

FEDERAL TRADE COMMISSION

TIME AND DATE: 3:00 p.m., Friday, March 6, 1987.

PLACE: Room 432, Federal Trade Commission Building, 6th Street and Pennsylvania Avenue, NW., Washington, DC 20580.

STATUS: Open.

MATTER TO BE CONSIDERED: Discussion of Commission Reauthorization.

CONTACT PERSON FOR MORE

INFORMATION: Susan B. Ticknor, Office of Public Affairs: (202) 326-2179, Recorded Message: (202) 326-2711.

Emily H. Rock,

Secretary.

[FR Doc. 87-5529 Filed 3-11-87; 12:12 p.m.]

BILLING CODE 6750-01-M

Corrections

Federal Register

Vol. 52, No. 49

Friday, March 13, 1987

This section of the FEDERAL REGISTER contains editorial corrections of previously published Rule, Proposed Rule, and Notice documents and volumes of the Code of Federal Regulations. These corrections are prepared by the Office of the Federal Register. Agency prepared corrections are issued as signed documents and appear in the appropriate document categories elsewhere in the issue.

ENVIRONMENTAL PROTECTION AGENCY

[OPP-180717; FRL-3156-7]

New Jersey Department of Environmental Protection; Receipt of Applications for Emergency Exemptions To Use Pursuit™; Solicitation of Public Comment

Correction

In notice document 86-3107 beginning on page 4961 in the issue of Wednesday,

February 18, 1987, make the following correction:

The first three lines in the first column on page 4962 should appear at the bottom of the second column on page 4961.

BILLING CODE 1505-01-D

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Food and Drug Administration

21 CFR Part 5

Delegations of Authority and Organization; Center for Food Safety and Applied Nutrition

Correction

In rule document 87-4065 beginning on page 5950 in the issue of Friday, February 27, 1987, make the following correction:

On page 5951, in the first column, in the authority citation for Part 5, the third

line should read "61-63, 141 et seq., 301-392, 467f(b), 679(b), 801 et seq.,".

BILLING CODE 1505-01-D

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Food and Drug Administration

[Docket No. 86N-0416]

Clinical Studies of Safety and Effectiveness of Orphan Products; Availability of Grants; Request for Applications

Correction

In notice document 87-24 beginning on page 360 in the issue of Monday, January 5, 1987, make the following correction:

On page 360, the Docket No. should read as it appears in the heading of this document.

BILLING CODE 1505-01-D

The first part of the paper is devoted to a general discussion of the problem of the origin of life. It is shown that the problem is one of the most important and interesting in the history of science. The second part of the paper is devoted to a detailed discussion of the problem of the origin of life. It is shown that the problem is one of the most important and interesting in the history of science. The third part of the paper is devoted to a detailed discussion of the problem of the origin of life. It is shown that the problem is one of the most important and interesting in the history of science. The fourth part of the paper is devoted to a detailed discussion of the problem of the origin of life. It is shown that the problem is one of the most important and interesting in the history of science. The fifth part of the paper is devoted to a detailed discussion of the problem of the origin of life. It is shown that the problem is one of the most important and interesting in the history of science. The sixth part of the paper is devoted to a detailed discussion of the problem of the origin of life. It is shown that the problem is one of the most important and interesting in the history of science. The seventh part of the paper is devoted to a detailed discussion of the problem of the origin of life. It is shown that the problem is one of the most important and interesting in the history of science. The eighth part of the paper is devoted to a detailed discussion of the problem of the origin of life. It is shown that the problem is one of the most important and interesting in the history of science. The ninth part of the paper is devoted to a detailed discussion of the problem of the origin of life. It is shown that the problem is one of the most important and interesting in the history of science. The tenth part of the paper is devoted to a detailed discussion of the problem of the origin of life. It is shown that the problem is one of the most important and interesting in the history of science.

Test Report Federal Register

Friday
March 13, 1987

Part II

Department of Energy

Office of Conservation and Renewable
Energy

10 CFR Part 430

Energy Conservation Program for
Consumer Products; Test Procedures for
Water Heater; Notice of Proposed Rule
and Public Hearing

DEPARTMENT OF ENERGY

Office of Conservation and Renewable Energy

10 CFR Part 430

[Docket No. CAS-RM-79-105]

Energy Conservation Program for Consumer Products; Test Procedures for Water Heaters

AGENCY: Office of Conservation and Renewable Energy, Department of Energy.

ACTION: Notice of proposed rule and public hearing.

SUMMARY: The Department of Energy (DOE) hereby proposes to amend its test procedure for water heaters. Test procedures are one part of the energy conservation program for consumer products established pursuant to the Energy Policy and Conservation Act as amended by the National Energy Conservation Policy Act.

DATES: Written comments (eight copies) in response to this notice must be received by May 12, 1987; the public hearing will be held on April 23, 1987; requests to speak at the public hearing by April 21, 1987. Copies of oral statements by noon on April 22, 1987.

ADDRESSES: Written comments, requests to speak at the public hearing, and eight copies of statements to: U.S. Department of Energy, Office of Conservation and Renewable Energy, Hearings and Dockets, Water Heater Test Procedure, Docket No. CAS-RM-79-105, Room 6B-025, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC 20585, (202) 586-9320.

The public hearing will begin at 9:30 a.m. and will be held at the following location: U.S. Department of Energy, Forrestal Building, 1000 Independence Avenue, SW., Room 1E-245 (1st Floor, E Corridor), Washington, DC 20585.

Copies of the transcript of the public hearing, and the public comments received may be viewed at or obtained from the DOE Freedom of Information Reading Room; Room 1E-190, 1000 Independence Avenue, SW., Washington, DC 20585, (202) 586-6020, 9:00 a.m. through 4:00 p.m.

FOR FURTHER INFORMATION CONTACT:

Michael J. McCabe, U.S. Department of Energy, Office of Conservation and Renewable Energy, Forrestal Building, Mail Station CE-132, 1000 Independence Avenue, SW., Washington, DC 20585, (202) 586-9127
U.S. Department of Energy, Office of Conservation and Renewable Energy, Hearings and Dockets, Forrestal

Building, Room 6B-025, 1000 Independence Avenue, SW., Washington, DC 20585, (202) 586-9320
Eugene Margolis, Esq., U.S. Department of Energy, Office of General Counsel, Forrestal Building, Mail Station GC-12, 1000 Independence Avenue, SW., Washington, DC 20585, (202) 586-9507

SUPPLEMENTARY INFORMATION:

I. BACKGROUND

On October 1, 1977, the Department of Energy (DOE) assumed the authority of the Federal Energy Administration (FEA) for the energy conservation program for consumer products, under Section 301 of the Department of Energy Organization Act (DOE Act) (Pub. L. 95-91). The energy conservation program for consumer products was established by FEA pursuant to Title III, Part B of the Energy Policy and Conservation Act (EPCA) (Pub. L. 94-163). Subsequently, EPCA was amended by the National Energy Conservation Policy Act (NECPA) (Pub. L. 95-619). References in this notice to the Act, or to sections of the Act, refer to EPCA as amended by NECPA. Among other program elements, Section 323 of the Act requires that standard methods of testing be prescribed for covered products, including water heaters. Test procedures appear at 10 CFR Part 430, Subpart B.

The water heater test procedure was prescribed by FEA by notice issued September 27, 1977, 42 FR 54110, (October 4, 1977). These original procedures coupled laboratory tests and calculations to obtain estimates of energy efficiency and annual energy consumption for storage type electric, gas and oil water heaters. The laboratory tests consisted of a "cold start recovery efficiency test," which measured the ability of a water heater to heat cold water, and a "standby loss test," which measured the energy loss of a water heater when not providing heated water. Recovery efficiency and percent standby loss are then mathematically combined in the calculations to obtain an energy factor, DOE's overall measure of water heater efficiency. Also, the original procedures included calculations for determining the annual consumption and annual operating costs. DOE amended the water heater test procedure by notice issued October 13, 1978 (43 FR 48986, October 19, 1978) in order to correct an error in the derivation of energy factor. DOE again amended the water heater test procedures by notice issued August 30, 1979 (44 FR 52632, September 7, 1979) in order to prescribe a "measure of a water heater's useful capacity called first hour rating", where useful capacity is the maximum hourly demand which

can be met by the water heater. It is emphasized here that up to this point in time, these procedures only addressed storage type electric, gas and oil water heaters. Other types of water heaters, i.e. instantaneous and heat pump type water heaters, had not entered the domestic marketplace.

By notice published in the Federal Register February 8, 1984 (49 FR 4870) (herein referred to as the 1984 proposal), DOE proposed to amend its test procedure for water heaters. DOE's objective was threefold: First, to extend coverage of the test procedure to heat pump water heaters, a relatively new water heater design not previously covered by the test procedure. Second, to add a method of testing to determine the first hour rating of water heaters equipped with thermal compensating dip tubes. Third, to make modifications to the test procedures that would yield more accurate determinations of energy efficiency and cost of operation for gas, oil and electric storage water heaters. At that time, DOE did not see a significant penetration into the marketplace by instantaneous water heaters consequently, they were not addressed in the 1984 proposal.

By notice published March 16, 1984 (49 FR 10071), DOE, on request of the water heater industry, extended the comment period 42 days and rescheduled the March 15, 1984, public hearing to April 26, 1984.

In comments received in 1984 and throughout 1985 numerous parties requested that DOE withdraw the 1984 proposal and wait until a more comprehensive proposal could be developed. Most notably, on October 2-3, 1985, DOE and the National Bureau of Standards (NBS) hosted a forum on testing and rating procedures for consumer products which was attended by manufacturers, utilities, States, and public interest groups. At the forum there was unanimous agreement that DOE should withdraw the 1984 proposal and initiate the development of a single test procedure method which would be applicable to all types of residential type water heaters (storage and non-storage). Today's notice reflects this consensus.

Today's proposal also addresses the matter of four test procedure waivers where four individual manufacturers of water heaters have received the allowance to test certain water heaters under modified test procedures. Today's proposal would extend these modifications to all manufacturers of similar designs and thereby would terminate the four individual waivers. The four waivers are: (1) A.O. Smith

Corporation for its gas water heaters equipped with thermal compensating dip tubes (47 FR 53942, November 30, 1982), (2) Bock Water Heaters Inc., for some models of water heaters with large thermal mass (50 FR 47106, November 14, 1985, modified 51 FR 21975, June 17, 1986), (3) Ford Products Inc., for some models of water heaters with large thermal mass (50 FR, 50678, December 11, 1985, modified 51 FR 18659, May 21, 1986), and (4) Lochinvar Water Heaters Inc., (51 FR 22966, June 24, 1986).

II. DISCUSSION

a. 1984 Proposal

As discussed above, the objective of the 1984 proposal was threefold: to extend coverage to include heat pump water heaters, to make modifications to existing test procedures, and to address the issue of thermal compensating dip tubes. The following discussion establishes to what extent the provisions and concepts of the 1984 proposal are retained in today's proposal.

1. Heat Pump Water Heater Test Procedure

Procedure

The most significant aspect of the 1984 proposal would have been the establishment of a test procedure for a new type of water heater called a heat pump water heater. As its name implies, a heat pump water heater utilizes a heat pump, a mechanical refrigeration unit consisting of a compressor, condenser, expansion device and an evaporator, to heat water. The heat pump extracts heat energy from its surroundings, boosts it with electromechanical energy, and delivers the total heat energy to water stored in a storage tank connected to the domestic hot water supply system of a household.

Heat pump water heaters can be classified into two categories: those with storage tanks and those without storage tanks. Heat pump water heaters with storage tanks are intended for use as sold to meet the hot water demands of a household. Heat pump water heaters without storage tanks are intended to be used in conjunction with a separate storage tank which must be supplied by the consumer. In actual usage, there will be no functional difference between these two categories of heat pump water heaters. Both consist of a heat pump unit and a storage tank, be it supplied with the heat pump unit or not.

The 1984 proposal included definitions of "heat pump water heater with storage tank" and "heat pump water heater without storage tank". The definitions would insure that any heat pump water

heater that is supplied with a storage tank by the manufacturer, whether as an integral unit or an assembly, shall be tested with that particular storage tank, and that any heat pump water heater without storage tank shall be tested with a standard test storage tank.

Today's proposal includes the identical definitions and provisions except that the specification for the "standard test storage tank" has changed. This change in the specification is in response to received comment and is discussed below in section II.d.8.

The method of test established in the 1984 proposal for heat pump water heaters was significantly different than that already in place for other water heaters. Specifically, DOE determined that since the energy consumption of a heat pump water heater is so dependent on the magnitude of various temperatures at various times, the existing test method of "cold start recovery" and separate standby loss test is inappropriate and a "simulated use" test method is the best means to determine the efficiency and annual operating cost of heat pump water heaters. Today's proposal maintains the "simulated use" test method for heat pump water heaters except that the test format (draw schedule) is changed from that proposed in the 1984 proposal. (The change in the test format is discussed below in section II.c.2.).

In addition, the 1984 proposal established national average operating conditions for heat pump water heaters. These conditions, which are used as the basis for calculating the energy consumption, include the following: inlet water temperature, stored water temperature, room ambient air temperature, and daily water usage. It was DOE's intent to be as consistent as possible with the existing provisions for gas, oil and electric water heaters and still provide a fair basis of comparison for heat pump water heaters. Consequently, the 1984 proposal established that the existing provisions of inlet water temperature (55 °F), stored water temperature (145 °F), and daily usage (64.3 gallons per day) would be applicable to heat pump water heaters. A room ambient air temperature of 65 °F for heat pump water heaters versus 55 °F for all other water heaters, would be the only difference between the operating conditions of the two types of water heaters in the 1984 proposal. Today's proposal extends this policy of consistency even further than the 1984 proposal. Specifically, the operating conditions in today's proposal are identical for all types of water heaters. The development of each of these uniform conditions is discussed below.

Also included in today's proposal are the 1984 proposal's testing and rating provisions regarding heat pump water heaters without a storage tank. Specifically, the 1984 proposal required this category of heat pump water heater to be connected to a representative storage tank when conducting the laboratory tests. The representative storage tank was specified as a typically sized electric water heater with a typical standby loss. The 1984 proposal maintained that instances of heat pump water heaters without a storage tank being connected to other than electric storage type water heater is very unlikely and that the range of performance differences of various electric storage type water heaters is so small as to justify the single test with a representative electric water heater. Only a slight difference in the specification of this standard storage type water heater resulted from the received comments. (See section II.d.8 of today's notice).

2. 1984 Proposed Changes to Existing Test Procedures for Storage Type Water Heaters

In order to avoid the burdens of retesting, the 1984 proposal did not include any significant changes to the provisions already in place for storage type electric, gas and oil water heaters. Thus, the 1984 proposal essentially maintained the existing procedures except that some changes involving the first hour rating test and heat traps provisions were included.

Two changes were proposed in 1984 regarding the first hour rating test: (1) The water draw rate for the first hour rating water draw test was changed from 5.0 gallons per minute, which represents severe conditions of household usage, to 3.0 gallons per minute, which represents a more typical demand flow rate, and (2) The temperature adjustment ratio, a factor in the calculation for first hour rating, was slightly modified to correct an error in the existing calculations for first hour rating.

Today's proposal would provide for a first hour rating test for all types of water heaters including non-storage type water heaters. With this larger perspective DOE now does not see the need to change 5 gallon per minute flow rate specification in the first hour rating test as was proposed in 1984 for storage type water heaters. DOE believes that the first hour rating should be based on severe conditions of household usage (5 gallons per minute) rather than the typical demand (3 gallons per minute). A large factor contributing to DOE's

current position on this matter is today's proposal regarding instantaneous water heaters, where the first hour rating is determined by adjusting the actual flow rate to a flow rate of 5 gallons per minute (See section II.c.1 below). The purpose of this adjustment is to normalize the utility of an instantaneous water heater, which may have a limited ability to deliver hot water at a high flow rate, to the utility of a storage water heater which can deliver some amount of hot water at any flow rate.

Logically, DOE believes the adjustment to determine first hour rating for instantaneous water heaters and the draw rate of the first hour rating test for storage type water heaters should be the same, and further, this rate should be reflective of severe conditions of household use. Accordingly, today's proposal maintains the existing test procedures 5 gallon per minute flow rate in the first hour rating draw test instead of the 3 gallon per minute flow rate proposed in the 1984 proposal.

DOE received no adverse comment regarding the 1984 proposal to correct the temperature ratio adjustment factor in the first hour rating equations for storage type water heaters, and therefore, is including in today's proposal the correction for temperature ratio adjustment factor. Accordingly, where the existing test procedure incorrectly adjusts for the energy content of withdrawn water by using the ratio of the mean draw temperature over the initial outlet temperature, today's proposal would adjust the withdrawn water by using the ratio of the mean temperature difference between the withdrawn water and the surrounding air over the initial temperature difference between the heated water and the surrounding air.

The 1984 proposal also eliminated the heat trap energy saving credits found in the existing test procedure. This was done because the installation instructions included in the 1984 proposal clarified the test set-up provisions such that the fixed credits were no longer needed. Specifically, the 1984 proposal would have allowed testing with heat traps only if the heat traps are an integral part of the water heater and such testing would be reflective of the energy savings contribution of heat traps. Today's proposal continues this concept; however, some additional changes are proposed for the installation provisions as a result of received comments (See section II.d.16).

3. Waivers

Finally, the 1984 proposal addressed the matter of a test procedure waiver

granted to A.O. Smith Corporation (A.O. Smith). 47 FR 53942, (November 30, 1982). A.O. Smith received allowance to conduct the first hour rating test at lower tank temperature (145 °F) than the elevated temperature (160 °F) of the existing test procedures when testing its water heaters equipped with thermal compensating dip tubes. The 1984 proposal would have defined the term "thermal compensating dip tube" and would have allowed the provisions granted A.O. Smith to all manufactures which test water heaters equipped with thermal compensating dip tubes. Today's proposal eliminates all testing provisions requiring elevated temperatures, and thus there is no need in today's proposal to address the issue of thermal compensating dip tubes. However, since today's proposal would solve the testing problems associated with thermal compensating dip tubes, the resulting final rule would terminate the A.O. Smith waiver.

b. A Single Test Method for All Designs of Water Heaters

An important aspect of the 1984 proposal was DOE's position that a new and different test method (i.e. simulated use test method) was required for heat pump water heaters. Further, the 1984 proposal held that in consideration of the burden of retesting, requiring this new test method for all types of water heaters was not justified. Consequently, the 1984 proposal maintained the existing "cold-start recovery/separate standby loss" test method for non-heat pump water heaters. Substantial comment was received regarding this position. See II.b.1 below. DOE believed it inappropriate to make a decision on this issue until further comment was received. Subsequently, DOE sought to develop a consensus position regarding this issue. Specifically, by means of a public forum hosted by DOE and the National Bureau of Standards (NBS), DOE was given a clear expression of need from the water heater industry. Basically the forum attendees recommended that DOE should initiate the development of a single test procedure, a simulated use test method, which would be applicable to all types of residential type water heaters, and that the burden of retesting is justified. DOE agrees with this position and accordingly is proposing a uniform test procedure that addresses all types of water heaters and is withdrawing the 1984 proposal.

1. 1984 Proposal Discussion of Comments Regarding Test Method/Methods

Six commenters indicated in various ways that all water heaters should be tested using the same test method, regardless of the energy source or type of water heater.

DEC International Inc. (DEC International), a manufacturer of heat pump water heaters, asserted that if the existing DOE test procedure for water heaters is inappropriate for testing heat pump water heaters because it does not simulate usage, then it must be inappropriate for testing gas and oil water heaters for the same reason. DEC International agrees that heat pump water heater performance will be different under a cold start test versus a simulated use test and that even the size of the water draw of the simulated use test would affect the efficiency of heat pump water heaters; but, DEC International contends that the same is true of gas and oil water heaters. DEC International claims that the statement made by DOE in its 1984 proposal notice that the efficiencies of gas, oil and electric storage water heaters are nearly the same regardless of the temperature of the water being heated is "certainly not sufficient" to justify the DOE proposal. (DEC International, No. 1, at 1.)¹

A.O. Smith, a water heater manufacturing firm, expressed the concern that the use of different procedures for testing heat pump water heaters versus other types of water heaters would seem to be contrary to one of the labeling program's objectives, i.e., that the consumer would be able to make legitimate comparisons between options. With inconsistent test approaches, it would seem that the consumer could be misled when comparing heat pump water heaters with other water heaters. A.O. Smith further questioned whether DOE had data to show that results of testing storage water heaters with the simulated use test provides comparable data to the current water heater test procedure. Without such data, A.O. Smith believes it would be ill-advised to

¹ Comments on the rulemaking were given docket numbers. For comments submitted in writing, citations provide the name of the organization, firm or person who made the comment, the docket number assigned to the comment, and the page on which the comment is found in the commenter's submittal. For comments made in oral presentations at public hearings, citations provide the name of the organization, firm or person represented by the person making the presentation, the date of the public hearing, and the page number of the official transcript of the public hearing where the comment is found.

adopt the 1984 proposed rule. (A.O. Smith, No. 2, at 1.)

Mr. W.H. Stephenson stated that all water heaters should be tested in exactly the same manner no matter what their energy source may be because it is extremely important to have test procedures that are a common standard in the industry. (Stephenson, No. 11, at 1.)

The Natural Resources Defense Council, Inc. (NRDC), a non-profit environmental organization, stated that heat pump water heaters differ from other electric water heaters only in their greater efficiency; they have no distinguishing differences in performance, utility, or convenience features. However, NRDC agrees with DOE's reasoning concerning the inappropriateness of a cold start test for recovery efficiency for heat pump water heaters since actual water heater recovery operation in the field will occur over a small range of water temperatures ending with the thermostatically controlled temperature setting of the water heater. NRDC stated that DOE properly notes that for testing convenience, the cold start procedure is a good approximation for non-heat pump water heaters, but that heat pumps must use a more realistic water draw procedure for measuring recovery efficiency. The 1984 proposed procedure, in which one-third of the daily water use is withdrawn at a time, seemed reasonable to NRDC. Finally, NRDC commented that given the philosophy DOE has pursued elsewhere in its rule, it would be more logical to specify the simulated use test procedure for all types of water heaters. (NRDC, No. 13, at 1 and 4.)

Amtrol, Inc. (Amtrol), a manufacturer of heat pump water heaters, stated that the DOE test approach for measuring the recovery efficiency and standby loss of all water heaters should be the same; otherwise, the consumer will not have a common base upon which to compare different types of water heaters. (Amtrol, No. 14, at 1.)

The Gas Appliance Manufacturers Association (GAMA) stated that the primary value of a water heater efficiency test method is to allow for relative comparisons of various models and various types of water heaters, and that it is of paramount importance that all water heaters be tested, and as much as practically possible, on the same basis. That is, all water heaters should be tested using similar test methods and under similar installation and usage conditions. GAMA contends that a test method which only allows for the comparison of models of the same type of water heater, but does not allow for

the comparison of models of different types of water heaters using different fuels, is inappropriate and is inferior to a test procedure which tests water heaters on a common basis. (GAMA, No. 19, at 3; and April 26, 1984, at 12.)

DOE believes the commenters have made a good case for using the same test approach for all types of water heaters. Their arguments are logical on the basis that the output of all water heaters is the same, namely, hot water. Therefore, DOE is today proposing to amend the water heater test procedures to require all water heaters to be tested using the same test approach.

2. Justification of "Simulated Use" Test Method for All Water Heaters

Today's proposal would prescribe the "simulated use" test method for all designs of water heaters, for the following reasons:

(1) Heat pump water heaters cannot be evaluated fairly under the existing test method and as a consequence a different test method is needed for at least this design of water heater.

(2) A "simulated use" test method has been shown to be appropriate for heat pump water heaters and any other type of water heaters including storage water heaters.

(3) Instantaneous water heaters operate only when a draw of water is made and thus "simulated use" test method is the logical test method for this type of water heater.

(4) All interested parties known to DOE, including the water heater manufacturers, desire a consistent test method across all designs of water heaters regardless of retesting burden.

Therefore, in consideration of all of the above, today's proposal would include the "simulated use" test method for all water heaters.

c. Additional Issues and Concepts of Today's Proposal

1. Instantaneous Water Heaters

Today's proposal includes testing and rating procedures for a type of water heater which has not been addressed in previous DOE test procedure rulemakings, namely "instantaneous" type water heaters. These types of water heaters differ from storage type water heaters in that they heat water on demand as opposed to storage type water heaters which heat and store water in anticipation of demand. These designs have recently appeared in the marketplace and are most distinguishable from storage type water heaters by their lack of an appreciable stored volume of heated water. Consequently, today's rule would define

an instantaneous water heater as a residential water heater with less than 20 gallons of storage capacity, where 20 gallons is the lower limit of storage water heaters already covered in the test procedures.

Since the "simulated use" test method is well suited for the testing of all types of water heaters, extending the coverage of DOE test procedures to include instantaneous type water heaters is a relatively straightforward matter. In fact, most of the provisions and calculations apply to all types of water heaters, and as a consequence, separate provisions and calculations are not generally needed for instantaneous water heaters.

One exception to this uniformity involves the calculation of first hour rating, the test procedure measure that describes the useful capacity of a water heater. For storage type heaters, today's notice continues the provisions of the existing test procedures where the useful capacity is determined by actual testing including drawing water from the tank, whereas, for instantaneous water heaters, which have no tank, today's notice provides a method of estimating an equivalent first hour rating by adjusting the volume of 135 °F water which an instantaneous heater can deliver in a one hour period. The adjustment relates the flow rate of an instantaneous water heater to a flow rate of 300 gallons per hour. The purpose of the adjustment is to equalize the basis of capacity comparisons between instantaneous and storage type heaters. In other words, since a storage type water heater can deliver some amount of hot water at any flow rate, DOE believes the hourly capacity (first hour rating) of an instantaneous water heater should be adjusted relative to the rate at which the instantaneous water heater can deliver this water. DOE chose the 300 gallons per hour rate as representative of the upper limit of flow rates that may be desired in a household (e.g., 300 gallons per hour is typical of hot water fill demands of clothes washers and dishwashers).

An example of the procedure to determine the first hour rating of an instantaneous water heater would be as follows: (1) The heater is tested and determined to have a recovery rate of 2 gallons per minute (120 gallons per hour), where recovery rate is the flow rate at which the heater can provide 135 °F water. (2) The first hour rating is then determined by multiplying the recovery rate (120 gal/hr) times the ratio of the recovery rate (120 gal/hr) over 300, the resulting product being 48 gallons. The implication of this adjustment is that

DOE believes an instantaneous water heater which can deliver hot water at a rate of 2 gallons per minute is roughly equivalent in utility to a storage water heater with a first hour rating of 48 gallons. In this example the adjustment is downward because the instantaneous water heater of this flow rate cannot provide hot water at a flow rate that might be expected at sometime during typical household usage.

In summary, DOE believes today's proposal would provide for fair and accurate representations of the efficiency and energy consumption of instantaneous type water heaters. NBS has tested a number of instantaneous type water heaters using the "simulated use" test method of today's proposal, and has not reported any technical difficulties. DOE is interested in receiving comments on these procedures, particularly comments that report testing experience in using today's proposed procedures.

2. Format of Simulated Use Test (Draw Schedule)

The 1984 proposal introduced the "simulated use" test method for the first time in DOE water heater test procedure matters. As the name implies this test method attempts to simulate in the laboratory the conditions of operation which a water heater is likely to experience in a home. Ideally, this laboratory test should simulate the operation of a water heater through a typical 24-hour period, by including a large number of water draws of differing quantities of water, occurring at various times throughout a 24-hour period. The test format, sometimes referred to as draw schedule, could be developed from field reports which reflect the monitoring of residential water heater installations. Such draw schedules have been developed and compared to less complicated draw schedules to determine the effect of draw schedule on energy efficiency measures. NBS found that the energy efficiency of heat pump water heaters is relatively insensitive to the hot water draw schedule employed in a simulated use test, so long as the same total volume of hot water was withdrawn over the same period of time. Consequently, the 1984 proposal specified a simulated use test for heat pump water heaters which was 24 hours in duration beginning with three equal water draws conducted in succession and ending with a standby loss test for the remainder of the 24-hour period. An advantage of this proposed format is that the testing could be started and all of the water draws completed within a standard 8-hour workday and the unit could be left to

operate unattended for the remaining portion of the test. This represents a reduced testing burden when compared to a draw schedule which requires water draws throughout a 24-hour period.

Since the time of the 1984 proposal, DOE has directed NBS to investigate the effect of test format including draw schedule on the measured efficiency of all types of water heaters. The results of these efforts showed that, as with heat pump type water heaters, the energy efficiency is relatively insensitive to the test format and the hot water draw schedule. As a consequence, today's proposal does not expand the test procedures to model a 24-hour period but rather the general format of the 1984 proposal for heat pump water heaters is proposed for all water heaters. That is, a draw period, which can be conducted in a 8-hour workday, is followed by a standby loss test for the remainder of a 24-hour test period. However, since the NBS work did not include all the possible designs of water heaters available today and could not include future designs of water heaters, DOE believes it prudent to propose a draw test which is as reflective of household usage as possible and still can be conducted in an 8-hour workday. Therefore, today's proposal includes in the draw portion of the simulated use test a draw schedule which would require six equal draws of water. DOE believes this draw schedule is more reflective of household usage than the three equal draws of the 1984 proposal for heat pump water heaters because the six equal draws are more representative of water draw volumes that occur during typical daily usage.

DOE is interested in comments relating to test format and draw schedule, particularly comments that include test data.

3. Assigned Usage Rates

Today's proposal includes a new concept of assigned usage rates for different sized water heaters. This concept is discussed below in conjunction with the comments on the 1984 proposal concerning usage rates (See section II.d.3).

4. Effective Date

In consideration of the retesting that would be required by today's proposal and in consideration of conflicting ratings, DOE is proposing that use of the current and new test procedure be allowed from the publication date of the final rule and to continue for a period of six months, at which time only the new test procedure can be used.

5. Test Procedure Waivers Since the 1984 Proposal

Since the time of the 1984 proposal, three manufacturers of water heaters filed petitions for and were granted test procedure waivers with regard to their models of water heaters with high thermal mass. (Federal Register citations are included in the Background section of this notice).

These waivers allow the manufacturers to test their high thermal mass models using the simulated use test method. Since today's proposal would allow testing of all types of water heaters using the simulated use method, today's proposal would constitute the termination of all three waivers. This action is in accordance with the expiration provision in each test procedure waiver granted by DOE.

6. "Off Peak" Storage Type Electric Water Heaters

Several electric utility industry representatives have asked DOE to consider the inclusion of "off peak" storage type electric water heaters into the DOE test procedures. These water heaters, sometimes referred to as "controlled" water heaters, incorporate a control mechanism which deactivates the energy supply for some predetermined period each day. These heaters are of two types, those under direct control by electric utilities and those not under direct control. Direct control is achieved by communicating the control of the consumer's water heater to the electric utility. The communication is done by the use of radio transmission or direct wiring. Nondirect controlled water heaters would include a device at the water heater, which would implement the deactivation of the energy supply.

The primary benefit of "off peak" storage type water heaters is their positive effect on a given utility's peak load management. As a consequence, many utilities offer a financial incentive to consumers who have "off peak" storage water heaters.

A second benefit of controlled water heaters is that they consume less energy than identical water heaters without these controls. Specifically, if a deactivation period of significant length is imposed on the daily cycle of a water heater, the standby loss, a component of DOE energy factor, is reduced. With this increase in energy efficiency, a corresponding reduction in energy consumption results. Since the existing and proposed test procedures model the daily energy consumption of a water heater without such controls,

improvement in energy performance for controlled water heaters would not be reflected in the test results. The electric utility industry realizes that improvements in energy efficiency do not describe completely the benefits of this technology; however, industry believes recognition in the DOE efficiency test procedures would greatly improve the available information regarding this technology.

DOE has formulated a procedure which provides for alternative energy factors and energy consumptions calculated from laboratory tests where the tests include the deactivation periods. These separately determined measures of energy consumption, Controlled Energy Factor (CEF) or Controlled Energy Consumption (CEC) could be delineated under § 430.22(e)(3).

DOE believes it is appropriate to restrict the use of this alternate procedure only to those electric water heaters that are best suited for this type of control, i.e., electric water heaters with high storage volumes and low standby losses.

DOE requests comments on whether these alternate measures of energy use under § 430.22(e)(3) should be added for water heaters operating as "off peak" water heaters. Specifically, DOE is interested in receiving comments regarding the desirability of incorporating these measures into the test procedures and including any restrictions.

d. Comments on The 1984 Proposal

1. Repeatability and Reproducibility of Simulated Use Test Method

As mentioned above, today's proposal not only would require the simulated use test method for heat pump water heaters as proposed in 1984, but also would require the simulated use method for all types of water heaters. DOE maintains that the repeatability and reproducibility of today's proposed simulated use test is sufficient for the purposes of the program.

In commenting on the 1984 proposal, GAMA stated that any efficiency test procedure cannot accurately estimate the actual energy consumption, or cost of operation, for all the varying installation and usage conditions which occur. GAMA concludes that the primary value of an efficiency test procedure is to provide a reasonable comparative estimate of a product's efficiency and/or cost of operation under prescribed installation and usage conditions. GAMA states that to maximize the value of a comparative estimate of efficiency, a test procedure must have a high degree of repeatability

and reproducibility. Further, in order to insure the validity of comparisons of estimated efficiencies, the inherent variances in any test procedure must be minimized so that differences in efficiencies will be reflective of differences in the design of the models being compared, and not due to test tolerances. GAMA contends that in developing any test procedure there is a need for compromise between scientific accuracy and repeatability and the desire to provide a measure of efficiency which will be reflective of the efficiency achieved in actual usage. GAMA stated that since the primary value of an efficiency test procedure is the establishment of a relative scale for comparing models, the need to simulate field usage installation conditions should be subjugated to the need for scientific accuracy and repeatability. Having established this philosophy for developing test procedures, GAMA went on to cite deficiencies in the procedures and results of tests conducted at NBS and which DOE used as a basis for identifying the simulated use test methodology as best for heat pump water heaters. GAMA cited lack of control of ambient conditions, specifically room temperature and relative humidity, as a major shortcoming of the tests conducted. GAMA also cited the standard deviation in the test results as being excessive (6 percent of the average value of energy factor for unit "A" and 9 percent of the average value for unit "B"). GAMA cited the low repeatability exhibited by these test results as reason to question seriously the viability of the simulated use test approach. (GAMA, No. 19, at 2, 10, 11, 12 and 13).

In response to GAMA's comments, DOE directed NBS to perform additional tests on the heat pump water heaters under controlled ambient conditions to evaluate the repeatability of the simulated use test methodology. (This test program also was instituted to address comments that the relative humidity specification in the 1984 proposal for the simulated use test permitted too broad a tolerance, contributing to test variability). The results of this test program support the need for tighter controls on ambient conditions, specifically relative humidity, for testing heat pump water heaters by the simulated use test. With such tighter controls, the repeatability of the test results for the simulated use test is high. To compare, the standard deviation for test unit "A" was 2.1 percent of the average value of energy factor (five tests conducted) and was 0.7 percent of the average value of energy

factor for test unit "B" (three tests conducted).

As a consequence of this cooperative test program, DOE is proposing in today's notice tighter control of humidity when testing heat pump water heaters. However, in consideration of testing burden and because little effect was found, today's proposal would not require tighter controls on ambient testing conditions for other designs of water heaters.

2. Thermostat Temperature Setting and Stored Water Temperature for Storage Type Water Heaters

Today's proposal would establish that all storage type water heaters be tested at a thermostat temperature setting of $135^{\circ}\text{F} \pm 5^{\circ}\text{F}$ and that for the purpose of calculating energy factor and energy consumption the stored water temperature is to be as measured in the test.

In response to the 1984 proposal only one comment was received (California Energy Commission, No. 8, at 1) which supported DOE's proposal that all water heaters be tested at a thermostat setting of 145°F . Thirteen commenters disagreed with the use of an actual or simulated thermostat setting of 145°F for testing heat pump water heaters and/or for testing of gas, oil and electric storage water heaters.

DEC International stated that many manufacturers of heat pump water heaters produce units with maximum thermostat settings of 145°F . DEC recommends a thermostat setting of 135°F for testing heat pump water heaters. (DEC International, No. 1, at 2).

Central Power and Light Company (Central Power and Light), a utility company serving the southern area of Texas, commented that a 145°F thermostat setting is far from reality in its service area. Central Power and Light has encouraged its customers to use a 120°F thermostat setting for years. Central Power and Light contends that testing heat pump water heaters at a thermostat setting of 145°F would be grossly inaccurate and misleading. (Central Power and Light, No. 5, at 2.)

South Carolina Electric and Gas Company (SC Electric and Gas), citing active participation in evaluating heat pump water heaters, recommended that they be tested at a thermostat setting of 130°F for energy savings, product life, and thermostat design reasons. (SC Electric and Gas, No. 6, at 1.)

Borg-Warner Central Environmental Systems, Inc. (Borg-Warner), a manufacturer of heat pump water heaters, suggested that unless specified differently by the manufacturer, the

thermostat setting for testing heat pump water heaters should be 140 °F ± 3 °F. (Borg-Warner, No. 7, at 1.)

Mr. Robert E. Cook, a retired Director of Engineering of a major water heater manufacturer speaking on his own behalf, commented that the great majority of newly manufactured residential electric water heaters leave the factory with their thermostats preset at a temperature setting of between 135 °F and 140 °F. He also commented that the "normal" indicator on the temperature control knob of gas water heater thermostats will reflect a 140 °F water temperature setting. (Cook, No. 9, at 2.)

Florida Power Corporation (Florida Power), an electric utility company, commented that the requirement of a thermostat setting of 145 °F for heat pump water heaters represents an unnecessary tax on the efficiency and reliability of compressors used in this application. Florida Power recommended that the outlet water temperature for heat pump water heaters be 120 °F since this is the temperature at which most hot water is used in homes. Florida Power also recommended that other types of water heaters be tested to simulate a field thermostat setting of 120 °F since this would be representative of hot water temperatures presently used, recommended, and sometimes legally required. (Florida Power, No. 12, at 2 and 3.)

NRDC recommended that the water storage temperature be revised downward to 135 °F since temperature setback of thermostats has been recommended as a conservation measure since at least the mid-1970's. NRDC remarked that utilities recommend that the temperature be set no higher than 140 °F and only then if the homeowner has a dishwasher. For households without a dishwasher, recommended thermostat settings are 120 °F. A further reason for a 135 °F setting, according to NRDC, is that the efficiency of heat pump water heaters declines as the temperature of the stored water increases from 130 °F to 150 °F. NRDC contends that the higher (145 °F) temperature in the test procedure will encourage manufacturers to improve the performance of their products at maintaining the higher water temperatures, which is likely to be an inefficient use of their resources. Finally, NRDC stated that if data on water temperature were to be collected from surveys, it would more likely support NRDC's recommended test temperature of 135 °F than the proposed test

temperature of 145 °F. (NRDC, No. 13, at 4.)

Amtrol recommended that a thermostat setting of 135 °F be established for all water heaters due to the trend of lowering thermostat settings to prevent scalding. (Amtrol, No. 14, at 1.)

E-Tech, a heat pump water heater manufacturer, suggested that the final mean tank temperature should be 135 °F ± 3 °F. It was stated that the unnecessarily high value of 145 °F is beyond the performance capability of most of the current models of heat pump water heaters and is above the 140 °F maximum temperature recommended by both water heater manufacturers and most government agencies. If the test procedure requires testing at 145 °F, E-Tech predicts that manufacturers will design heat pump water heaters to achieve the highest efficiency rating when heating to 145 °F. When these units are then placed in the field and operated at 135 °F, E-Tech said they will be operating off of their design point, resulting in a very significant loss in energy savings on a national basis. (E-Tech, No. 15, at 2.)

Edison Electric Institute (EEI) commented that a 145 °F thermostat setting specification is inappropriate since the vast majority of homes use hot water at less than 140 °F and many use hot water below 120 °F. The proposed thermostat setting specification of 145 °F for heat pump water heaters would also represent an unnecessary burden on the efficiency and reliability of the units' compressors. EEI further stated that additional field data are required to verify the assumptions used by DOE in the test procedure since the data DOE used is statistically inadequate to provide a reliable assumption. EEI stated that the electric utility industry has for more than 10 years distributed massive amounts of informal literature and contacted millions of customers explaining the benefits of and the procedure for reducing water heater thermostat settings to 120 °F. Surveys in post-Residential Conservation Service (RCS) audits in Oklahoma and Wisconsin revealed that 70-80 percent of the customers had water temperatures below 140 °F. Finally, EEI stated that in some States—such as California and Florida—145 °F is beyond the range of normal water heater temperature settings and should be reduced to a temperature representative of hot water temperatures presently used, and suggested a thermostat setting of 120 °F. (EEI, No. 18, at 2 and 3.)

Southern California Edison Company (Southern California Edison), an electric

utility company, indicated its concern that the temperature setting used may not be representative of typical operational practices. Southern California Edison remarked that over the last several years it has recommended that consumers set their heat pump water heater thermostats at 120 °F or 140 °F, depending on whether a dishwasher is present, rather than at the 145 °F setting of the proposed test procedure. In addition, Southern California Edison claimed that most manufacturers of heat pump water heaters with storage tanks recommend a setting of 140 °F only if a dishwasher is present. Southern California Edison is concerned that the use of a 145 °F temperature setting for test purposes will yield results that are not representative of consumer usage. Southern California Edison recommended that the test temperature setting be lowered from 145 °F to 140 °F. (Southern California Edison, No. 20, at 1.)

Sears, Roebuck and Company (Sears) believes the proposed 145 °F thermostat setting for heat pump water heaters is too high. Sears commented that many heat pump water heaters manufactured today cannot attain water temperatures that high. Sears observed that both the proposed Air Conditioning and Refrigeration Institute Standard and Gas Appliance Manufacturers Association Standard for testing heat pump water heaters specify 135 °F as the temperature setting for test purposes. Sears recommended that 135 °F be adopted by DOE as the temperature setting for testing heat pump water heaters because it is more indicative of actual consumer usage. (Sears, No. 21, at 1.)

At the public hearing on the 1984 proposal and in written comments, GAMA commented that the present safety standards for gas residential storage type water heaters specify that the water heater leaves the factory with the thermostat set at its lowest setting and also includes instructions to the homeowner to set the thermostat at a setting consistent with a water temperature of 130 °F. The safety standard for electric residential storage type water heaters specifies that the water heater be factory set at a thermostat setting of 140 °F. In view of this trend towards lower water heater thermostat settings, GAMA requested that consideration be given to revising the test procedure to specify a thermostat setting of 135 °F. (GAMA, April 26, 1984, at 13 and 14; and No. 19, at 14.)

With regard to heat pump water heaters, commenters provided convincing arguments that consumers use a lower thermostat setting than 145 °F. A number of considerations raised by commenters point to this, including: consumer response to the advice of utility companies and public service organizations to reduce water heater thermostat settings to save energy and reduce the hazard of scalding; characteristics of current heat pump water heater designs which are optimized for operation at thermostat settings below 145 °F; and industry standards pertaining to water heater temperature controls which are likely to lead to lower thermostat settings in actual usage.

DOE also considered that, with the purchase price of heat pump water heaters running at two to three times that of a conventional storage water heater, consumers who purchase heat pump water heaters do so in recognition of their energy savings potential. DOE considers it reasonable that such consumers are likely to operate them in accordance with the manufacturer's recommendations in order to realize these potential energy savings. Since it appears that all heat pump water heater manufacturers advise that their units be operated at thermostat settings below 145 °F, DOE expects most heat pump water heater users will abide by this advice.

For these reasons, DOE accepts the thermostat setting specification of 135 °F recommended by the majority of commenters for testing heat pump water heaters. Today's proposal would require that heat pump water heaters be tested at a thermostat setting of 135 °F $\pm$ 5 °F and today's calculations would assume a thermostat setting of 135 °F.

In addition, DOE and NBS have studied thermostat setting for all types of storage water heaters since the time of the 1984 proposal. Specifically, in a report entitled "A Review of Energy Use Factors for Selected Household Appliances", NBSIR 85-3220, August 1985, NBS concluded that a 135 °F thermostat set-point would be a more appropriate assumption for all types of water heaters currently produced. DOE agrees and is defining, in today's proposal, that for calculation purposes, 135 °F is the assumed thermostat set-point for all storage type water heaters.

Further in the interest of consistency, today's proposal specifies that all storage type water heaters be tested at a thermostat setting of 135 °F $\pm$ 5 °F. This represents a change from the existing provisions for non-heat pump storage water heaters which specify an elevated thermostat setting of 160 °F when

conducting tests. This setting was required to maintain a specified temperature difference during the test without possibly requiring cooling of the supply water. Because of the change in the supply water specification, discussed below, and because of the increase in testing sophistication demonstrated by those testing water heaters, DOE does not now perceive a need to maintain the elevated thermostat setting provisions. Consequently, today's proposal would require 135 °F $\pm$ 5 °F tank temperatures to be maintained in the actual laboratory testing of all storage type water heaters.

3. Daily Hot Water Usage

Today's proposal would establish four daily hot water usage rates in the procedures. Depending on the capacity, a given water heater model would be assigned one of the four rates for the purposes of efficiency testing and energy consumption calculations. The four rates are 20, 40, 60, 80 gallons per day where the large majority of water heater models would be assigned the new national average of 60 gallons per day.

In response to the 1984 proposal three comments were received on the established average daily hot water usage of 64.3 gallons per day.

DEC International indicated it believes that 75 gallons per day is a more realistic value because of increased use of automatic clothes washers and automatic dishwashers. (DEC International, No. 1, at 1.)

Florida Power indicated that the 64.3 gallons per day of hot water usage is far in excess of that determined for apartment households in a nationwide test metering project jointly conducted by ASHRAE and EEL. Statistical sampling of energy use by water heaters in the Florida Power service area shows that less than 5% of water heaters would use the energy projected by the temperatures and volume of water used in the DOE test. Florida Power resubmitted data obtained from separately metered electric water heaters which had previously been submitted under DOE's first rulemaking in 1977 to adopt a test procedure for water heaters. (Florida Power, No. 12, at 2.)

NRDC commented that the use of 64.3 gallons of hot water per day per household is inappropriate because it is based on the water consumption of a family of four, whereas actual household size has declined to less than three. NRDC contends that there are no objective data supporting the use of a family of four as the basis for this test

procedure: It is neither average, typical, nor representative. In 1980, for example, families of four were less prevalent than families of either one, two, or three, and the average household size was 2.75. Average household size has been declining steadily and has not been as high as four since the early 1930's. Thus, NRDC contends, it is likely to decline further by the time this test procedure is effective. Projected household size for 1985 should therefore be the basis for hot water use in the test procedure. NRDC included, as an appendix to its written comment, a detailed analysis of daily hot water consumption which NRDC says clearly shows that current hot water usage is on the order of 25-40 gallons per day. NRDC also cited deficiencies in the data from which DOE originally obtained the 64.3 gallons per day estimate. (NRDC, No. 13, at 3 and 7.)

DOE and NBS have studied daily hot water usage since the time of the 1984 proposal and comment period. Specifically, in a report entitled "A Review of Energy Use Factors for Selected Household Appliances," NBSIR 85-3220, August 1985, NBS evaluated various studies available on the issue. NBS concluded that "in weighing all of the studies together, . . . the 64.3 gallons per day factor for a national hot water usage may be an upper limit and a lower value may be more representative."

During the process of studying this issue, DOE and NBS have developed a test procedure improvement that does not require determining a single average daily usage. The improvement is based on the proposition that different "sizes" of water heaters will be exposed to proportionally different usages (e.g. larger water heaters will see a larger daily usage). Stated simply, today's proposal would require testing and calculation of results based on a daily usage rate most appropriate for that particular water heater.

The single daily usage rate of the existing test procedure has merit in that it normalizes the energy consumption comparisons to a common basis. In other words, all water heaters are evaluated on the basis that they will provide the same useful output of service, i.e., 64.3 gallons of hot water per day. DOE believes this commonality of basis of comparison should be maintained to the extent possible in all consumer product test procedures. However, for water heaters some problems have resulted from this policy. In particular water heaters which differ significantly from the typical residential size are evaluated on a usage which is not likely to be seen by these water

heaters, e.g., a 20 gallon electric water heater is not likely to be exposed to a 64.3 gallon daily usage. As a consequence, energy efficiency information for extremely small and extremely large residential water heaters is somewhat misleading under the existing test procedure.

DOE believes this problem can be resolved and still maintain a reasonably uniform basis of comparison, if a few discrete usage rates are incorporated into the test procedures. That is: 20, 40, 60, or 80 gallons per day usage is assigned to a particular water heater model depending on that water heater's likely application.

DOE believes that first hour rating is the best characteristic of a water heater on which to base an assigned usage rate. Consequently, today's proposal assigns a daily usage (U) for various ranges of first hour rating. This assigned U would be used throughout the test procedure, including the total amount of water drawn during the simulated use test.

DOE believes oil water heaters should be excepted from this assigned usage plan because oil water heaters by design have inherently high first hour ratings but are not typically exposed to daily usages proportional to their first hour ratings. Also, there does not appear to be a large range of first hour ratings available for oil water heaters. Consequently, today's proposal assigns a single usage rate of 60 gallons per day to all oil water heaters regardless of the first hour rating.

4. Supply Water Temperature

Today's proposal would establish 58 °F as the national average inlet water temperature and would require testing with 58 °F ± 2 °F supply water temperature for all types of water heaters.

In response to the 1984 proposal, three commenters commented on the appropriateness of the supply water temperature of 55 °F. All three commenters believe that the supply water temperature should be higher.

Central Power & Light (serving about 490,000 residential customers in a 44,000 square mile area in the lower one-third of Texas) provided data concerning water main temperatures in its service area. The data, monthly temperature readings for each of 7 cities over a one year period, range from a low of 55.2 °F (February) to a high of 86.8 °F (July). (Central Power and Light, No. 5, at 1.)

Florida Power commented that the assumed average inlet water temperature of 55 °F does not take into consideration that inlet water temperatures in populated areas are

typically 10–15 °F higher than ground water temperatures due to the interchange of heat between underground piping and heat exchange in the building environment. Another factor justifying the use of a higher average incoming water temperature cited by Florida Power is that most new construction is occurring in the so-called sunbelt area of the country where ground water temperatures are higher than in other areas of the country. Florida Power recommends that the water supply temperature for testing all water heaters should be 70 °F. (Florida Power, No. 12, at 1 and 3.)

EEL stated that a water heater inlet (supply) temperature of 65–70 °F would be more realistic and cited the same rationale as Florida Power. In addition, EEL included data on average monthly tap water temperatures for the Washington, (D.C.) Suburban Sanitary Commission areas, as well as a copy of the water main temperature data supplied by Central Power and Light. EEL recommended the inlet water temperature for the test be increased to 65–70 °F. (LEI, No. 18, at 4.)

DOE and NBS have examined the matter of average inlet water temperature since the time of the 1984 proposal and comment period. Specifically, in a report entitled "A Review of Energy Use Factors for Selected Household Appliances," NBSIR 85-3220, August 1985, NBS expanded the basis of a national average water inlet temperature by conducting a population-weighted analysis. Using a U.S. Geological Survey map, a single representative water heater inlet temperature was estimated for each State. Each State's temperature was then weighted by that State's estimated number of water heaters in order to compute a national average. On this basis NBS recommends an average inlet temperature of 58 °F. DOE agrees and is incorporating this value into today's proposed calculation procedures.

Further, today's proposal would require all water heaters to be tested with inlet water temperature of 58 °F ± 2 °F. This represents a change from the existing test procedures for storage type water heaters which specify an elevated inlet water temperature of 70 °F when conducting tests. This temperature was specified to avoid the burden of cooling the inlet water during testing when local tap water temperatures were in excess of the national average. As with the thermostat setting provisions discussed above, DOE does not now perceive a need to maintain the elevated inlet water testing provisions. Consequently, today's proposal would require 58 °F ± 2 °F inlet water temperatures to be

supplied in the actual laboratory testing of all water heaters.

5. Ambient Air Temperature

Today's proposal would establish an ambient air temperature of between 65 °F to 70 °F for the testing and rating of all water heaters.

In response to the 1984 proposal, eight commenters addressed the ambient air temperature specifications of the proposed rule. DOE proposed an ambient air temperature specification of 65 °F ± 2 °F for testing heat pump water heaters. For testing gas, oil and electric storage water heaters, DOE proposed to change the existing test procedure requirement that the average ambient air temperature be between 65 °F and 85 °F for the duration of the test and not be permitted to vary more than ± 7 °F from its average value throughout the duration of the test to a requirement that the ambient air temperature be 75 °F ± 7 °F for the duration of the test. Both the existing test procedure and the 1984 proposed changes would require that the average ambient air temperature be determined over the duration of the test and that the test results be mathematically adjusted to reflect an assigned ambient air temperature for storage water heaters.

DEC International commented that the 1984 proposed ambient air temperature specification of 65 °F, although lower than the GAMA heat pump water heater test procedure ambient air temperature specification of 75 °F, is acceptable (DEC International, No. 1, at 1 and 2).

Mr. Robert E. Cook recommended that all water heaters be tested at an adjusted ambient temperature of 65 °F. He stated that an ambient temperature of 55 °F would have a much more adverse impact on the performance of a heat pump water heater than that temperature would have on the performance of a conventional electric water heater. He also concurred with DOE's observation that the nature of operation of a heat pump water heater will result in lower ambient temperatures in the vicinity of the water heater than would be found with an identically located conventional electric water heater. If DOE does not provide an upward adjustment of the ambient air temperature when testing conventional electric water heaters, Mr. Cook contends that heat pump water heaters may show an unjustified performance improvement over conventional water heaters (Cook, No. 9, at 2).

Florida Power and EEL submitted essentially identical comments on this issue. Both stated that the assumption of

an average room ambient temperature of 55 °F fails to take into account the fact that most water heaters are installed in interior building spaces or spaces subject to some median temperature between indoor and outdoor conditions, such as garages or utility rooms. Both commenters contend that a location that has an average year-round temperature of 55 °F would certainly be subject to below freezing temperatures part of the year to compensate for the higher summer temperatures. They pointed out that no water heater would be installed in a space subject to temperatures below freezing. Both commenters further stated that the discussion of ambient temperatures in the 1984 proposal concentrates on lower air temperatures in utility spaces in the wintertime without giving consideration to their higher temperatures during the summer. The result of this annual effect would be to move the average temperatures close to that of a water heater that is located in indoor spaces since the heat pump water heater cools the space in which it is installed during its operation. Florida Power concluded that a 65 °F ambient temperature for the heat pump water heater is logical if 70 °F is used as the comparable ambient temperature for other storage water heaters and that the use of a 70 °F room temperature will simplify the test procedure and the calculation of recovery efficiency and storage losses. EEI concluded that the use of a 70 °F room temperature would be more realistic and would provide a better indication of recovery efficiency and standby loss. (Florida Power, No. 12, at 1, 2, and 3; and EEI, No. 18, at 4.)

NRDC stated that DOE's reasoning stated in the 1984 proposal concerning the 65 °F ambient temperature appears to be reasonable. For consistency though, this ambient temperature should be the same for all types of water heaters. One basis for the 65 °F temperature assumption, which NRDC remarked was not discussed by DOE, is that it is roughly midway between the national average annual ambient temperature of 55 °F and a typical average indoor temperature in the low 70's. This average will reflect the fact that some water heaters are located in conditioned spaces, while others are located in unconditioned or semi-conditioned spaces. (NRDC, No. 13, at 6.)

E-Tech commented that the proposed ambient air temperature specification for heat pump water heaters is too low. E-Tech contends that heat pump water heaters will be sold primarily for installation in residences which have more favorable temperatures, meaning

either that the climate is warmer or that the unit can be located near a waste heat source. E-Tech recommends that the ambient air temperature specification for heat pump water heaters be 75 °F ± 2 °F. (E-Tech, No. 15, at 1.)

Sears did not comment directly on whether DOE's proposed ambient air temperature specification for testing heat pump water heaters was appropriate. Rather, Sears addressed the differences between the stored water temperature and the ambient air temperature resulting from DOE's proposed temperature specifications. Sears commented that comparisons between heat pump water heaters and conventional water heaters are, at best, quite difficult to make. Sears said the problem lies in the differences between stored water temperature and ambient air temperature. Under the DOE proposed amendments, heat pump water heaters would have a temperature differential of 80 °F between the ambient air and the stored water whereas conventional water heaters would have a 90 °F differential. These differences affect standby loss and, therefore, average daily energy consumption. To make it easier to compare the energy efficiency of the two different types of water heaters, Sears recommended standardizing the difference between the ambient air temperature and the stored water temperature in the test procedure for water heaters to 80 °F for all water heaters. (Sears, No. 21, at 2.)

GAMA commented that the proposed ambient air temperature specification of 65 °F for testing heat pump water heaters is too low. GAMA noted that DOE stated in its proposed rule that it has no data to support this specified ambient air temperature. It was also noted that DOE's proposed ambient air temperature specification for testing gas, oil and electric storage water heaters is 75 °F ± 7°. GAMA recommended that DOE use this same ambient air temperature specification for testing heat pump water heaters. (GAMA, April 26, 1984, at 17.)

DOE and NBS have examined the matter of ambient air temperature since the time of the 1984 proposal. Specifically, in a report entitled "A Review of Energy Use Factors for Selected Household Appliances," NBSIR 85-3220, August 1985, NBS stated that it would be difficult to justify the current value of 55 °F as a national average ambient water heater temperature based on a critical review of the available data. NBS believes a value of 65 °F to 70 °F is more appropriate.

As with supply water temperature and thermostat setting discussed above, DOE and the commenters are seeking a consistent basis across all water heaters. In view of the comments received and the NBS recommendation, DOE believes the best basis of comparison for all water heaters will be achieved by specifying ambient air temperature to be maintained during testing of between 65 °F and 70 °F, and for the purposes of calculation, the room air temperature would be as measured during the test.

6. Relative Humidity Specification

Today's proposal includes a relative humidity specification for the testing of heat pump water heaters of 50 percent plus or minus three percent.

In response to the 1984 proposal, five commenters indicated that the relative humidity specification of 40 to 60 percent for the simulated use testing of heat pump water heaters permits too wide a tolerance that will adversely affect test results.

DEC International stated that the proposed specification on relative humidity (between 40 percent and 60 percent) is too variable since heat pump water heaters will be affected by such changes. A suggested number was 50 percent relative humidity with a tolerance of plus or minus 2 percent. (DEC International, No. 1, at 2.)

Borg-Warner commented that a plus or minus 10 percent tolerance on relative humidity is entirely too high. It was stated that the actual capacity of a heat pump water heater is sensitive to wet bulb temperature (i.e. relative humidity). A tolerance of plus or minus 0.75 °F on the wet bulb temperature was suggested. (Borg-Warner, No. 7, at 1.) (DOE notes that at a specified dry bulb temperature of 65 °F and relative humidity of 50 percent, the wet bulb temperature is 54.2 °F; then if the wet bulb temperature varies plus or minus 0.75 °F about this specification, the corresponding relative humidity range would be 53 percent to 47 percent.)

E-Tech said that most testing laboratories can hold the relative humidity during testing within plus or minus one percent. E-Tech theorized that most manufacturers would hold a relative humidity level of 59 percent plus or minus one percent during testing to achieve the best performance. It was recommended that the relative humidity be specified to be 50 percent plus or minus one percent for the duration of testing. (E-Tech, No. 15, at 2.)

GAMA commented that the proposed relative humidity specification of 40 percent to 60 percent allows for

significant variation in the efficiency measurement of heat pump water heaters and would introduce significant error into any attempt to verify the efficiency rating of a heat pump water heater. GAMA provided data from the testing of two heat pump water heaters at 40 percent relative humidity and 60 percent relative humidity which indicates that humidity does have an effect on the performance of heat pump water heaters (ETL Testing Laboratories, Inc., Report No. 463539, May 14, 1984). GAMA suggested that DOE adopt a relative humidity specification of a dry bulb temperature of $75^{\circ}\text{F} \pm 0.5^{\circ}\text{F}$ and a wet bulb temperature of $62.5^{\circ}\text{F} \pm 0.3^{\circ}\text{F}$. (GAMA, No. 19, at 13; and April 26, 1984, at 17.) (DOE notes that this recommended specification also reflects GAMA's recommendation that the ambient temperature specification be revised from 65°F to 75°F .)

Sears stated that the proposed relative humidity specification is too great since the sensitivity of heat pump water heaters to changes in relative humidity varies widely between different models. Sears recommended that DOE adopt the relative humidity specification used by GAMA in its test procedure of 50 percent plus or minus 3 percent. (Sears, No. 21, at 2.)

The relative humidity tolerance in the 1984 proposal was based upon a limited amount of testing of heat pump water heaters at NBS where tests from 35 percent relative humidity to 65 percent relative humidity showed an insignificant variation in test results. It was the intent of DOE to permit the broadest range of conditions where it was believed the significance was minor in order to make the testing less burdensome to perform. Further testing conducted by NBS confirms the commenters' recommendation that the relative humidity specification be 50 percent plus or minus 3 percent. This specification is included in today's proposal for heat pump water heaters only, because for other water heaters little or no effect in test results could be found from variations in relative humidity.

7. Achieving Stored Water Temperature With Heat Pump Water Heaters

As discussed above, today's proposal would require testing of all storage water heaters with a stored water temperature of 135°F .

The 1984 proposal called for replacing any nonadjustable thermostat on a heat pump water heater with an adjustable thermostat in cases where the heat pump water heater could not achieve the required stored water temperature

for test purposes of $145^{\circ}\text{F} \pm 3^{\circ}\text{F}$. It also stipulated that for heat pump water heaters with two thermostats, the thermostat which controls the electric resistance heating element shall be set to yield a maximum tank temperature after cut-out of $145^{\circ}\text{F} \pm 3^{\circ}\text{F}$ for the top thermocouple, unless specified differently by the heat pump water heater manufacturer, in which case it was to be set in accordance with the heat pump water heater manufacturer's instructions. Four comments were received on the 1984 proposed requirement.

DEC International stated that the thermostat setting for the electric resistance heating elements of a heat pump water heater with or without storage tank should be according to the manufacturer's instructions. (DEC International, No. 1, at 2.)

Mr. Robert E. Cook stated that owners of heat pump water heaters will not disconnect the electric resistance heating elements on the tank. Rather, they are likely to leave the upper heating element operational to act as a booster heater to offset the lower stored water temperature or the slower recovery, or both, that are characteristic of heat pump water heaters. Mr. Cook agrees with DOE's proposal regarding the setting of thermostats for electric resistance heating elements on heat pump water heaters. (Cook No. 9, at 2.)

E-Tech commented that the test procedure must not provide for altering the design of heat pump water heaters. Rather than replacing thermostats, the test procedure should stipulate that the heat pump water heater manufacturer's recommendations found in the operating manual for the unit be followed to achieve the requisite stored water temperature. (E-Tech, No. 15, at 2.)

GAMA commented that the 1984 proposal's provision to replace a non-adjustable thermostat is totally inappropriate since it alters the design of the water heater and, in essence, does not test the efficiency of the water heater as designed. GAMA recommended that DOE allow the auxiliary electric resistance heating elements to raise the stored water to the specified temperature in those cases where the heat pump water heater thermostat cannot reach that temperature. (GAMA, April 26, 1984, at 18.)

The change in the thermostat setting from 145°F to 135°F for heat pump water heaters that is discussed in Item II.d.2, above, is thought to allay much of the concerns of the commenters on this issue. Nevertheless, DOE does concur with the comments that it is improper to alter the design of heat pump water

heaters for testing purposes by requiring replacement of their thermostats if they cannot achieve the specified test temperature. Such an alteration would cause the heat pump water heater to operate during the test in a manner that would be uncharacteristic of its typical operation in actual consumer usage. Since consumers seeking higher stored water temperatures for heat pump water heaters would likely follow the manufacturer's instruction for doing so, DOE considers this to also be the appropriate procedure for achieving the required mean tank temperature for test purposes. Today's proposal provides that in cases where the maximum setting of the heat pump water heater thermostat does not achieve the specified maximum mean tank temperature of $135^{\circ}\text{F} \pm 5^{\circ}\text{F}$, the heat pump water heater manufacturer's instructions for achieving higher stored water temperatures shall be followed in order to satisfy this specification.

8. Specification for Standard Test Electric Storage Water Heater

Today's proposal maintains the 1984 proposal for heat pump water heaters without a storage tank, except for a slight change in the specification for the "standard test electric storage water heater."

In the 1984 proposal, DOE provided for testing heat pump water heaters without storage tanks using a "standard test electric storage water heater." The 1984 proposed calculations allowed determination of energy factors and energy consumptions for the standard storage water heater and other water heaters of similar design but of different storage capacity. The proposed specification for the "standard test electric storage water heater" stated, in part, that it shall have a rated storage capacity of 52 gallons, as specified by the manufacturer on the water heater nameplate and shall have a standby loss of 0.009 ± 0.0005 per hour. Four comments were received regarding this proposed specification.

DEC International commented that there should be a provision in the test procedure to show the effect of operating a heat pump water heater without storage tank connected to a poorly insulated tank. It was stated that such a provision is needed to permit a consumer to compare the cost of heating water with a heat pump water heater with storage tank to that of a heat pump water heater without storage tank connected to a poorly insulated tank. DEC International said that it has found this to be the more typical case. (DEC International, No. 1, at 1 and 2.)

Borg-Warner commented that it had purchased two different commercially available water heaters, both with a rated storage capacity of 52 gallons, and upon measuring them, found one to have an actual storage capacity of 45.5 gallons and the other, 56 gallons. Borg-Warner stated that this kind of variation in storage capacity could lead to variations in energy consumption measurements in the laboratory. Borg-Warner recommended that DOE specify a tolerance on the storage capacity of the standard test electric storage water heater. (Borg-Warner, No. 7, at 1.)

Mr. Robert E. Cook commented that he agrees that a 50/52 gallon electric storage water heater is the proper storage capacity selection for testing heat pump water heaters without storage tanks. (Cook, No. 9, at 2.)

GAMA commented that the proposed specification for the storage capacity of the standard test electric storage water heater permits too great a tolerance. GAMA recommended that the test tank storage capacity to be specified be 47 gallons plus or minus 0.5 gallon true capacity. (GAMA, April 26, 1984, at 17.) Because current industry standards permit the true storage capacity of electric storage water heaters to be 10 percent below their nominal rated storage capacity, GAMA stated that most manufacturers of electric storage water heaters are able to hold production tolerances close enough such that their 52 gallon nominal rated storage capacity electric storage water heaters have a true storage capacity of about 47 gallons. GAMA provided a further clarification that 47 gallons was the minimum volume permitted by the industry standard for the actual storage capacity of a 52 gallon nominal rated storage capacity electric storage water heater. (GAMA, April 26, 1984, at 26, 36, 37, 45 and 46.)

Commenters have pointed out that the true storage capacity of an electric storage water heater is permitted to vary widely from its rated storage capacity. Most water heater manufacturers are able to hold production tolerances close to the lower limit of the tolerance range. This results in water heater models with storage capacities consistently below their rated storage capacity. Yet, DOE understands that some water heater manufacturers either cannot hold production tolerances this tightly or prefer to rate the storage capacity of their water heaters closer to their true storage capacity. Consequently, DOE's proposed storage capacity specification for the standard test electric storage water heater, which states that the rated storage capacity

shall be 52 gallons, would permit a wide variation in the true storage capacity of such units. This high degree of variability in true storage capacity would translate into a high degree of variability in test results. The energy lost through the jacket of the standard test electric storage water heater, rated at 52 gallons storage capacity, would be less for units with true storage capacities near the lower end of the permissible range than it would for units with true storage capacities at or greater than their rated storage capacity of 52 gallons. Also, the results of the first hour rating water draw test would be affected since it is likely that more water could be withdrawn from standard test electric water heaters of higher true storage capacity than those of lower capacity.

Therefore, in response to the comments made, DOE has revised its proposed storage capacity specification for the standard test electric storage water heater to be used for testing heat pump water heaters without storage tanks. Today's proposal would require the storage capacity to be 47.0 gallons, plus 1.0 gallon, minus zero gallon. This one-sided tolerance on the storage capacity specification was prompted by GAMA's statement that 47 gallons was the minimum volume permitted by the industry standard for the actual storage capacity of a 52 gallon nominal rated electric storage water heater, and GAMA's request that the total tolerance permitted be 1 gallon.

Regarding the comment on providing consumers information on the cost of operation of heat pump water heaters without storage tanks connected to poorly insulated tanks, DOE already provides for the determination of the estimated annual operating cost of heat pump water heaters without storage tanks when connected to water heaters of different storage capacities. To add tank insulation as a variable into this procedure would yield more information to consumers but, at the same time, it would further complicate the consumer's decision-making process. To ask a consumer to account for the insulation on his present water heater (which the consumer frequently is in no position to ascertain) as well as its actual storage capacity in making a heat pump water heater purchasing decision, seems to be excessively burdensome and prone to error and misunderstanding. Therefore, DOE maintains its rationale for specifying the single standby loss of the standard test electric storage water heater to be 0.009 ± 0.0005 per hour found in the 1984 proposal. (See 49 FR 4872.)

9. Interconnecting Piping Specification for Heat Pump Water Heaters Without Storage Tanks

Based upon a review of comments and further study by DOE, today's proposal differs from the 1984 proposal regarding the interconnecting piping specification for heat pump water heaters without storage tanks.

One commenter, Borg-Warner, commented on the 1984 proposal that heat pump water heaters without storage tanks should be connected to a standard test electric storage water heater as specified by the manufacturer using $10 \text{ feet} \pm 0.5 \text{ feet}$ of tubing. Borg-Warner noted that no mention was made regarding insulation of the tubing. Borg-Warner recommended that the tubing be insulated in accordance with the manufacturer's instructions. (Borg-Warner, No. 7, at 1.)

DOE concurs with this recommendation and is proposing this recommended change to the specification. Further, DOE is proposing other changes to the procedure for connecting heat pump water heaters without storage tanks to standard test electric storage water heaters to better insure that heat pump water heaters without storage tanks will be tested in a manner reflective of how consumers will use them. To connect the unit to be tested to the standard test tank, today's proposal would require the use of the tubing provided with the kit for installing a heat pump water heater without storage tank if the manufacturer offers such a kit for such unit, otherwise $8 \text{ feet} \pm 0.5 \text{ feet}$ of tubing would be used. In both cases, the tubing would be insulated per the manufacturer's installation instructions.

10. Desuperheater Water Heater Test Procedure

Today's proposal does not cover "desuperheater water heaters" as was suggested by a commenter.

In response to the 1984 proposal, one commenter, Mr. Robert E. Cook, stated that he considers the scope of the DOE test procedure too narrow and that devices that recover heat from the condenser side of a home air conditioner and deliver the heat to a water heater (commonly referred to as "desuperheater water heaters") should be included. Mr. Cook comments that units of this type are gaining market attention and market share at a far greater rate than are heat pump water heaters. Mr. Cook does observe, though, that a literal reading of DOE's proposed definitions for heat pump water heaters does appear to include such

desuperheater water heaters. (Cook, No. 9, at 1.)

DOE has not investigated desuperheater water heaters. Also, DOE does not consider the test procedure proposed today applicable for testing desuperheater water heaters because it does not address the conditions of operation of the air conditioner which supplies heat to the desuperheater water heater. Therefore, DOE does not intend to propose test procedures for such devices at this time. In response to Mr. Cook's observation, DOE has made changes to its definitions to clarify that only "dedicated" heat pump water heaters, i.e. products where the sole purpose of the heat pump is to heat domestic water, would be covered by today's proposal.

11. Definition of Heat Pump Water Heater

Based on comments on the 1984 proposal, today's proposal includes changes in the 1984 proposed definition of heat pump water heater.

One commenter, DEC International, remarked that DOE's proposed definitions of a "heat pump water heater with storage tank" and a "heat pump water heater without storage tank" are too broad in coverage. DEC International stated several models of heat pump water heaters it manufactures for commercial application would fall under the coverage of the proposed definitions. DOE proposed that heat pump water heaters with power input ratings of 12 kilowatts or less be covered by the test procedure. DEC International recommended that a maximum power input rating of 6 or 7.5 kilowatts would be more appropriate to insure that only residential models of heat pump water heaters fall under the coverage of the definitions and not commercial models. (DEC International, No. 24, at 1.)

When DOE drafted its 1984 proposal, DOE included the same limit on the input power rating as used in its existing definition of an electric storage water heater, i.e. 12 kilowatts. The intent of this was to insure that all heat pump water heaters which are likely to be used by individual households would be covered by the DOE test procedure. Using the same input power specification as used for electric storage water heaters appeared to be appropriate to fulfill this intent. DOE's further evaluation of this premise brought about by DEC International's comment revealed that DEC International was correct. The proposed definition of heat pump water heaters covers units which are intended for commercial application and are unlikely

to be found in household use. DOE has, therefore, adopted DEC International's recommendation that the upper limit on the input power rating of heat pump water heaters to be covered by the test procedure be 7.5 kilowatts.

12. Test Procedure Specifications Effect On Thermostat Performance

As mentioned above in II.d.2, today's proposal requires thermostat setting at 135 °F for all water heaters.

In response to the 1984 proposal, two commenters, Florida Power and EEI, made essentially the same comment that the test procedure thermostat setting specification for gas, oil and electric storage water heaters of 165 °F causes thermostats to be manufactured to provide accurate control at this test temperature with an attendant sacrifice in their capability to control water temperature at lower, normal water usage temperatures. (Florida Power, No. 12, at 1; and EEI, No. 18, at 4).

Since today's proposal would require testing at a thermostat setting of 135 °F, DOE believes these comments are now moot.

13. Alternative Standby Loss Test Method

Today's proposal does not change the standby loss test method as suggested by a commenter to the proposal.

In response to the 1984 proposal, Florida Power commented that the standby loss test for gas, oil and electric storage water heaters should be terminated at the first subsequent thermostatic cut-out following an elapsed time of 48 hours (24 hours in today's proposal) from the start of the test. The existing and proposed test procedure calls for the test to be terminated at a specified elapsed time from the start of the test regardless of whether the main burner or a heating element is operating. Florida Power said that adopting its suggestion would insure that the standby loss test is conducted over complete heating cycles. (Florida Power, No. 12, at 3).

While the existing and proposed test procedures do not provide for determining the standby loss of a water heater over complete heating cycles, they do account for differences between the stored water temperature at the start of the test and at the end of the test to normalize the test data to simulate identical starting and ending conditions. Adopting Florida Power's proposal would increase the burden of testing by lengthening the standby loss test. Additionally, it would add uncertainty to a manufacturer's test scheduling since the standby loss test for a given test unit may not end for many hours after the

specified time period has elapsed. Since no specific information was provided to show that the results obtained from the current or proposed standby loss test approach are not representative of actual water heater standby operation, Florida Power's proposal has not been adopted in today's proposal.

14. First Hour Rating Test

Regarding the first hour rating test, today's proposal essentially maintains the provisions of the existing and 1984 proposal, except as noted in item II.a above.

In response to the 1984 proposal, two comments were received regarding the first hour rating test for water heaters.

The California Energy Commission (CEC) recommended changing the water draw test to begin immediately upon thermostat cut-in instead of the current requirement that it begin immediately upon thermostat cut-out. It was stated that this would more accurately reflect the temperature and quantity of water that a consumer is likely to receive. (California Energy Commission, No. 8, at 1).

Mr. Robert E. Cook commented that he agrees with the 1984 proposal to change the water draw rate from 5 gallons per minute to 3 gallons per minute in the first hour rating water draw test because this is more reflective of present residential use patterns. (Cook, No. 9, at 3).

DOE does not consider the California Energy Commission's proposal to be an improvement on the current first hour rating water draw test approach. The current specification for starting the test yields the maximum value for the amount of water withdrawn from the water heater, while the CEC proposal would yield the minimum value. Why the minimum value for this test would be any more reflective of the quantity of water that a consumer is likely to receive than the maximum value is unclear to DOE. Adopting this recommendation could have the effect of encouraging redesign of water heater thermostats to obtain cycling performance which maximizes the value of the water draw under the specified conditions of the first hour rating water draw test, i.e. frequent burner, heating element, or heat pump cycling to maintain a higher stored water temperature averaged over time. Such redesign, if it were to occur, could possibly have a detrimental effect on the energy efficiency of water heaters in actual usage or on the overall utility of water heaters to consumers. While these potential adverse impacts of adopting the California Energy Commission's

recommendation are merely speculation at this point, DOE does not see any adverse impacts associated with the current approach nor any particular advantage of CEC's recommendation. For these reasons, DOE has not adopted this recommendation in today's proposal.

Mr. Cook's comment regarding DOE's proposal to change the water draw rate specification was supportive of the proposed change. However, DOE has changed its position on this matter as discussed above in item II.a. Consequently, DOE is not proposing the 3 gallon per minute rate for all water heaters, but rather, retaining the 5 gallon per minute rate of the existing test procedures.

15. Alternate Measures of Efficiency

Today's proposal does not include an alternate measure of efficiency as suggested in comments on the 1984 proposal.

In response to the 1984 proposal, two commenters, Florida Power and EEI, offered essentially identical recommendations for alternate useful measures of efficiency that could be included in the test procedure. They recommended that alternate useful expressions of recovery efficiency would be Btu per gallon or watt-hours per gallon normalized to a standard temperature difference, and "net recovery efficiency" determined by dividing the energy imparted to the water during recovery by the quantity of the energy consumed during recovery minus the standby losses during recovery. They also recommended that standby loss be expressed directly as energy loss per unit time rather than as a percentage of the stored energy of the water in the tank lost per unit time. Both commenters remarked that these alternate measures of efficiency facilitate the calculation of the energy consumption of a water heater for differing amounts of hot water use and temperature conditions. Thus, they concluded that EnergyGuide labels could be redesigned to permit a consumer to better estimate the operating cost of a particular model of water heater for his particular conditions of operation and usage. (Florida Power, No. 12, at 3 and 4; and EEI, No. 18, at 5).

DOE agrees with the commenters that the suggested alternate measures of efficiency could prove useful for the purpose stated; however, DOE has not incorporated any of these alternate measures of efficiency into today's proposal because they are not necessary for determining the estimated annual operating cost of a water heater over

and above the existing measures of efficiency which are already a part of the test procedures.

16. Installation of Water Heaters: Water Pipes and Heat Traps

As a result of received comment and studies by NBS, today's proposal would change a number of testing installation provisions.

In the 1984 proposal, DOE proposed changes to the installation requirements for water heaters. The proposed changes called for bare copper pipes to be connected to the water heater inlet and outlet connections and heat traps to be installed only if they are an integral part of the shipped water heater or are included with the shipped water heater. The existing test procedure called for these pipes to be insulated and for heat traps to be installed where these pipes connect to the pipe connections on the water heater. In addition, the existing test procedure calculations allowed enhancement of efficiency rating for those water heaters shipped with heat traps. Six comments were received on this proposed change.

DEC International commented that it agrees with the proposed requirement to let the effectiveness of heat traps be reflected in the test results. (DEC International, No. 1 at 2.)

Mr. Robert E. Cook supported the proposal to eliminate the arbitrary fixed energy credits for heat traps and the substitution of an actual measured performance test. (Cook, No. 9, at 33.)

The Bock Corporation (Bock), a manufacturer of water heaters, commented that the net effect of eight feet of uninsulated copper pipe will greatly increase the heat loss from the water heater with or without heat traps. Bock stated that if the intent of the proposed revisions to the installation requirements is to let the effectiveness of heat traps be reflected in the results of the standby loss test, then it recommends that a better approach would be to test them separately, such as by the method used by NBS as described in a letter report to DOE of May 1982. Bock contends that testing heat traps separately would result in a more accurate determination of their effectiveness while preserving the existing DOE test methodology of treating water heaters as separate units, isolated from extraneous piping, under strict controlled test conditions. Another concern expressed by Bock was that uninsulated piping leads to greater variability in test results, reducing the validity of the test procedure as a means of comparing water heaters. Bock said that it had not conducted comparison tests of the present and proposed

installation configurations; however, it expects that the proposed installation configuration would increase the measured standby loss of water heaters above the limits set by ASHRAE, the State of California, and other similar codes. To Bock, this raises the question of whether these codes will be revised accordingly. Bock considers this doubtful. To meet these codes under DOE's proposed installation requirements, Bock said that items such as flue dampers would have to be considered, adding more to the cost of the unit. (Bock, No. 10, at 1.)

Amtrol stated that when DOE initially prescribed the test procedure for water heaters, it established that the standby loss test should be run with the pipes connected to the unit well insulated and with heat traps in place since only the water heater was to be tested, not the system. Amtrol believes that the installation requirements of the existing test procedure are still the most appropriate provisions for the same reasons as previously endorsed by DOE and is opposed to the proposed requirement of four feet of vertical uninsulated copper pipe (or tubing) attached to the water heater inlet and outlet connections. Amtrol also commented that the effectiveness of heat traps should be accounted for by using fixed energy credits which agree with the latest NBS report evaluating heat traps. (Amtrol, No. 14, at 1.)

Bradford-White Corporation (Bradford-White), a manufacturer of water heaters, stated that it strongly opposes the proposal to test water heaters with four foot sections of uninsulated pipe and the deletion of the heat trap credit. The basis for the objection is the burden placed on manufacturers versus the minimal benefit, if any, achieved by consumers. Bradford-White contends that the need to eliminate pipe heat losses while testing a water heater has not changed since the original test procedure was published on October 4, 1977. Testing a water heater with four foot sections of uninsulated copper pipe will provide results that reflect water heater energy usage plus the energy lost through the pipes. Should this portion of the proposal be adopted, it will necessitate a retesting of all presently manufactured units labeled under the Federal Trade Commission's EnergyGuide labeling program. Bradford-White manufactures about seventy-five models, necessitating at least one hundred and fifty individual tests. Bradford-White further remarked that this test burden would be brought about because DOE believes that the proposed test method is the most

appropriate to account for the contribution of heat traps to improving the efficiency of water heaters even though DOE states that the magnitude of the energy savings achievable by even the best performing heat trap would have only a minimal effect on the energy consumption of any water heater. Bradford-White said that this seems a great price to pay for only a minimal effect on energy consumption.

Bradford-White stated that it markets on a national basis and that many states have minimum efficiency requirements. These requirements, for the most part, reference American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Standard 90A-1980 and determination of compliance is based on tests conducted in accordance with the DOE test procedure. Should the proposal for testing with uninsulated pipe be adopted, Bradford-White claims many of the models currently meeting these various state standards will fail to meet the standby loss requirements under the proposed test procedure. It was stated that these previously acceptable water heaters will have failed not because of a change in construction, but only because the test procedure will have changed. This will necessitate a massive redesign program to once again bring these water heaters in compliance with the requirements.

Bradford-White said that it is a relatively small privately owned manufacturer. The amount of testing and redesign which would be brought about, should this proposal be enacted, would be burdensome and could have potential negative effects on the company. Bradford-White said that other manufacturers would face similar testing and redesign burdens.

It is Bradford-White's position that the present method of testing with insulated pipe and heat traps installed should be maintained. This would avert the massive testing and redesign programs which would undoubtedly follow. The question of heat trap credits should then be addressed separately. Bradford-White recommended that DOE initiate further testing and study of the various types of heat traps leading eventually to a standardized test method for heat traps which would provide a credit figure to be used when calculating the daily energy consumption for water heaters. Until such time, the present credit figure should be maintained. (Bradford-White, No. 16, at 1-4.)

GAMA stated that it is opposed to the deletions of the installation of heat traps in the hot water outlet and the cold water inlet piping of the water heater and of the credit for heat traps. GAMA claimed that the proposed amendment

will be of minimum benefit to consumers since the amendment may only provide a slightly better estimate of the energy savings associated with the use of a heat trap. GAMA said that, despite the slight impact that this minor fine tuning by DOE will have on water heater efficiency ratings, it would place a significant burden on the water heater industry.

GAMA notes that: (1) the present DOE water heater test procedure has been in use for over six years; (2) the Federal Trade Commission's EnergyGuide labels, which disclose estimated annual operating costs based on this test procedure, have been placed on water heaters for about four years; and (3) many States require compliance with the minimum efficiency requirements for water heaters specified in ASHRAE Standard 90A-1980 which references the DOE water heater test procedure. GAMA said about 700 models of residential gas, oil, and electric storage water heaters are available in the United States today. If the proposed amendment to delete the installation of heat traps and the credit for heat traps were adopted, all 700 models of water heaters would have to be retested for efficiency and their corresponding estimated annual operating costs recalculated. Furthermore, the EnergyGuide labels on all those models of water heaters would have to be revised. Also, GAMA remarked, in many cases, this change in the DOE water heater test procedure would result in some models of water heaters which presently comply with ASHRAE standards becoming non-compliant models, even though there has been no change in the design of the water heater, as a result of the increase in their rated standby loss brought on by the deletion of heat traps. This would require manufacturers to either redesign those models of water heaters so that they again would comply with the ASHRAE standards or remove those models which do not comply from those markets which require compliance with ASHRAE standards. In either case, GAMA cited a significant disruption of the water heater industry.

GAMA included two reports of tests conducted at ETL Testing Laboratories to examine the proposed amendments to the water heater test procedure. Tests showed that the increase in standby loss experienced by using two four-foot sections of uninsulated copper pipe and no heat traps was about 30 watts. Based on these test results, GAMA concludes that the proposed amendment would effect a slight adjustment in the estimated annual operating cost figure of all water heaters; however, it would

affect all water heaters equally and would not alter the relative-ranking of various models. In this sense, GAMA contends, the proposed amendment does not improve the information made available to consumers to aid them in selecting a water heater. Weighing this very minor adjustment in the estimated annual operating cost figure which appears on the EnergyGuide label against the hundreds of thousands of dollars that would have to be spent to retest water heaters and, in some cases, redesign water heaters as a result of the proposed amendment, makes it clear, according to GAMA, that the proposed amendment to the installation requirements for water heaters should not be adopted.

Finally, GAMA commented that, as DOE noted, the approach concerning the installation of heat traps in the existing test procedure was taken to eliminate pipe heat losses from affecting the measures of energy consumption of a water heater and yet credit water heaters supplied with heat traps by the manufacturer. GAMA emphasizes that the need to eliminate external losses when testing the efficiency of a water heater still remains, and is of critical importance. GAMA argues that it is unfair and illogical to impose an external factor in the measurement of the efficiency of a water heater when the manufacturer has no control over that external factor. Furthermore, there is no evidence that 4 feet of uninsulated vertical pipe is representative of the average field installation. (GAMA, No. 19, at 3-8; and April 26, 1984, at 15 and 16.)

There are a number of matters to be considered on the issue of the installation, or "hook-up," of a water heater for test purposes. These matters can be classified under two categories: (1) What are the appropriate installation requirements for testing water heaters? (2) Does the benefit of amending the installation requirements of the existing water heater test procedure justify the cost of retesting all current models of gas, oil and electric storage water heaters if the existing requirements are deemed to be inappropriate? The following discussion addresses these two issues separately.

For the most part, the water heater industry argues that manufacturers of water heaters have no control over how their water heaters are installed in residences. They contend that the approach of the existing test procedure which, from an energy consumption standpoint, effectively isolates the water heater from its inlet and outlet piping is the appropriate approach since the test

results are reflective of the product just as it is manufactured and are not influenced by factors outside of the manufacturer's control.

DOE understands the appeal that its existing test procedure holds for manufacturers of water heaters in this regard. DOE proposed to revise the installation requirements, though, because of a concern that they are not representative of how water heaters are typically installed in residences and lead to test results which are not reflective of the energy use of water heaters in characteristic operation. Heat traps and pipe insulation are normally add-on devices to reduce thermal losses in a water heating/distribution system. DOE expects that few water heaters are installed with such add-on devices because there is little incentive for installers to include these extra cost items in their installation of water heaters. Of course, some models of water heaters come equipped with heat traps in which case DOE expects that they are installed with these heat traps in place. While it is true that water heater manufacturers have little or no control over how their water heaters are installed, all must be connected to the domestic water supply system of a residence using two pipes, one to supply water to the water heater and one to deliver hot water from the water heater to the hot water supply system of the residence. DOE believes that in the typical installation, the pipes connected to the water heater make vertical runs upward from the cold water inlet and the hot water outlet connections to connect to domestic water supply system piping overhead. Given this typical installation, the addition of heat traps and pipe insulation to these vertical pipe runs would significantly reduce the thermal losses that would otherwise occur due to the circulation of stored hot water in the water heater tank rising into the pipes, losing heat to ambient surroundings by the mechanism of convective heat transfer, and then sinking back into the tank as it is displaced by more stored hot water from the tank, perpetuating the cycle. The reduction of these thermal losses has a small but measurable effect on the energy consumption of a water heater that DOE believes should be included in the test procedure.

Since for other reasons, today's proposal would essentially require retesting of all water heaters, the comments received which argue against installation provisions that would require retesting are now actually moot. Consequently, making these changes will have no impact on testing burden.

Also, since today's proposal, when considered in its entirety, constitutes a larger difference in the rating of water heaters than the entire effect of installation provisions, the comments made here regarding changes in the ratings are now not considered substantive.

In view of the received comments and in consultation with NBS, DOE believes most appropriate installation provisions are the following:

(1) Pipe insulation and heat traps are to be incorporated into the test rig only if they are shipped with the unit and,

(2) Pipe runs are to be 24 inches long of appropriate size copper pipe with suitable fittings. Each pipe run is to be in the direction of the water heater fitting and the far end of the pipe run is to have an appropriate size 90° copper elbow.

Today's proposal would require these provisions.

17. Flue Pipe Specification for Direct Vent Gas Storage Water Heaters

As a result of received comment, today's proposal includes flue pipe specifications for direct vent gas storage water heaters.

One commenter, GAMA, recommended a change to DOE's installation specification for direct vent gas storage water heaters. The 1984 proposal proposed that direct vent gas storage water heaters "shall be installed with venting equipment as specified in the manufacturer's instructions; however, the vertical length of the flue pipe shall be no greater than 5 feet." GAMA considers the limitation on the vertical length unnecessary. GAMA recommended that if DOE considers some specification on vertical flue length necessary, then GAMA suggests that the specification call for a direct vent gas storage water heater to be tested with the minimum vertical length of flue pipe acceptable for use in accordance with the unit's safety certification. GAMA notes that this recommended specification is similar to the venting conditions which DOE specifies for testing direct vent gas-fired furnaces. (GAMA, No. 19, at 3; and April 26, 1984, at 12, 13, and 20-23.)

DOE agrees with GAMA regarding this matter and has incorporated this change into today's proposal.

e. Miscellaneous

DOE has made other minor technical revisions to its proposed rule in response to comments received which DOE deemed to be clarifying in nature. GAMA suggested that the specification for the outlet pressure of a gas appliance pressure regulator should provide a tolerance of plus or minus 0.3 inch of

water column. GAMA noted that the present specification lacks any specific tolerance since it simply requires that the outlet gas pressure be "... approximately that recommended by the manufacturer." (GAMA, April 26, 1984, at 13.) Today's proposal reflects changes made in response to such comments.

Additionally, after careful consideration of all comments and in consultation with NBS, DOE has made some editorial and minor technical changes in today's proposal. For example, in the definition of "heat pump water heater without storage tank," DOE has revised the phrase "and which is intended to be connected to an electric, gas or oil storage water heater which has a storage capacity of not less than 20 gallons nor more than 120 gallons" to read as follows "and which is intended to be connected to an electric, gas or oil storage water heater or to some other type of water storage tank, not supplied by the manufacturer so that water heated by the unit can be stored at a thermostatically controlled temperature for delivery on demand." This change was made because the proposed language was unnecessarily restrictive in its use of a fixed storage capacity range and the identification of only electric, gas or oil storage water heaters as "intended" water storage tanks.

Finally, the definition of oil storage water heater has been revised to clarify the coverage of the test procedures. Specifically, oil water heaters with a .75 gallons per hour firing rate are covered by the test procedure as was always intended throughout the DOE test procedure rulemakings.

III. COMMENT PROCEDURE

a. Written Comment

Interested persons are invited to participate in the rulemaking by submitting data, views, or arguments with respect to the proposed amendments set forth in this notice to the Hearings and Dockets address indicated at the beginning of the notice.

Comments (eight copies) should be identified on the outside of the envelope and on documents submitted to DOE with the designation "Water Heater Test Procedures (Docket No. CAS-RM-79-105)." Eight (8) copies are requested to be submitted. All comments received by the date specified at the beginning of this notice and all other relevant information will be considered by DOE before final action is taken on the proposed regulation. Pursuant to the provisions of 10 CFR 1004.11, any person

submitting information which he or she believes to be confidential and exempt by law from public disclosure should submit one complete copy of the document, and seven copies, if possible, from which the information believed to be confidential has been deleted. DOE will make its own determination with regard to the confidential status of the information and treat it according to its determination.

Factors of interest to DOE, when evaluating requests to treat as confidential information that has been submitted include: (1) A description of the item; (2) an indication as to whether and why such items of information have been treated by the submitting party as confidential, and whether and why such items are customarily treated as confidential within the industry; (3) whether the information is generally known or available from other sources; (4) whether the information has previously been made available to others without obligation concerning its confidentiality; (5) an explanation of the competitive injury to the submitting person which would result from public disclosure; (6) an indication as to when such information might lose its confidential character due to the passage of time; and (7) whether disclosure of the information would be in the public interest.

b. Public Hearing

1. Procedures for Submitting Requests to Speak

The time and place of the public hearing are indicated at the beginning of this notice. DOE invites any person who has an interest in the proposed rule to make a written request for an opportunity to make an oral presentation. Such requests should be directed to the Hearings and Dockets address indicated at the beginning of this notice and must be received by the time specified at the beginning of this notice. Requests may be hand delivered to such address between the hours of 8:30 a.m. and 4:30 p.m., Monday through Friday. Requests should be labeled "Water Heater Test Procedures (Docket No. CAS-RM-79-105)" both on the document and on the envelope.

The person making the request should briefly describe the interest concerned and, if appropriate, state why he or she is a proper representative of the group or class of persons that has such an interest, and give a telephone number where he or she may be contacted.

Each person to be heard is requested to submit eight copies of his or her statement to the address and by the date given in the beginning of this notice. In

the event any person wishing to testify cannot meet this requirement, alternative arrangements can be made with the Office of Hearings and Dockets in advance of the hearing by so indicating in the letter requesting to make an oral presentation.

2. Conduct of Hearing

DOE reserves the right to schedule the respective presentations and to establish the procedures governing the conduct of the hearing. Each presentation shall be limited to 20 minutes.

A DOE official will be designated to preside at the hearing. The hearing will not be a judicial or evidentiary-type hearing, but will be conducted in accordance with 5 U.S.C. 553 and 42 U.S.C. 7191, section 501 of the DOE Organization Act, 42 U.S.C. 7101 *et seq.* At the conclusion of all initial oral statements, each person who has made an oral statement will be given the opportunity to make a rebuttal statement. The rebuttal statements will be given in the order in which the initial statements were made and will be subject to time limitations.

Any interested person who wishes to ask a question at the hearing may submit the question in writing to the presiding officer to be asked of any person making a statement at the hearing. The presiding officer will determine whether the question is relevant and whether time limitations permit it to be presented for answer.

Any further procedural rules regarding proper conduct of the hearing will be announced by the presiding officer.

A transcript of the hearing will be made and the entire record of the hearing, including the transcript, will be retained by DOE and made available for inspection at the DOE Freedom of Information Reading Room, Room 1E-190, Forrestal Building, 1000 Independence Avenue, SW., Washington, DC, between the hours of 9:00 a.m. and 4:00 p.m., Monday through Friday, (202) 586-6020. In addition, any person may purchase a copy of the transcript from the reporter.

IV. ENVIRONMENTAL REVIEW

Pursuant to section 7(c)(2) of the Federal Energy Administration Act of 1974, a copy of this notice has been submitted to the Administrator of the Environmental Protection Agency for his comments concerning the impact of this proposal on the quality of the environment.

Since test procedures under the energy conservation program for consumer products will be used only to standardize the measurement of energy

usage and will not affect the quality or distribution of energy usage, prescribing test procedures will not result in any environmental impacts. DOE, therefore, has determined that prescribing test procedures under the energy conservation program for consumer products clearly is not a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act of 1969. Consequently, neither an Environmental Impact Statement nor an Environmental Assessment is required for the proposed rule.

V. REVIEW UNDER EXECUTIVE ORDER 12291

The proposed rule has been reviewed in accordance with Executive Order 12291 which directs that all regulations achieve their intended goals without imposing unnecessary burdens on the economy, on individuals, on public or private organizations, or on State and local governments. The Executive Order also requires that regulatory impact analyses be prepared for "major rules." The Executive Order defines "major rule" as any regulation that is likely to result in: (1) An annual effect on the economy of \$100 million or more; (2) a major increase in costs or prices for consumers, individual industries, Federal, State, or local government agencies, or geographic regions; or (3) significant adverse effects on competition, investment, productivity, innovation, or on the ability of the United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

This proposed rule would prescribe test procedures for heat pump and instantaneous water heaters and would make changes to the existing test procedures for water heaters to allow for more accurate determinations of energy efficiency and cost. In the notice of proposed rulemaking regarding energy efficiency standards for eight types of appliances, including water heaters, DOE made estimates of the annual costs to manufacturers of certification and enforcement testing. See Table E-8.2A, Certification and Enforcement Analysis, June 1980, DOE/CS-0170. The upper bound estimate of annual effect on water heater manufacturers of testing water heaters under an energy efficiency standards program was calculated to be \$837,000 for testing prototype models, new production models and carryover production model tests. The impact of the test procedure amendments is expected to be less than the standards

program because fewer prototype and new models would be produced. Therefore, less testing would be required. Clearly, the annual effect on the economy would be well under \$100 million. The upper bound estimate of certification test costs is equal to a \$0.15 per unit cost increase. DOE does not consider this to be a major increase in cost or supportive of a major price increase, so none should occur. Small and large manufacturers of water heaters have expressed to DOE their desire to have this more accurate test procedure, even considering the retesting necessitated thereby. No manufacturer has indicated its opposition to the proposed test procedures. The manufacturers' widespread support for these test procedures is considered to be a reasonable indication of no "significant adverse effects" on industry productivity and competitiveness. DOE, therefore, has determined that prescribing test procedures under the energy conservation program for consumer products does not impose any significant burden on any person, industry, or government entity, and that the proposed rules do not come within the Executive Order's definition of "major rule."

VI. REGULATORY FLEXIBILITY ACT

The Regulatory Flexibility Act, Pub. L. 96-354 (5 U.S.C. 601-612), requires that an agency prepare an initial regulatory flexibility analysis to be published at the time the proposed rule is published. This requirement (which appears in section 603) does not apply if the agency "certifies that the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities." The proposed rule affects manufacturers of water heaters. As previously discussed, the proposed changes would not have significant economic impacts, but rather would simply improve the test procedures. Since small manufacturers of water heaters have proportionately fewer model offerings, and therefore, proportionately smaller testing requirements, DOE believes small water heater manufacturers are equally able to conduct new testing procedures without harmful effects. Therefore, DOE certifies that the proposed rules, if promulgated, would not have a "significant economic impact on a substantial number of small entities."

List of Subjects in 10 CFR Part 430

Administration practice and procedure, Energy conservation, Household appliances.

In consideration of the foregoing, it is proposed to amend Part 430 of Chapter II of Title 10, Code of Federal Regulations, as set forth below.

Issued in Washington, D.C., February 27, 1987.

Donna R. Fitzpatrick,
Assistant Secretary, Conservation and Renewable Energy.

PART 430—ENERGY CONSERVATION FOR CONSUMER PRODUCTS

1. The authority citation for Part 430 continues to read as follows:

Authority: Energy Policy and Conservation Act, Title III, Part B, as amended by National Energy Conservation Policy Act, Title IV, Part 2. (42 U.S.C. 6291-6309).

2. Section 430.2 is amended by revising the definition of the term "Basic model," adding a definition for "electric resistance heating element," revising the definition of the term "water heater," and by removing the definition of the term "immersed heating element", to read as follows:

§ 430.2 Definitions.

* * * * *

"Basic model" * * *

(5) With respect to water heaters, which have the same primary energy source and which, with the exception of immersed electric resistance heating elements, do not have any differing electrical, physical, or functional characteristics that affect energy consumption.

* * * * *

"Electric resistance heating element" means a device which is designed to directly convert electrical energy to heat energy by employing an electrical conductor which opposes the flow of electrical current, resulting in the generation of heat in the conducting material.

* * * * *

"Water heater" means an appliance that heats water for domestic purposes other than for space heating and which must be one of the following:

(1) "Electric storage water heater" means a water heater which stores water at a thermostatically controlled temperature for delivery on demand, which utilizes electricity as the energy source for heating the water, in which heating is solely provided by electric resistance heating elements, which has a manufacturer's specified energy input rating of 12 kilowatts or less at a voltage no greater than 250 volts, and which has a manufacturer's specified storage capacity of not less than 20 gallons nor more than 120 gallons.

(2) "Gas-fired storage water heater" means a water heater which stores water at a thermostatically controlled temperature for delivery on demand, which utilizes gas as the energy source for heating the water, which has a manufacturer's specified energy input rating of 75,000 Btu per hour or less, and which has a manufacturer's specified storage capacity of not less than 20 gallons nor more than 100 gallons.

(3) "Oil-fired storage water heater" means a water heater which stores water at a thermostatically controlled temperature for delivery on demand, which utilizes oil as the energy source for heating the water, which has a manufacturer's specified energy input rating of 104,000 Btu per hour (0.75 gallons of oil per hour firing rate equivalent) or less, and which has a manufacturer's specified storage capacity of not less than 20 gallons nor more than 50 gallons.

(4) "Heat pump water heater with storage tank" means a water heater which stores water at a thermostatically controlled temperature for delivery on demand, which utilizes single phase electricity as the energy source to operate a mechanical refrigeration unit consisting of a compressor, a condenser, an expansion device, a storage tank, and an evaporator designed expressly to extract thermal energy from the surrounding air and deliver it to the water in the unit, which may or may not be equipped with electric resistance heating elements, which has a manufacturer's specified energy input rating of 7.5 kilowatts or less at a voltage no greater than 250 volts, and which has a manufacturer's specified storage capacity of not less than 20 gallons nor more than 120 gallons.

(5) "Heat pump water heater without storage tank" means a water heater which utilizes single phase electricity as the energy source to operate a mechanical refrigeration unit consisting of a compressor, a condenser, an expansion device and an evaporator designed expressly to extract thermal energy from the surrounding air and deliver it to the water in the unit, which has a manufacturer's specified energy input rating of 7.5 kilowatts or less at a voltage no greater than 250 volts, and which is intended to be connected to an electric, gas or oil storage water heater, or to some other type of water storage tank, not supplied by the manufacturer, so that water heated by the unit can be stored at a thermostatically controlled temperature for delivery on demand.

(6) "Gas, oil and electric instantaneous water heater" means a

water heater with a storage volume less than 20 gallons.

3. Section 430.22 is amended by revising paragraph (e) to read as follows:

§ 430.22 Test procedures for measures of energy consumption.

(e) *Water heaters.* (1) The estimated annual operating cost for water heaters shall be—

(i) For a gas or oil storage water heater, the product of the representative average use cycle of 365 days per year times the sum of—

(A) The product of the average daily auxiliary electrical energy consumption in kilowatt-hours per day, determined according to section 4.5.1 of Appendix E or in Btu per day from section 4.1.8 of Appendix E1 of this subpart, times the representative average unit cost of electricity in dollars per kilowatt-hour or Btu as appropriate as provided by the Secretary plus;

(B) The product of the average daily gas or oil energy consumption in Btu per day, determined according to section 4.5.2 of Appendix E or in Btu per day from section 4.1.12 of Appendix E1 of this subpart, times the representative average unit cost of gas or oil, as appropriate, in dollars per Btu as provided by the Secretary, the resulting product then being rounded off to the nearest dollar per year;

(ii) For an electric storage water heater, the product of the following three factors:

(A) The representative average use cycle of 365 days per year;

(B) The average daily energy consumption in kilowatt-hours per day, determined according to section 4.5.4 of Appendix E or in Btu per day from section 4.1.12 of Appendix E1 of this subpart; and

(C) The representative average unit cost of electricity in dollars per kilowatt-hour or Btu as appropriate as provided by the Secretary, the resulting product then being rounded off to the nearest dollar per year;

(iii) For a heat pump water heater with storage tank, the product of the following three factors:

(A) The representative average use cycle of 365 days per year;

(B) The average daily energy consumption in Btu per day, determined according to section 4.1.12 of Appendix E1 of this subpart; and

(C) The representative average unit cost of electricity in dollars per Btu as provided by the Secretary, the resulting product then being rounded off to the nearest dollar per year;

(iv) For a heat pump water heater without storage tank, the product of the following three factors:

(A) The representative average use cycle of 365 days per year;

(B) The average daily energy consumption in Btu per day, determined according to section 4.1.12 of Appendix E1 of this subpart; and

(C) The representative average unit cost of electricity in dollars per Btu as provided by the Secretary, the resulting product then being rounded off to the nearest dollar per year; and

(v) For an instantaneous water heater, the product of the following three factors:

(A) The representative average use cycle of 365 days per year;

(B) The average daily energy consumption in Btu per day, determined according to section 4.1.12 of Appendix E1 of this subpart; and

(C) The representative average unit cost of energy in dollars per Btu as provided by the Secretary, the resulting product then being rounded off to the nearest dollar per year.

(2) The energy factor for water heaters shall be—

(i) For a gas or oil storage water heater, the quotient of the daily hot water energy consumption, determined according to section 4.3 of Appendix E of this subpart, divided by the average daily energy consumption, determined according to section 4.5.3 of Appendix E of this subpart, the resulting quotient then being rounded off to the nearest 0.01; or as determined in section 4.1.16 of Appendix E1 of this subpart;

(ii) For an electric storage water heater, the quotient of the daily hot water energy consumption, determined according to section 4.3 of Appendix E of this subpart, divided by the product of the average daily energy consumption, determined according to section 4.5.4 of Appendix E of this subpart, times 3.413 Btu per kilowatt-hour, the resulting quotient then being rounded off to the nearest 0.01; or as determined in section 4.1.16 of Appendix E1 of this subpart;

(iii) For a heat pump water heater with storage tank, as determined in section 4.1.16 of Appendix E1 of this subpart;

(iv) For a heat pump water heater without storage tank, as determined in section 4.1.16 of Appendix E1 of this subpart; and

(v) For an instantaneous water heater, as determined in section 4.1.16 of Appendix E1 of this subpart.

(3) The coefficient of performance for a heat pump water heater with or without storage tank shall be the recovery efficiency determined according to section 4.1.9 of Appendix

E1 of this subpart, rounded off to the nearest 0.01.

(4) Other useful measures of energy consumption for water heaters shall be those measures of energy consumption which the Secretary determines are likely to assist consumers in making purchasing decisions and which are derived from the application of Appendix E or Appendix E1 of this subpart.

(5) For a transition period of 6 months from the publication date of this amendment, all measures of energy consumption shall be determined either by the uniform test method for measuring energy consumption of water heaters, as set forth in Appendix E of this subpart or by the amended test method for measuring energy consumption of water heaters, as set forth in Appendix E1 of this subpart. After the transition period, all measures of energy consumption shall be determined only by the amended test method as set forth in Appendix E1 of this subpart; the uniform test method, as set forth in Appendix E of this subpart shall no longer be used.

4. Subpart B of Part 430 is amended by adding Appendix E1, to read as follows:

Appendix to E1 Subpart B of Part 430—Uniform Test Method for Measuring the Energy Consumption of Water Heaters

1. Definitions

1.1 "Cut-in" means the time or temperature when a water heater thermostat has acted to increase the energy or fuel input to the heating elements, compressor or burner to cause the heating action to increase.

1.2 "Cut-out" means the time or temperature when a water heater thermostat has acted to reduce the energy or fuel input to the heating elements compressor or burners to a minimum.

1.3 "Design Power Rating" means the nominal power rating that a water heater manufacturer assigns to a particular design of water heater heating means, expressed in kilowatts or Btu per hour as appropriate.

1.4 "Heat Trap" means a device which can be integrally connected, or independently attached, to the hot or cold water pipe connections of a water heater such that the device will develop a thermal or mechanical seal to minimize the recirculation of water due to natural thermal convection between the water heater tank and its water supply pipes and thereby reduce the heat loss to the environment from the hot water stored in the water heater.

1.5 "Instantaneous Water Heater" means a water heater that heats water on demand and the water heating operation is activated by a flow of water. No appreciable volume of hot water is stored in this type of water heater. For this test procedure, any water heater with a water storage of less than 20

gallons is considered to be an instantaneous water heater.

1.6 "Recovery Efficiency" means the ratio of the heat imparted to the water to: (a) In the case of an electrically operated water heater, the energy input to the heating elements, compressor and any auxiliary equipment during the period that the water temperature is raised from the inlet temperature to the outlet temperature during the draw test.

(b) In the case of a gas-fired or oil-fired water heater, the heat content of the fuel and energy consumed by the burners and any auxiliary equipment during the period that the water temperature is raised from the inlet temperature to the outlet temperature during the draw test.

1.7 "Standby Loss" means the ratio of the heat loss per hour to the heat content of the stored water above room temperature.

1.8 "Storage Water Heater" means a water heater that heats and stores water in an insulated tank to provide hot water as needed from the insulated storage tank.

2. Test Conditions

2.1 Installation

Install the storage type water heater according to the manufacturer's directions on a ¾ inch thick plywood platform supported by three 2 x 4 inch runners in such a way that the bottom of the water heater is elevated approximately 4 inches above the floor. For heat pump water heaters without a storage tank supplied by the manufacturer, connect the heat pump water heater to the storage tank described in section 3.1.1 using the installation kit and directions as provided by the manufacturer. If no installation kit is available from the manufacturer use 8 foot long connecting hoses, following the directions provided by the manufacturer. Install the instantaneous type water heater according to the manufacturer's directions. Install connecting piping using copper pipe of the appropriate size to the fittings on the water heater. Only if heat traps and/or piping insulation are supplied with the water heater shall they be installed for testing. Appropriate sized copper fittings will be soldered to the pipe nipples which shall be 24" long extending in a straight direction from the fitting on the water heater with a 90 degree elbow at the end of each pipe nipple. Clearance shall be provided so that none of the piping contacts other surfaces in the test room.

2.2 Flue Requirements for Gas and Oil-Fired Water Heaters

2.2.1 Flue Requirements for Gas-Fired Water Heaters

For a gas-fired water heater having a vertically discharging draft hood outlet, a 5 foot vertical flue pipe extension having a diameter equal to the largest flue collar size of the draft hood shall be connected to the draft hood outlet. For a gas-fired water heater having a horizontally discharging draft hood outlet, a 90 degree elbow having a diameter equal to the largest flue collar size of the draft hood shall be connected to the draft hood outlet. A 5 foot length of flue pipe shall be connected to the elbow and oriented to discharge vertically upward. Perform all tests with the natural draft established by this length of flue pipe. Direct vent gas-fired

water heaters should be installed with venting equipment as specified in the manufacturer's instructions; however, the vertical length of the flue pipe shall be no greater than 5 feet.

2.2.2 Flue Requirements For Oil-Fired Water Heaters

For an oil-fired water heater, established a draft at the flue collar equivalent to at least 0.02 inch of water column during periods of burner firing. For an oil-fired water heater having a vertically discharging draft hood outlet, establish the draft by using a sufficient length of flue pipe connected to the water heater flue outlet and directed vertically upward. For an oil-fired water heater having a horizontally discharging draft hood outlet, a 90 degree elbow having a diameter equal to the largest flue collar size of the draft hood shall be connected to the draft hood outlet. A length of flue pipe sufficient to establish the draft shall be connected to the elbow fitting and oriented to discharge vertically upward. Direct vent oil-fired water heaters should be installed with venting equipment as specified in the manufacturer's instructions.

2.3 Water Supply

During the entire test, maintain the water supply to the water heater inlet at a temperature of 58 °F ± 2 °F, and at a gauge pressure of between 40 pounds per square inch and the maximum pressure specified by the manufacturer for the water heater under test. If the water supply pressure varies outside of these limits during testing, the heater shall be isolated by use of a shut-off valve in the supply line downstream of the shut-off valve. There shall be no shut-off means between the expansion tank and the water heater inlet.

2.4 Energy Supply

2.4.1 Electrical Supply

For an electric water heater and for the auxiliary electrical system, if any, of an oil or gas water heater, maintain the electrical supply voltage to within ± 1 percent of the center of the voltage range specified by the water heater manufacturer on the water heater nameplate throughout the entire operating portion of each test.

2.4.2 Gas Supply

2.4.2.2 Natural Gas

For a gas water heater utilizing natural gas, maintain the gas supply at a normal inlet test pressure immediately ahead of all controls as specified by the manufacturer or if not specified then at 7 to 10 inches of water column. If the water heater is equipped with a gas appliance pressure regulator, the regulator outlet pressure at the normal test pressure shall be approximately that recommended by the manufacturer. All burners shall be adjusted to achieve an hourly Btu rating that is within ± 2 percent of the hourly Btu rating specified by the manufacturer. Use natural gas with a higher heating value of approximately 1,025 Btu per standard cubic foot. Determine the actual higher heating value, H in Btu per standard cubic foot, for the natural gas to be used in the test, with an error no greater than ± 1 percent, and use that value for all calculations included herein. Alternatively, the test can be conducted using "bottled" natural gas of a higher heating value of approximately 1,025 Btu per standard cubic

foot as long as the actual higher heating value of the bottled natural gas has been determined with an error no greater than ± 1 percent as certified by the supplier.

2.4.2.2 Propane Gas

For a gas water heater utilizing propane, maintain the gas supply at a normal inlet test pressure immediately ahead of all controls at 11 to 13 inches of water column. If the water heater is equipped with a gas appliance pressure regulator, the regulator outlet pressure at normal test pressure shall be approximately that recommended by the manufacturer. All burners shall be adjusted to achieve an hourly Btu rating that is within ± 2 percent of the hourly Btu rating specified by the manufacturer. Use propane with a higher heating value of approximately 2,500 Btu per standard cubic foot. Determine the actual higher heating value, Hp, in Btu per standard cubic foot, for the propane to be used in the test, with an error no greater than ± 1 percent, and use that value for all calculations included herein. Alternatively, the test can be conducted using "bottled" propane of a higher heating value of approximately 2,500 Btu per standard cubic foot as long as the actual higher heating value of the bottled propane has been determined with an error of greater than ± 1 percent as certified by the supplier.

2.4.3 Oil Supply

For an oil water heater utilizing fuel oil, maintain an uninterrupted supply of fuel oil to the water heater during the entire operating portion of the test cycle. Use fuel oil with a heating value of approximately 138,700 Btu per gallon. Determine the actual heating value, Ho, in Btu per gallon for the fuel oil to be used in the test with an error no greater than ± 1 percent, and use that value for all calculations included herein. Alternatively, the tests can be conducted using a tested fuel oil with a certified higher heating value of approximately 138,700 Btu per gallon as long as the actual higher heating value of the test fuel oil has been determined with an error no greater than ± 1 percent as certified by the supplier.

2.5 Thermocouple Installation

2.5.1 Thermocouple Installation For Storage Type Water Heater

Install six thermocouples inside the water heater tank. Position each thermocouple measuring junction along a vertical line at the level of the center horizontal plane of each of six non-overlapping sections of approximately equal volume from the top to the bottom of the tank such that each thermocouple is surrounded by water and as far as possible from any heating element, anodic protective device, or a water tank or flue wall. The anodic protective device may be removed in order to install the thermocouples and all testing may be carried out with the device removed. Install thermocouples in both the cold-water inlet pipe and the hot-water outlet pipe not more than six inches from the connections to the water heater, or where those connections are inaccessible, at the closest accessible point to those connections. Install in the test room a thermocouple with junction shielded against direct radiation from the water heater and positioned at the vertical mid-point of the

heater at a perpendicular distance of approximately 24 inches from the surface of the water heater jacket. Provide an associated temperature measurement and indicator system to assure that the temperature indicated for the thermocouple location is within $\pm 1^\circ\text{F}$ of the actual temperature at that location.

2.5.2 Thermocouple Installation for Instantaneous Type Water Heaters

Install thermocouples at the inlet and outlet pipes not more than six inches from the connection to the water heater, or where those connections are inaccessible, at the closest accessible point to those connections. Install the test room thermocouple as described in section 2.5.1.

2.6 Setting The Thermostat

2.6.1 Setting The Thermostat For Storage Type Water Heater

Starting with a tank of unheated water, initiate normal operation of the water heater. After cutout, determine whether the maximum value of the mean tank temperature is within the range of $135^\circ\text{F} \pm 5^\circ\text{F}$. If not, turn off the water heater, adjust the thermostat, empty the tank and refill the tank with unheated water, then initiate normal operation of the water heater, and once again determine the maximum mean tank temperature after cut-out. Repeat this sequence until the maximum mean tank temperature after cut-out is within the range of $135^\circ\text{F} \pm 5^\circ\text{F}$ at which time the thermostat is properly set. If a water heater has two thermostats, the thermostat which controls the upper heating element shall be set first to yield a maximum water temperature of $135^\circ\text{F} \pm 5^\circ\text{F}$ as measured by the topmost tank thermocouple after cutout. The thermostat which controls the lower heating element shall then be set to yield a maximum mean tank temperature of $135^\circ\text{F} \pm 5^\circ\text{F}$ after cutout.

2.6.2 Setting The Outlet Water Temperature For Instantaneous Type Water Heater

Initiate normal operation of the water heater, with a flow rate of 3.0 ± 0.25 gallons per minute, measure the outlet flow for three times starting one minute after the start of the flow and each subsequent minute of the four minute draw. Set the outlet water temperature by following the manufacturers instructions, to provide a mean discharge water temperature of $135^\circ\text{F} \pm 5^\circ\text{F}$. If the water heater is unable to provide 3.0 ± 0.25 gallons per minute of $135^\circ\text{F} \pm 5^\circ\text{F}$ water then reduce the flow rate as necessary to provide discharge water at the specified $135^\circ\text{F} \pm 5^\circ\text{F}$.

2.7 Fuel or Energy Consumption Measurement

Install one or more instruments which measure, as appropriate, and with an error no greater than ± 1 percent, the quantity of electrical energy, natural gas, propane or fuel oil consumed by a water heater. Electrical energy consumption is to be expressed in units of kilowatt-hours. Natural gas and propane consumption shall be expressed in units of standard cubic feet, i.e., measured cubic feet corrected to standard conditions of 60°F temperature and 30 inches of mercury column pressure. Fuel oil consumption is to be expressed in units of gallons. Also install one or more instruments which measure, as appropriate, and with an error no greater

than ± 1 percent, the rate of electrical energy, natural gas, propane or fuel oil consumption by a water heater. The rate of electrical energy consumption shall be expressed in units of kilowatts. The rate of natural gas and propane consumption shall be expressed in units of standard cubic feet per hour. The rate of fuel oil consumption shall be expressed in units of gallons per hour. The fuel or energy shall be measured during the draw test and the recovery, Q1, expressed in Btu; while in the standby mode, Q2, expressed in Btu and the total for the 24 hour simulated use test is Q3, expressed in Btu.

2.8 Room Ambient Temperature

Maintain the ambient air temperature of the test room between 65°F and 70°F at all times during the test, as measured according to section 3.5.

2.9 Room Ambient Relative Humidity

For heat pump water heaters only, maintain the ambient relative humidity at $50\% \pm 3\%$ during the test. Use care to ensure that the water heater tank is not placed where drafts or air currents will be excessive and thereby increase the standby losses of the tank above normal.

3. Test Procedures and Measurements

3.0 Suggested Test Sequence

It is suggested that the testing sequence be conducted in the following order to minimize testing time:

3.0.1 Determine the tank volume, if applicable, as described in section 3.1.

3.0.2 Install the water heater piping, flue and instrumentation as described in sections, as applicable, 2.1; 2.2; 2.3; 2.4; and 2.5.

3.0.3 Set the thermostat and/or discharge water temperature as appropriate and as described in section 2.6.

3.0.4 Provide for fuel or energy consumption measurement as appropriate and as described in section 2.7.

3.0.5 Control ambient conditions as appropriate and as described in section 2.8 and 2.9.

3.0.6 Make the power input determination as described in sections 3.2 and 4.1.14.

3.0.7 Conduct the first hour rating test and calculations as described in section 3.6; 4.1.1; 4.1.2 or 4.1.3 as appropriate.

3.0.8 Based upon the value of, F as determined in 3.0.7, select the appropriate value of U from table 1.

3.0.9 Based upon the value of U from table 1 select the appropriate draw schedule from table 1 and conduct the recovery efficiency test as described in sections 3.3 and 4.1.9.

3.0.10 Determine the flow rate during a draw as described in section 4.1.13.

3.0.11 After the draw test is complete and the recovery is complete and a thermal equilibrium is achieved as described in section 3.3.1, take all appropriate temperature, time and energy readings and allow the water heater to remain in the standby mode until exactly 24 hours have elapsed from the start of the draw test. At this conclusion of the standby portion of the simulated use test take all appropriate temperature, time and energy readings.

3.0.12 Calculate the daily water heating energy consumption as described in sections 4.1.15.

3.0.13 Calculate the daily hot water energy consumption as described in section 4.1.12.

3.0.14 Calculate the energy factor as described in section 4.1.16.

3.0.15 Calculate the recovery rate as described in section 4.1.17.

3.1 Tank Storage Capacity

Determine the storage capacity, V, of the water heater under test, in gallons, by determining the tare of the empty tank and subtracting this tare from the gross weight of a full tank of water at 58°F with all air eliminated, with line pressure applied as described in section 2.3 and dividing the net pounds of water by 8.33 pounds per gallon, the density of water at 58°F . The resulting quotient is the tank capacity, in gallons.

3.1.1 Tank Storage Capacity for Heat Pump Water Heaters Without Tank Supplied by Manufacturer

The tank to be used for testing heat pump water heaters, without tank supplied by the manufacturer, shall have a capacity, as determined in section 3.1, of 47.0 gallons, plus 1.0 gallon, minus zero gallon and have a standby loss of 0.009 ± 0.0005 per hour.

3.2 Power Input Determination

3.2.1 Power input determination for all types of water heaters. Initiate normal operation of the water heater, and by using the appropriate instrumentation specified in section 2.7 and the appropriate fuel heating values of section 2.4, determine the power input, P, to the main burners (including pilot light power, if any) or heating elements of the water heater under test, in Btu per hour or kilowatts, as appropriate. Meter fuel input of gas fueled burners following a 15 minute preheat period.

3.3 Recovery Efficiency

3.3.1 Recovery efficiency for all types of storage water heaters. With the water heater turned off, fill the tank with supply water and eliminate any air from the tank and then apply pressure as described in section 2.3. Turn on the water heater and run until cutout occurs at $135^\circ\text{F} \pm 5^\circ\text{F}$ as specified in section 2.6.1. It is not required to measure the energy used during this recovery. After cut-out occurs measure the mean tank temperature using the thermocouples described in section 2.5 every minute until thermal equilibrium is achieved (i.e., no change in successive mean tank temperatures). Record the time, mean tank temperature, oil or gas energy measurements, as appropriate, and the electrical energy meter reading (if any electrical energy is used by the water heater under test convert to the Btu equivalent) and begin the draw test by drawing water out of the water heater as described in table 1. All draws during the simulated use test are to be made at flow rates of 3.0 ± 0.25 gallons per minute. During the draws, measure the water temperature of the outlet and inlet water using the thermocouples described in section 2.5 at the end of the first minute of the draw and every subsequent whole minute since the draw started and take the arithmetic mean of the hot water discharge and the cold water inlet. Subtract the mean water inlet temperature from the mean water outlet temperature and multiply this difference by

the amount of the draw of hot water, in gallons, by 8.25 the specific heat of water expressed in Btu per gallon degree F. The resulting product is the heat supplied to the water for that specific draw of hot water. Add the energy for all of the draws and recoveries plus the term to account for the energy difference in the mean tank water temperature at the start of the simulated use test from the mean tank water temperature at the end of the last draw and recovery at end of the draw test. This term to account for the energy difference is the product of the mean tank water temperature at the end of the draw test and recovery, minus the mean tank water temperature at the start of the simulated test, the specific heat of water, expressed as 8.25 Btu per gallon degree F and the volume of the tank, expressed in gallons as determined in section 3.1. Divide the sum of all of the preceding energy terms, expressed in Btu by the total energy, Q_1 , expressed in Btu, used during the draw test expressed in Btu, required for the water heater to effect the heating of the total amount of hot water drawn off. The quotient is the recovery efficiency expressed as a decimal without units.

3.3.2 Recovery efficiency for all types of instantaneous water heaters. With the water heater turned off, fill the instantaneous water heater with supply water and eliminate any air from the lines and water heater then apply pressure as described in section 2.3. With the thermostat set as described in section 2.6.2 initiate normal operation of the water heater with a flow rate of 3.0 ± 0.25 gallons per minute, or as adjusted and described in section 2.6.2, during the prescribed draw schedule in table 1 while measuring the inlet and outlet water temperature every minute and taking the mean values as described in section 2.6.2. Record the energy used, Q_1 , expressed in Btu, used during the draw test converting electrical energy, Z , to Btu, if necessary, the amount of the total draws, in gallons, U , as defined in table 1. Subtract the mean inlet (supply) water temperature from the mean outlet (discharge) water temperature and multiply this quantity, T_1 , by the total amount of the draws, U , as defined in Table 1 and multiply by the nominal specific heat of water, 8.25 Btu per gallon degree F and divide by the total energy, Q_1 , used during the draw test. The resultant is the recovery efficiency, E_r , expressed as a decimal without units.

3.4 Room Temperature Measurement
Room temperature wherever specified shall be the temperature determined by using the test room thermocouple described in section 2.5.

3.5 Mean Tank Temperature Measurement
Mean tank temperature, the average temperature of the water in a water heater tank, wherever specified shall be the mean of the temperatures determined by using the six water heater tank thermocouples described in section 2.5.

3.6 First Hour Rating Water Draw Test For All Water Heaters

Establish normal water heater operation with the maximum mean tank temperature within the range specified in section 2.6 and with all air eliminated from the water heater tank. Begin the first hour rating water draw

test after thermal equilibrium is achieved as described in section 3.3.1 after a cutout by recording the mean hot water outlet water temperature as described in section 3.3.1, recording the time, and begin withdrawing water from the water heater through the hot water outlet at a rate of 5.0 ± 0.25 gallons per minute. Interrupt electrical power to the heating elements or fuel to the main burner of the water heater to prevent their operation during this test. Collect all of the water withdrawn from the water heater during the test in a suitable container for the purpose of determining its weight at the conclusion of the test. Alternatively, a water meter may be used to directly measure the volume of water withdrawn from the water heater. Beginning 15 seconds after the start of the test and at every subsequent 15 second interval throughout the duration of the water draw, record the outlet and inlet water temperatures. For the purposes of this test, the maximum recorded temperature shall be referred to as the initial outlet water temperature, T_o . Monitor the functioning of the water heater thermostat(s) and record the time that any thermostat cuts in. Continue the withdrawal of water until the outlet water temperature drops to a value 20°F below the initial water temperature, T_o , at which time terminate the withdrawal. Determine the weight of the water withdrawn, W , in pounds measured with an error no greater than 2 percent, or the volume of water withdrawn, G , in gallons measured with an error no greater than 2 percent. Determine the arithmetic mean of the outlet water temperature readings recorded, T_m , in degrees F. Determine the arithmetic mean of the inlet (supply) water temperature readings recorded, T_i , in degrees F. Determine the elapsed time of the test prior to a thermostat of the water heater acting to operate a heating element or the main burner, T_c , in hours measured with an error no greater than 1 percent. If a thermostat on the water heater does not act to operate a heating element or the main burner within one hour after the start of the test, the test is to be terminated and T_c expressed as one hour.

4. Calculation of Derived Results From Test Measurements

4.1 In order to compute an energy factor to determine the annual cost of operation of various types of water heaters, the following formulas are used in the order presented.

4.1.1 First Hour Rating for all storage water heaters except heat pump water heaters without a storage tank supplied by the manufacturer. For a gas, oil, electric and for a heat pump water heater with a storage tank supplied by the manufacturer, calculate the first hour rating, F , expressed in gallons and defined as:

$$F = (Wd)(T_o - T_i) / ((d)(T_o - T_i) + (R)(1 - T_c))$$

$$\text{or}$$

$$F = (V_2)(T_o - T_i) / ((d)(T_o - T_i) + (R)(1 - T_c))$$

where
 Wd = weight of the water withdrawn during the first hour rating water draw test determined in accordance with section 3.6 for storage gas, oil, electric and heat pump water heaters with storage tanks supplied by the manufacturer, expressed in pounds

d = 8.25 pounds per gallon the nominal density of water at the nominal mean temperature of the water

T_o = mean of the outlet water temperature measurements made over the period of the first hour rating draw test determined in accordance with section 3.6 for storage gas, oil, electric and heat pump water heaters with storage tanks supplied by the manufacturer, expressed in degrees F.

T_i = the mean inlet water temperature as determined in accordance with section 3.6, expressed in degrees F

T_c = the maximum recorded water temperature as determined in accordance with section 3.6, expressed in degrees F

R = recovery rate as determined in section 4.1.17, expressed in gallons per hour

T_c = elapsed time from the start of the first hour rating draw test until a thermostat on the water heater acts to operate the water heating process in accordance with section 3.6, expressed in hours

V_2 = the volume of water withdrawn during the first hour rating water draw test determined in accordance with section 3.6, expressed in gallons

4.1.2 First hour rating for heat pump water heaters without a storage tank supplied by the manufacturer. For a heat pump water heater without a storage tank supplied by the manufacturer, calculate the first hour rating, F , expressed in gallons and defined as:

$$F = (Wd)(T_o - T_i) / ((d)(T_o - T_i) + (R)(1 - T_c) + (0.837)(V_r - 47))$$

where

Wd = weight of the water withdrawn during the first hour rating draw test determined in accordance with section 3.6, expressed in pounds

d = 8.25 pounds per gallon the nominal density of water at the nominal mean temperature of the water

T_o = mean of the outlet water temperature measurements made over the period of the first hour rating draw test determined in accordance with section 3.6, expressed in degrees F

T_i = the mean inlet water temperature as determined in accordance with section 3.6, expressed in degrees F

T_c = the maximum recorded water temperature as determined in accordance with section 3.6, expressed in degrees F

R = recovery rate as determined in section 4.1.17, expressed in gallons per hour

T_c = elapsed time from the start of the first hour rating draw test until a thermostat on the water heater acts to operate the water heating process in accordance with section 3.6, expressed in hours

0.837 = nominal relationship between the volume of water withdrawn from an electric storage water heater during the first hour rating water draw test and its rated storage capacity, determined by a linear regression analysis of test data, expressed as a dimensionless quantity

V_r = storage capacity of the storage water heater to which the heat pump water heater without storage tank is to be connected, expressed in gallons

47 = rated storage capacity of the standard test electric storage water heater used for test purposes, expressed in gallons

4.1.3 First hour rating for all instantaneous water heaters. For all instantaneous water heaters the first hour rating, F, expressed in gallons is calculated as:

$$F = (R)(R)/300$$

where

R = recovery rate as determined in section 4.1.17, expressed in gallons per hour

4.1.4 Gas Correction Factor. The correction factor, Cf, to determine the "standard" gas volume used is calculated where "standard" conditions are at 60F and 30.00 inches Hg (1016 millibars) atmospheric pressure. The partial pressure of the water vapor is determined from tables of vapor pressure of water at various temperatures, by entering the appropriate gas temperature. The other pressures are to be taken from appropriate instrument readings. The correction factor, Cf, is calculated as a dimensionless quantity and is defined as:

$$Cf = (17.64)(Pg + Pa + Pwv)/(Tg + 460)$$

where

Pg = the gas pressure, expressed in inches Hg. Note: to convert inches of water to inches Hg, multiply by 0.07343

Pa = the atmospheric pressure, expressed in inches Hg. Note: if the pressure is in millibars, then multiply by 0.02953 to convert inches Hg

Pwv = the water vapor pressure, partial, expressed in inches Hg. Note: This factor applies only when net test meter is used.

Tg = the temperature of gas, expressed in degrees F.

4.1.5 Energy Used During a Draw Test for Gas-Fired Water Heaters. The energy used during a draw test of a gas-fired water heater, Q1, is calculated where the volume (Vol) of gas used during a test is corrected to standard conditions using Cf and is converted to Btu using the higher heating value of the gas. The energy used during a draw test is defined as:

$$Q1 = (Cf)(H)(Vol) + q$$

where

Cf = the correction factor as defined in 4.1.4

H = the higher heating value of gas used, expressed in Btu per standard cubic foot

Vol = the volume of gas used during a test as measured by the gas meter, expressed in cubic feet

q = is as calculated in section 4.1.8, expressed in Btu

4.1.6 Energy Used During a Draw Test for Electric and Heat Pump Water Heaters. The energy used during a draw test of electric and/or heat pump water heaters, Q1, is calculated in Btu and is defined as:

$$Q1 = (Z)(3,413)$$

where

Z = the total electrical energy used during a draw test, expressed in kilowatt hours
3,413 = a constant to convert kwh to Btu.

4.1.7 Energy Used During a Draw Test for Oil-Fired Water Heaters. The energy used during a draw test of an oil-fired water heater, Q1, is calculated in Btu as:

$$Q1 = (J)(Wf) + q$$

where

J = the heating value of the fuel oil, expressed in Btu/lb

Wf = the weight of the fuel oil consumed during the draw test, expressed in pounds

q = is as calculated in section 4.1.8, expressed in Btu

4.1.8 Auxiliary Energy Used During a Draw Test for All Types of Water Heaters.

The auxiliary energy used by all types of water heaters (pumps, motor, fans, etc.), q, during a draw test is calculated in Btu and is defined as:

$$q = (Z)(3,413)$$

where

Z = is as defined in 4.1.6

3,413 = is as defined in section 4.1.6

4.1.9 Recovery Efficiency. The recovery efficiency, Er, during a draw test, by taking draws in accordance with table 1, is calculated as a dimensionless quantity and is defined as:

$$Er = ((k)(U)(T1) + (k)(V1)(Te - Ti))/(Q1)$$

where

k = 8.25 Btu/gallon F, the nominal specific heat of water during the temperature range used

U = the total volume of the draws during the draw test, expressed in gallons per day, established as shown in Table 1

T1 = the mean temperature rise of the hot water drawn during the draw test (Tha - Tia) where Tha is calculated in 4.1.10 and Tia is calculated in 4.1.11, expressed in degrees F

V1 = the volume of the storage tank, expressed in gallons

Te = the mean storage tank water temperature at thermal equilibrium at the completion of the recovery after the final draw of the draw test, expressed in degrees F

Ti = the initial mean tank water temperature at the beginning of the simulated use test, expressed in degrees F

Q1 = is as defined in 4.1.5, 4.1.6 or 4.1.7 as appropriate, expressed in Btu

4.1.10 Mean Outlet Hot Water

Temperature. The mean value of the outlet hot water temperature, Tha, is calculated in degrees F and is defined as:

$$Tha = (t2 + t3 + \dots + tn)/(n)$$

where

t2 = the hot water temperature at the end of the first 15 seconds of the draw, expressed in degrees F

t3 = the hot water temperature after 30 seconds of the draw, expressed in degrees F

tn = the hot water temperature at the start of the nth 15 second interval of the draw, expressed in degrees F

n = the number of discrete 15 second intervals during the draw test

4.1.11 Mean Supply Water Temperature. The mean value of the supply (cold) water temperature, Tia, is calculated in degrees F and is defined as:

$$Tia = (t2 + t3 + \dots + tn)/(n)$$

where

t2 = the cold water inlet temperature at the end of the first 15 seconds of the draw, expressed in degrees F

t3 = the cold water inlet temperature at the start of the first 30 seconds of the draw, expressed in degrees F

tn = the cold water inlet temperature at the start of the nth 15 second interval of the draw, expressed in degrees F

n = the number of discrete 15 second intervals during the draw test

4.1.12 Daily Water Heating Energy Consumption. The total daily water heating energy consumption, Cy, of all types of water heaters expressed in Btu per day and using an established daily hot water usage, U, as defined in table 1, is calculated with a twenty four hour simulated use test and is defined as:

$$Cy = Q3 - (k)(V1)(Tf - Ti)/(Er)$$

where

Q3 = the total of all energy used during the 24 hour simulated use test, note that Q3 is the sum of Q1, the energy used during the draw test, and Q2, the energy used during the remaining time while the water heater is in the standby mode, expressed in Btu

k = is as defined in 4.1.9

V1 = the volume of the storage tank, expressed in gallons

Tf = the final mean tank temperature at the end of the 24 hour simulated use test, expressed in degrees F

Ti = the initial mean tank temperature at the beginning of the simulated use test, expressed in degrees F

Er = the recovery efficiency as determined by 4.1.9.

4.1.13 The Flow Rate During a Draw. The flow rate of hot water during a draw, Fr, in gallons per minute, is calculated by weighing the water from a draw and timing the draw and is defined as:

$$Fr = Ww/((Td)(8.25))$$

where

Ww = the weight of the water during the draw, expressed in pounds

Td = the duration of the draw, expressed in minutes

8.25 = is a constant to convert pounds of water to gallons of water.

4.1.14 Power or Firing Rate

Determination. The average input power, P, in Btu per hour, for a given test is calculated and is defined as:

$$P = (60 \text{ min/hour})(Q1)/(Tb)$$

where

Q1 = is as defined in 4.1.5; 4.1.6 or 4.1.7 as appropriate, expressed in Btu

Tb = the duration of the burner or heating element or compressor on time, expressed in minutes

60 = is a constant to convert minutes to hours.

4.1.15 Daily Hot Water Energy Consumption. The daily hot water energy consumption, Cc, is calculated in Btu per day and is defined as:

$$Cc = (k)(U)(T1)$$

where

k = is as defined in 4.1.9

U = is as defined in 4.1.9

T1= is as calculated in 4.1.9

4.1.16 Energy Factor. The energy factor, EF, is calculated as a dimensionless quantity and is defined as:

$$EF = (Cc)/(Cy)$$

where

Cc= is as calculated in 4.1.15

Cy= is as calculated in 4.1.12.

4.1.17 Recovery Rate. Recovery rate, R, for all types of water heater is calculated in gallons per hour and is defined as:

$$R = (P)(Er)/((k)(T1))$$

where

P= is as calculated in 4.1.14

Er= is as calculated in 4.1.9

k= is as defined in 4.1.9

T1= is as calculated in 4.1.9

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TABLE 1

F	U	Draw Schedules: Times and Amounts						
		Draw number	1	2	3	4	5	6
First hour rating, F, for all gas, electric and heat pump water heaters as determined by test in section 4.1.1; 4.1.2 or 4.1.3 as appropriate	Assigned value for U* expressed in gal/day	Time from start of test, hours	0	1	2	3	4	5
		Amount of draw as a percent of U#	16.7	33.3	50.0	66.7	83.3	100.0
			Cumulative percents					
Up to 40 gallons	20	Amount of draw in gallons #	3.3	6.7	10.0	13.3	16.7	20.0
Over 40 but less than 55 gallons	40	Amount of draw in gallons #	6.7	13.3	20.0	26.7	33.3	40.0
Over 55 but less than 80 gallons	60	Amount of draw in gallons #	10.0	20.0	30.0	40.0	50.0	60.0
Over 80 gallons	80	Amount of draw in gallons #	13.3	26.7	40.0	53.3	66.7	80.0

NOTES: *For all oil-fired water heaters U is assigned to be 60 gallons/day.

#Amounts shown are cumulative, all draws are equal.

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Registered Federal Reporter

Friday
March 13, 1987

Part III

Department of Agriculture

Farmers Home Administration

7 CFR Parts 1806, 1822, 1901, 1924,
1930, 1933, 1940, 1942, 1943, 1944, 1945,
and 1955

Provisions for Planning and Performing
Construction and Other Development;
Final Rule

DEPARTMENT OF AGRICULTURE

Farmers Home Administration

7 CFR Parts 1806, 1822, 1901, 1924, 1930, 1933, 1940, 1942, 1943, 1944, 1945, and 1955

Provisions for Planning and Performing Construction and Other Development

AGENCY: Farmers Home Administration, USDA.

ACTION: Final rule.

SUMMARY: The Farmers Home Administration (FmHA) amends its regulation for planning and performing construction and other development work. This action is being taken to change the basic structure of FmHA's development standards for single and multiple family housing, to require certification of plans and specifications and to reference guides which address liveability, marketability and construction practice concerns. Other revisions add comparative classifications for rehabilitation of multiple family housing; consolidate and clarify criteria and procedures for determining the acceptability of insured 10-year home warranties for new single family homes financed by FmHA, add definitions of modular/panelized housing and manufactured housing; and add options for meeting builder surety requirements.

The change in development standards implements FmHA's authority to determine and prescribe standards for adequate housing under section 509(a) of the Housing Act of 1949, as amended by the Housing Urban-Rural Recovery Act of 1983, Pub. L. 98-181. The intended effect is to comply with Pub. L. 98-181 and provide affordable housing to eligible families in rural areas according to development standards which are generally acceptable to the public and the building industry and which protect the safety and health of the occupants.

EFFECTIVE DATE: May 12, 1987.

FOR FURTHER INFORMATION CONTACT:

Joyce M. Halasz, Single Family Housing Loan Specialist, Telephone: 202-382-1489, regarding single family housing requirements; Keith A. Suerdick, Architect, Telephone: 202-382-9651, regarding technical requirements; and Karen King, Multiple Family Housing Loan Specialist, Telephone: 202-382-1620, regarding multiple family housing requirements.

SUPPLEMENTARY INFORMATION: This final rule has been reviewed under USDA procedures established in Departmental Regulation 1512-1 which

implements Executive Order 12291 and has been classified as "nonmajor." This action will result in an annual effect on the economy of less than \$100 million and will neither result in a major increase in cost or prices, nor adversely affect competition, employment, investment, productivity, innovation, or the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets. There is no impact on proposed budget levels, and funding allocations will not be affected because of this action.

This document has been reviewed in accordance with 7 CFR Part 1940, Subpart G, "Environmental Program." It is the determination of FmHA that it does not constitute a major Federal action significantly affecting the quality of the human environment and in accordance with the National Environmental Policy Act of 1969, Pub. L. 91-190, an Environmental Impact Statement is not required.

The FmHA programs which are listed in the Catalog of Federal Domestic Assistance under numbers 10.405—Farm Labor Housing Loans and Grants; 10.411—Rural Housing Site Loans; 10.415—Rural Rental Housing Loans; 10.416—Soil and Water Loans; 10.420—Rural Self-Help Housing Technical Assistance are subject to the provisions of Executive Order 12372 which requires intergovernmental consultation with state and local officials (7 CFR 3015, Subpart v, 48 FR 29112, June 24, 1983).

Emergency Loans—10.404; Farm Ownership Loans—10.407; Very Low and Low Income Housing Loans—10.410; Very Low Income Housing Repair Loans and Grants—10.417 are excluded from the scope of Executive Order 12372 which requires intergovernmental consultation with state and local officials.

References to the forms related to this regulation have been revised to reflect their renumbering to the 1924 series, which corresponds to the CFR reference numbers, and several other minor and editorial changes have been made.

The implementation of other development standards to replace FmHA's present: Minimum Property Standards (MPS) and the renumbering of related forms has necessitated amendments to several Parts of Chapter XVIII, Title 7, Code of Federal Regulations. These amendments consist of conforming changes and cross references in numerous FmHA loanmaking and loan servicing regulations since development standards are relied on in several FmHA decisionmaking processes. All FmHA regulations that refer to MPS are

amended to refer to an applicable development standard. In addition, we have added a reference to noise abatement procedures in Subpart C of Part 1940 of this chapter to assure compliance with the Noise Abatement and Control Act. These changes are addressed in the final rule publication, but were not included in the proposed rule since they were only administrative in nature.

The addition of comparative classifications for multiple family housing rehabilitation is to assure that buildings rehabilitated or repaired will meet levels of quality or performance comparable to those prescribed by the Secretary of HUD.

The criteria and procedures for determining the acceptability of insured 10-year home warranties were located in several different sections of the regulation and required clarification and consolidation. The intended effect of the revision is to simplify and shorten the approval process.

Revised definitions of modular/panelized housing and manufactured housing are in § 1924.4 (k) and (mn).

Options for builder surety requirements are in § 1924.6(a)(3).

Discussion of Comments

A proposed rule was published in the *Federal Register* (51 FR 9014) on March 17, 1986, and invited comments for 60 days ending May 16, 1986.

Twenty-four comments were received from builders, non-profit housing organizations, trade associations, legal services organizations, state community development agencies, FmHA employees and other individuals addressing numerous aspects of the regulation, some of which were not proposed to be revised. The following summarizes the comments and the actions taken.

A. Revision of Development Standards

Numerous comments were received on the primary purpose of this revision, acceptance of national model building codes as FmHA minimum development standards. Most comments were favorable, stressing the benefits of uniformity of standards, cost effectiveness, encouragement of new housing technology, streamlining the preconstruction approval process and making new housing more accessible to lower income families. Three commenters, however, expressed concerns that the change would result in housing of poor appearance and quality and, therefore, be less acceptable to the community. This agency is concerned with maintaining the quality and appearance of our housing loan portfolio

and, therefore, provides design guides to assist field personnel in evaluating certain housing characteristics during the underwriting process. We believe with less government regulation, the housing consumer will have a direct influence on what is available in the housing market and will influence it favorably toward lower costs and improved housing design.

One commenter requested clarification of the development standards since the proposed rule did not clearly identify the types of codes that must be included in the development standards. Section 1924.5(d)(1)(i)(E) has been revised for clarification.

B. Insured 10-Year Warranties

There was a request for clarification of our provisions for insured 10-year warranties with respect to the procedures for requesting partial payments when construction inspection reports are not available and with respect to our conditional acceptance of risk retention groups as 10-year warranty insurers under the Product Liability Risk Retention Act. Sections 1924.6(a)(12)(v)(B) and 1924.9(b)(3)(i) have been revised to clarify the relationship between requests for partial payments and inspections of development work covered by a 10-year warranty. We have determined to retain the language concerning our right to reconsider our recognition of any group claiming authority as a risk retention group if such authority is ever challenged by a state insurance commission or other regulatory agency. We do not believe this language unfairly prejudices acceptance of such warranties in the field. We do not intend to imply that they are not authorized, we simply note that there are still questions which, if raised, may necessitate reconsideration. We have added a statement to this effect. In addition, we have added a new § 1924.12, entitled "Warranty of Development Work," and incorporated pertinent information previously in § 1924.9(d), "Warranty Period."

C. Certification of Plans and Specifications

Several comments were received concerning plan certification. One commenter requested clarification as to when certification documents are required. Another commenter believed the rule should be amended to allow approval of plans where they have been certified and are being resubmitted by the same builder. One commenter felt certification may be burdensome for applicants, due to an absence of

architects, engineers or code officials in rural areas. Finally, one commenter opposed imposing independent certification requirements on the builder, but suggested that self-certification be used if deemed necessary. The agency has determined that the retention of the certification requirement is necessary to protect its interest in providing decent, safe and sanitary housing and that procedures for certification are readily available even in the most rural areas. The final rule has been clarified to require certification of the final plans only. Recertification is not required for resubmitted plans that have not been modified. Any modifications, however, must be certified. Certification of modifications to single family housing plans which do not affect code compliance may be waived by the FmHA County Supervisor if the builder provides FmHA a written statement that the modification is not regulated by the applicable development standards. Certification by an in-house architect/engineer or by the architect who prepared the plans is acceptable. See § 1924.5(f)(1)(iii).

D. Reference to Other Codes or Standards

One commenter suggested that the National Standard Plumbing Code be included as one of the voluntary national model building codes. Even though the National Standard Plumbing Code is used by many jurisdictions and organizations throughout the country, it is not directly referenced or adopted by an association of building officials, which was the basic criteria used in the President's Commission on Housing Report in 1982 to identify a national model building code. This criteria has been included in the final rule. Changes were made to § 1924.4(h)(2) and Exhibit E. It was pointed out by one commenter that to completely eliminate all references to the minimum property standards would not ensure that FmHA financed construction would meet acceptable levels of quality, safety and durability because these standards are not included in the model building codes. We agree with the commenter and are referencing appendices C and F of HUD Handbook 4910.1, Minimum Property Standards for Housing, in the final rule to ensure the continued durability of products which are likely to be used in FmHA-financed construction. This change appears in § 1924.5(d)(1).

E. Thermal Performance Construction Standards

One commenter recommended revising Note 2 in Exhibit D, paragraph

IV.A. to allow nonuniform installation of ceiling insulation as long as the maximum U-value for the ceiling assembly is met. This commenter referred to low pitch roof construction where uniform distribution of insulation is hampered by roof geometry. FmHA does allow compression of ceiling insulation at the outside building walls to allow for a 1-inch ventilation space under the roof sheathing. Additional compression is permitted if the overall U-value of the ceiling assembly meets the standards in Exhibit D. We have clarified Note 2 in the final rule to require insulation to be continuous above all ceiling joists such that there are no gaps in insulation above these joists. Another commenter recommended requiring lower infiltration rates for windows and doors due to recent improvements in the infiltration rates of these products. We agree that the infiltration properties of windows and doors has improved recently, however, further study is needed to determine what maximum infiltration rate should be allowed. We are gathering information on this subject. It was noted that paragraph IV.D.3.b. of Exhibit D, published previously in 45 FR 39789 (June 12, 1980), was inadvertently omitted from the text of the proposed rule. We have included this paragraph in the final rule document.

F. Lead-Based Paint Hazards

One commenter raised the issue of the need for updating the "Prohibition of Lead-Based Paint," Exhibit H to this Subpart. We agree that this exhibit, first issued in 1974, must be updated because recent experiences and research indicates that potential hazard areas and mitigation methods have changed. The Department of Housing and Urban Development (HUD) issued its final rule on Lead-Based Paint Hazard Elimination on August 1, 1986. FmHA will update its regulations on the elimination of lead-based paint hazards in rural areas accordingly at the earliest opportunity. We have, however, clarified that the applicable warnings should be given to applicants, borrowers or tenants.

G. Exception to Competitive Bidding

Comments were received objecting to the requirement in § 1924.13(e)(1)(vii) that costs must be comparable to other similar projects in the area which were competitively bid. This is difficult when Section 515 projects are built in areas in which there are no comparable competitively bid projects. The commenters felt that competitive bidding does not always lead to less

expensive projects and in fact, may result in more expensive projects, therefore, past experience of the contractor should be grounds upon which to permit a negotiated contract. The Agency has considered the comments and agrees. We have changed § 1924.13(e)(1)(vii)(A)(I) to state: "An applicant may negotiate a construction contract provided the State Director grants an exception and documentation shows that:

(1) The contract price is competitive with other projects similar in construction and design built in the area."

The wording "under contracts which have been competitively bid" has been eliminated. In effect, exceptions to competitive bidding may be granted to nonprofit organizations and public bodies provided all the requirements of § 1924.13(e)(1)(vii) are met.

H. Cost Certification and Audit Requirements

Comments were received objecting to cost certifying as costly and time consuming. The commenters felt that if the State Director can justify the cost of an owner-builder project and it is comparable in cost to publicly bid projects, cost certification should not be required. The Agency does not deem it appropriate to eliminate the cost certification requirement for projects involving an identity of interest. In such instances we have found cost certification to be an extremely valuable tool in the determination of actual cost of construction.

Comments were received regarding § 1924.13(e)(1)(v)(D) which requires that the CPA or LPA determine that "the actual cost of construction performed under the contract is accurate and correct." The commenters felt that this was inappropriate for a CPA who is neither an architect nor an engineer and unfamiliar with the actual costs of such materials and activities. Further, requiring the CPA or LPA to determine that costs are "accurate and correct," requires additional time and work to complete a project. The commenters recommended that, if necessary, they would suggest using such language as "fairly represent cost of construction" instead. The Agency has considered all comments pertinent to this issue and has revised the rule to afford the CPA or LPA the professional latitude necessary to cost certify respective project costs without violating the CPA code of ethics.

I. Partial Payments, Contract Retainage and FmHA Approval of Payments by Interim Lenders

Comments were received suggesting that the Agency reduce the required amount of payment retention to 5 percent or that we induce prompt payment by eliminating payment retention. The Agency does not concur with these recommendations because they would increase the borrower's financial exposure during the construction period and minimize the borrower's and the Agency's assurance that sufficient funds will be available to complete construction in the event of contractor default. These construction contracts are not subject to Federal Procurement Regulations.

A comment was received questioning why owner-builders are allowed to draw 90 percent without precautions. The Agency takes the position that we treat owner-builders the same as any other builder where the release of partial payments is concerned.

A comment was received recommending that the Agency permit no exceptions to surety requirements. The Agency's position is that the State Director needs the latitude and the provisions under which to accept a contractor who cannot obtain a payment and performance bond when it is in the best financial interest of the borrower and the government. In such instances, surety of another type is required.

J. Plant Inspections—Modular/Panelized Housing Units

Two commenters requested clarification of FmHA requirements for periodic inspections of plant facilities for modular/panelized housing units. There appeared to be a discrepancy between the language in § 1924.8(e) and that in Exhibit B to this subpart. Section 1924.8(e) has been revised to clarify that plant inspections will be performed in accordance with paragraphs II and III of Exhibit B. We do accept plant inspections by HUD or a HUD authorized agency in Category III states; however, some panelized units do not require HUD factory inspections, and FmHA employees should inspect off-site assembly, as necessary, to determine the performance and stability of materials and construction.

K. Other Comments

One comment was received suggesting that owner-builder projects are difficult to administer to protect the interest of the government, and, therefore, the owner-builder should deposit 5 percent in an interest bearing escrow to help defray costs of the one-

year guarantee. The Agency has considered this proposal and is not incorporating it. The suggested 5 percent deposit seems arbitrary. Furthermore, even though not explicitly required in our regulations, the owner-builder will normally insist that all work and materials by suppliers and contractors be warranted for one year.

One commenter was concerned that additional guidelines for seasonal farm labor housing were necessary. In northern states, heating is a major concern even in the summer months and the commenter felt that adequate heating was seldom available. Residents use make-shift heating sources which create a potential health and safety hazard. The commenter suggested that a standard be developed based on heating degree days similar to the ratios used in determining need for weatherization in Exhibit D. This would insure adequate safe heating units. The Agency has considered this proposal and finds that Section 303-7 of Exhibit I requires the thermal performance of seasonal farm labor housing to comply with Exhibit D, paragraph IV, C. 3. Compliance with this standard should prevent tenants from being forced to install unsafe heating devices.

One commenter felt that confusion exists between the use of FmHA forms and AIA forms prescribed in Guide 1 and questioned why there are two different sets of documents. The Agency's position is that projects that are small in magnitude and complexity, such as single family housing and small rural rental housing projects, do not require the same degree of detail in the contracts needed for larger projects, therefore, using the same contract forms is neither logical nor efficient. Section 1924.6(a)(1) is revised to indicate that Form FmHA 1924-6 is the only acceptable contract form for single family housing.

One commenter suggested that a full-time project representative should not be required for small projects and that, if required, should be an authorized use of loan funds. The requirement for a project representative is currently at the discretion of the State Director and has seldom been imposed. The cost of this service is eligible for inclusion in the total project cost.

One commenter stated that at the eleventh month of the warranty phase, the architect is to make an inspection with FmHA. The commenter felt that this inspection should be free of charge if there has been a mistake made by the architect. The Agency's position is that the warranty phase service by the architect is required and thus eligible for

reimbursement regardless of whether there are any deficiencies or not. The deferral or retainage of payments to the architect by the owner for alleged or actual error or negligence should be considered a separate issue and action.

One commenter suggested that using a percentage to determine builders' profit is a strong disincentive to save costs. Under this method, a builder is actually financially penalized if a project comes in under cost. The commenter suggested that an incentive system to save costs be developed. The Agency's position is that if an owner-builder is allowed to increase his/her profit if the costs come in low, then the final development costs remain the same. Rent schedules, therefore, would not be reduced for the tenants who are supposed to be the real beneficiaries of this program.

It was stated by one commenter that architects' errors and omission liability does not allow them to certify inspections on requests for payment to contractors as required on FmHA Form 1924-18, FmHA Instruction 1924-A, Guide 1 allows the use of AIA document G702-1978 for partial payments. This form has slightly different wording acceptable to FmHA. Either form may be used for partial payment requests.

A commenter suggested that FmHA not specify scales to be used on drawings, and recommended the use of folded 11" x 17" sheets. A minimum scale for certain drawings insures that drawings are readable and that sufficient detail can be shown. If documents were reduced in size, information and detail could be lost. The Agency does not feel that folded 11" x 17" sheets can be required or recommended.

A suggestion to revise Form FmHA 1924-2 (FHA 2005 and VA 26-1852), "Description of Materials," was received from one commenter. This form is used by all three agencies, and revisions require agreement by all three agencies. To date, discussions have been held, but no firm date is known for revising these forms.

One commenter felt FmHA should concur in construction contracts rather than approve them, since FmHA is not a party to the contract. Section 1924.13(e)(1)(ii) (A) and (H) has been reworded to reflect this comment.

The time for retaining file copies of plans and specifications in § 1924.5(f)(1)(ii) was felt to be too short by one commenter. The time requirement has been adjusted and relocated to § 1924.5(f)(2)(xiii) to provide for returning plans and specifications after the warranty phase is completed.

The proposed rule does not require the architect to attend a preconstruction

conference. Section 1924.13(a)(5)(v)(A) has been revised to include this requirement. Section 1924.13(e)(1)(vi) concerning partial payments needed to be revised to delete reference to an "FmHA approved" contract, and to the "reverse" side of Form FmHA 1924-18, which no longer contains information. Likewise, § 1924.13(e)(2)(ix) has been revised to include language contained in the revised Form FmHA 1924-18.

One commenter requested clarification of § 1924.5(d)(3) which made reference to borrowers' payment for technical services, and another was concerned that the procedure for materials acceptance was not referenced in the body of the instruction. We have determined that the contents of § 1924.5(d)(3) should be deleted since the issue is adequately and more appropriately addressed in program regulations and we have placed in that paragraph, as appropriately located, a reference to the materials acceptance procedure described in paragraph XI of Exhibit B of Subpart A of Part 1924.

One commenter, with specific reference to § 1924.6 (a) which states "... (Conditional commitment construction is not covered under this paragraph) . . .", suggested numerous changes to assure that conditional commitment construction is adequately addressed in this instruction. We recognize such a revision would be beneficial and have made some minor revisions; however, since this aspect of the instruction was not revised for the proposed rule, it would entail numerous additional changes in related program instructions and, if changed for the final rule, would effectively eliminate the public's opportunity to comment on considered alternative proposed actions, we have decided to address this comment in a separate proposed rule making at a future date.

One commenter expressed concern with language in § 1924.6(a)(1) regarding the use of construction contracts which "are customarily used in the area . . ." We concur that this may be somewhat confusing to applicants who may not be aware of what is customary and, therefore, be at a disadvantage during contract negotiation; therefore, we have made revisions to require the use of Form FmHA 1924-6, Construction Contract, for single family housing construction, to assure that all FmHA contract requirements are met and to assure protection of the interests of the borrower.

Exhibit A was revised in the proposed rule to reflect more accurate estimated percentages of total construction costs for single family structures with different types of foundations. The

estimates are based on cost data obtained from the Residential/Light Commercial Cost Data Handbook, published by Robert Snow Means Company, Inc. One commenter was concerned that it was not clearly indicated that these were estimated percentages and that actual figures could vary according to differing construction methods or practices. Although it is clearly indicated in § 1924.6(a)(12)(v)(C) that Exhibit A is a guide, we have revised the title of Exhibit A to "Estimated Breakdown of Dwelling Costs For Estimating Partial Payments."

Exhibit E, Preconstruction Conference, did not adequately address all the items which should be covered in a preconstruction conference, nor did it take into consideration deletions or additions which may be necessary for different types or levels of complexity of construction methods, therefore, it has been eliminated. [Exhibit E now lists the Voluntary National Model Building Codes.] Form FmHA 1924-16, "Record of Preconstruction Conference," may be used as a guide for an agenda. Section 1924.6(a)(11)(i) has been revised to clarify that the purpose of the preconstruction conference is to review each party's responsibilities under the terms and conditions of the contract documents and the loan agreement during the construction and warranty periods.

Finally, the Agency received several comments of an editorial nature. We have evaluated these comments and have made changes in the Final Rule as appropriate.

Typographical errors noted in the Proposed Rule have been corrected.

We have determined it to be unnecessary to republish certain illustrations, Attachments 1 and 2 of Exhibit C and Figures 1 and 2 and the Roof Overhangs illustration, redesignated as Attachments 1, 2 and 3 to Exhibit D, since they have not been changed, are satisfactory and readable in the current printing and will be available in any FmHA office for public review. References to these illustrations have all been annotated "available in any FmHA office."

List of Subjects in 7 CFR Part 1924

Agriculture, Construction management, Construction and repair, Energy conservation, Housing, Loan programs—Agriculture, Loan programs—Housing and community development, Low and moderate income housing.

Therefore, Chapter XVIII, Title 7, Code of Federal Regulations is amended as follows:

PART 1806—INSURANCE

1. The authority citation for Part 1806 continues to read as follows:

Authority: 7 U.S.C. 1989; 42 U.S.C. 1480; 42 U.S.C. 2942; 5 U.S.C. 301; 7 CFR 2.23 and 2.70.

Subpart B—National Flood Insurance

2. In § 1806.25, the introductory text of paragraph (a)(2) is revised to read as follows:

§ 1806.25 Conditions.

(a) * * *

(2) If the financial assistance is to build or provide substantial improvement, the requirements of paragraph (a)(1) of this section must be met and all construction must meet requirements of the applicable development standards, and:

PART 1822—RURAL HOUSING LOANS AND GRANTS

3. The authority citation for Part 1822 continues to read as follows:

Authority: 42 U.S.C. 1480; 7 CFR 2.23 and 2.70.

Subpart B—Section 502 Rural Housing Weatherization Loans

4. In Exhibit A, paragraph D is revised to read as follows:

Exhibit A—Cooperative Agreement Between _____ and the Farmers Home Administration

D. Development Standards. Weatherization improvements must meet the applicable development standards as required by § 1924.5(d) of Subpart A of Part 1924 of this chapter or standards established by the utility, whichever are greater. All improvements to the property will conform to applicable laws, ordinances, codes and regulations which relate to the safety and the sanitary features of the dwelling.

Subpart G—Rural Housing Site Loan Policies, Procedures, and Authorizations

5. In § 1822.267, introductory text of paragraph (l)(2) is amended in the last sentence by changing the form number from "444-11" to "1944-11."

PART 1901—PROGRAM RELATED INSTRUCTIONS

6. The authority citation for Part 1901 is revised to read as follows:

Authority: 7 U.S.C. 1989; 42 U.S.C. 1480; 5 U.S.C. 301; 7 CFR 2.23 and 2.70.

Subpart E—Civil Rights Compliance Requirements

7. In § 1901.205, paragraphs (b)(1), (b)(2)(i), (b)(3)(ii) and (e)(2) are amended by changing the numbers of Forms FmHA 424-5, 424-6, 424-12 and 424-21 to Forms FmHA 1924-5, 1924-6, 1924-12 and 1924-21, respectively.

8. In § 1901.205, paragraph (b)(3)(iv) is amended by changing the words "10 days" to "10 calendar days."

9. Exhibit C is revised to read as follows:

Exhibit C—FmHA Financed Contract

To: Area Director, Office of Federal Contract Compliance Program, U.S. Department of Labor (DOL) (Insert address for your DOL area, from Exhibit E, FmHA Instruction 1901-E)

We submit the following information relative to a construction contract in excess of \$10,000:

1. Contractor's name: _____
Address: _____
Telephone Number: _____
Employer's Identification Number: _____
2. Contract for: _____ \$
Starting Date: _____
Completion Date: _____
Contract Number: _____
City: _____
DOL Region: _____

PART 1924—CONSTRUCTION AND REPAIR

10. The authority citation for Part 1924 is revised to read as follows:

Authority: 7 U.S.C. 1989; 42 U.S.C. 1480; 5 U.S.C. 301; 7 CFR 2.23 and 2.70.

Subpart A—Planning and Performing Construction and Other Development

11. In Subpart A §§ 1924.1-1924.50, and Exhibits A-I, and K and L are revised to read as follows:

Subpart A—Planning and Performing Construction and Other Development

Table of Contents

Sec.	
1924.1	Purpose.
1924.2	[Reserved]
1924.3	Authorities and responsibilities.
1924.4	Definitions.
1924.5	Planning development work.
1924.6	Performing development work.
1924.7	[Reserved]
1924.8	Development work for modular/panelized housing units.
1924.9	Inspection of development work.
1924.10	Making changes in the planned development.
1924.11	District Director's review of incomplete development.
1924.12	Warranty of development work.
1924.13	Supplemental requirements for more complex construction.

Sec.

1924.14-1924.48	[Reserved]
1924.49	State Supplements.
1924.50	OMB control number.
Exhibit A	Estimated breakdown of dwelling costs for estimating partial payments.
Exhibit B	Requirements for modular/panelized housing units.
Exhibit C	Guide for drawings and specifications.
Exhibit D	Thermal performance construction standards.
Exhibit E	Voluntary national model building codes.
Exhibit F	Payment bond.
Exhibit G	Performance bond.
Exhibit H	Prohibition of lead-based paints.
Exhibit I	Guidelines for seasonal farm labor housing.
* * *	
Exhibit K	Classifications for multi-family residential rehabilitation work.
Exhibit L	Insured 10-year home warranty plan requirements.

PART 1924—CONSTRUCTION AND REPAIR

Subpart A—Planning and Performing Construction and Other Development

§ 1924.1 Purpose.

This subpart prescribes the basic Farmers Home Administration (FmHA) policies, methods, and responsibilities in the planning and performing of construction and other development work for insured Rural Housing (RH), insured Farm Ownership (FO), Soil and Water (SW), single unit Labor Housing (LH), Recreation (RL), and Emergency (EM) loans for individuals. It also provides supplemental requirements for Rural Rental Housing (RRH) loans, Rural Cooperative Housing (RCH) loans, multiunit (LH) loans and grants, and Rural Housing Site (RHS) loans.

§ 1924.2 [Reserved]

§ 1924.3 Authorities and responsibilities.

The County Supervisor and District Director are authorized to redelegate, in writing, any authority delegated to them in this subpart to the Assistant County Supervisor and Assistant District Director, respectively, when determined to be qualified. FmHA Construction Inspectors, District Loan Assistants, and County Office Assistants are authorized to perform duties under this subpart as authorized in their job descriptions.

§ 1924.4 Definitions.

(a) *Construction.* Such work as erecting, repairing, remodeling, relocating, adding to or salvaging any building or structure, and the installation or repair of, or addition to, heating and electrical systems, water systems, sewage disposal systems,

walks, steps, driveways, and landscaping.

(b) *Contract documents.* The borrower-contractor agreement, the conditions of the contract (general, supplementary, and other), the drawings, specifications, warranty information, all addenda issued before executing the contract, all approved modifications thereto, and any other items stipulated as being included in the contract documents.

(c) *Contractor.* The individual or organization with whom the borrower enters into a contract for construction or land development, or both.

(d) *County Supervisor and District Director.* In Alaska, for the purpose of this subpart, "County Supervisor" and "District Director" also mean "Assistant Area Loan Specialist" and "Area Loan Specialist," respectively. The terms also include other qualified staff who may be delegated responsibilities under this subpart in accordance with the provisions of Subpart F of Part 2006 (available in any FmHA office).

(e) *Date of commencement of work.* The date established in a "Notice to Proceed" or, in the absence of such notice, the date of the contract or other date as may be established in it or by the parties to it.

(f) *Date of substantial completion.* The date certified by the Project Architect/Engineer or County Supervisor when it is possible, in accordance with any contract documents and applicable State or local codes and ordinances, and the FmHA approved drawings and specifications, to permit safe and convenient occupancy and/or use of the buildings or other development.

(g) *Development.* Construction and land development.

(h) *Development standards.* Any of the following codes and standards:

(1) A standard adopted by FmHA for each state in accordance with § 1924.5(d)(1)(i)(E) of this subpart.

(2) *Voluntary national model building codes (model codes).* Comprehensive documents created, referenced or published by nationally recognized associations of building officials that regulate the construction, alteration and repair of building, plumbing, mechanical and electrical systems. These codes are listed in Exhibit E of this subpart.

(3) *Minimum Property Standards (MPS).* The Department of Housing and Urban Development (HUD) Minimum Property Standards for Housing, Handbook 4910.1, 1984 Edition with Changes. (For One and Two Family Dwellings and Multi-Family Housing).

(i) *Identity of interest.* Identity of interest will be construed as existing

between the applicant (the party of the first part) and general contractors, architects, engineers, attorneys, subcontractors, material suppliers, or equipment lessors (parties of the second part) under any of the following conditions:

(1) When there is any financial interest of the party of the first part in the party of the second part. The providing of normal professional services by architects, engineers, attorneys or accountants with a client-professional relationship shall not constitute an identity of interest.

(2) When one or more of the officers, directors, stockholders or partners of the party of the first part is also an officer, director, stockholder, or partner of the party of the second part.

(3) When any officer, director, stockholder or partner of the party of the first part has any financial interest whatsoever in the party of the second part.

(4) When the party of the second part advances any funds to the party of the first part.

(5) When the party of the second part provides and pays on behalf of the party of the first part the cost of any legal services, architectural services or engineering services other than those of a surveyor, general superintendent, or engineer employed by a general contractor in connection with obligations under the construction contract.

(6) When the party of the second part takes stock or any interest in the party of the first part as part of the consideration to be paid them.

(7) When there exist or come into being any side deals, agreements, contracts or undertakings entered into thereby altering, amending, or cancelling any of the required closing documents except as approved by FmHA.

(j) *Land development.* Includes items such as terracing, clearing, leveling, fencing, drainage and irrigation systems, ponds, forestation, permanent pastures, perennial hay crops, basic soil amendments, pollution abatement and control measures, and other items of land improvement which conserve or permanently enhance productivity. Also, land development for structures includes the applicable items above, and items such as rough and finish grading, retaining walls, water supply and waste disposal facilities, streets, curbs and gutters, sidewalks, entrancewalks, driveways, parking areas, landscaping and other related structures.

(k) *Manufactured housing.* Housing, constructed of one or more factory-built sections, which includes the plumbing, heating and electrical systems contained

therein, which is built to comply with the Federal Manufactured Home Construction and Safety Standards (FMHCSS), and which is designed to be used with or without a permanent foundation. Specific requirements for manufactured homes sites, rental projects and subdivisions are in Exhibit J of this subpart.

(l) *Mechanic's and materialmen's liens.* A lien on real property in favor of persons supplying labor and/or materials for the construction for the value of labor and/or materials supplied by them. In some jurisdictions, a mechanic's lien also exists for the value of professional services.

(m) *Modular/panelized housing.* Housing, constructed of one or more factory-built sections, which, when completed, meets or exceeds the requirements of one or more of the recognized development standards for site-built housing, and which is designed to be permanently connected to a site-built foundation.

(n) *Project representative.* The architect's or owner's representative at the construction site who assists in the administration of the construction contract. When required by FmHA, a full-time project representative shall be employed.

(o) *Technical services.* Applicants are responsible for obtaining the services necessary to plan projects including analysis of project design requirements, creation and development of the project design, preparation of drawings, specifications and bidding requirements, and general administration of the construction contract.

(1) *Architectural services.* The services of a professionally qualified person or organization, duly licensed and qualified in accordance with state law to perform architectural services.

(2) *Engineering services.* The services of a professionally qualified person or organization, duly licensed and qualified in accordance with State law to perform engineering services.

(p) *Warranty.* A legally enforceable assurance provided by the builder (warrantor) to the owner and the FmHA indicating that the work done and materials supplied conform to those specified in the contract documents and applicable regulations. For the period of the warranty, the warrantor agrees to repair defective workmanship and repair or replace any defective materials at the expense of the warrantor.

§ 1924.5 Planning development work.

(a) *Extent of development.* For an FO loan, the plans for development will include the items necessary to put the

farm in a livable and operable condition consistent with the planned farm and home operations. For other types of loans, the plans will include those items essential to achieve the objectives of the loan or grant as specified in the applicable regulation.

(b) *Funds for development work.* The total cash cost of all planned development will be shown on Form FmHA 1924-1, "Development Plan," except Form FmHA 1924-1 may be omitted when: (1) All development is to be done by the contract method, (2) adequate cost estimates are included in the docket, and (3) the work, including all landscaping, repairs, and site development work, is completely described on the drawings, in the specifications, or in the contract documents. Sufficient funds to pay for the total cash cost of all planned development must be provided at or before loan closing. Funds to be provided may include loan proceeds, any cash to be furnished by the borrower, proceeds from cost sharing programs such as Agricultural Stabilization and Conservation Service (ASCS) and Great Plains programs or proceeds from the sale of property in accordance with paragraph (g) of this section.

(c) *Scheduling of development work.* (1) All construction work included in the development plan for RH loans will be scheduled for completion as quickly as practicable and no later than 9 months from the date of loan closing, except for mutual self-help housing where work may be scheduled for completion within a period of 15 months.

(2) Development for farm program loans will be scheduled for completion as quickly as practicable and no later than 15 months from the date of loan closing unless more time is needed to establish land development practices in the area.

(d) *Construction.* (1) All new buildings to be constructed and all alterations and repairs to buildings will be planned to conform with good construction practices. The FmHA Manual of Acceptable Practices (MAP) Vol. 4930.1 (available in any FmHA office), provides suggestions and illustrative clarifications of design and construction methods which are generally satisfactory in most areas. All improvements to the property will conform to applicable laws, ordinances, codes, and regulations related to the safety and sanitation of buildings; standards referenced in Appendices C and F of HUD Handbook 4910.1, Minimum Property Standards for Housing; Thermal Performance Construction Standards contained in

Exhibit D of this subpart and, when required, to certain other development standards described below.

(i) The development standard applicable to a proposal will be selected by the loan applicant or recipient of an RH Conditional Commitment in accordance with the following. The standard selected must:

(A) Relate to the type(s) of building proposed.

(B) Meet or exceed any applicable local or state laws, ordinances, codes and regulations.

(C) Include all referenced codes and standards.

(D) Exclude inapplicable administrative requirements.

(E) Be the current edition(s) of either subparagraph (1) or (2) below:

(1) The development standard, consisting of building, plumbing, mechanical and electrical codes, adopted by FmHA for use in the state (identified in a State Supplement to this section) in which the development is proposed, in accordance with the following:

(i) The adopted development standard shall include any building, plumbing, mechanical or electrical code adopted by the State, if determined by the State Director to be based on one of the model codes listed in Exhibit E to this subpart, or, if not available,

(ii) The adopted development standard shall include any building, plumbing, mechanical or electrical code adopted by the state, if determined by the Administrator to be acceptable, or, if not available,

(iii) The adopted development standard shall include the model building, plumbing, mechanical or electrical code listed in Exhibit E to this subpart that is determined by the State Director to be most prevalent and appropriate for the state.

(2) Any of the model building, plumbing, mechanical and electrical codes listed in Exhibit E to this subpart or the standards defined in § 1924.4(h)(3) of this subpart.

(ii) Guide 2, "FmHA Design Guide," of this subpart (available in any FmHA office), includes guidelines for the evaluation of the design features which are not fully addressed in the development standards.

(iii) In new housing, all design, materials and construction will meet or exceed the applicable development standard as provided in paragraph (d)(1)(i) of this section.

(iv) For multi-family residential rehabilitation, as defined in Exhibit K of this subpart, all substantial rehabilitation work on existing buildings will meet or exceed the applicable

development standard. All moderate rehabilitation work should comply with Guide 3, "Quality and Performance Criteria for Moderate Rehabilitation," of this subpart (available in any FmHA office).

(v) The design and construction of housing repairs made with FmHA loan or grant funds will, as near as possible, comply with the applicable development standard.

(vi) Farm LH design and construction will comply with the following:

(A) Family projects, where the length of occupancy will be:

(1) Year-round, will meet or exceed the applicable development standard.

(2) Less than 12 months, but more than 6 months, will be in substantial conformance with the applicable development standard and constructed to facilitate conversion to year-round occupancy standards.

(3) Six months or less, may be less than the applicable development standard but should be constructed in accordance with Exhibit I of this subpart.

(B) Dormitory and other nonfamily type projects, where the length of occupancy will be:

(1) More than 6 months, will be in substantial conformance with the applicable development standard and will at least meet or exceed the requirements of the Department of Labor, Bureau of Employment Security (29 CFR 1910.140).

(2) Six months or less, will comply with § 1924.5(d)(1)(vi)(A)(3).

(vii) Farm service buildings should be designed and constructed for adaptation to the local area. In designing and locating farm service buildings, consideration will be given to practices recommended by agriculture colleges, the Extension Service (ES), Soil Conservation Service (SCS) and other reliable sources.

(2) Drawings, specifications, and estimates will fully describe the work. Technical data, tests, or engineering evaluations may be required to support the design of the development. The "Guide for Drawings and Specifications," Exhibit C of this subpart, describes the drawings and specifications that are to be included in the application for building construction, and § 1804.74 of Subpart D of Part 1804 of this chapter (Exhibit A of FmHA Instruction 424.5) describes the drawings that should be included for development of building sites. The specific development standard being used, if required under paragraph (d)(1) of this section will be identified on all drawings and specifications.

(3) Materials acceptance shall be the same as described in paragraph XI of Exhibit B to this subpart.

(e) *Land development.* (1) In planning land development, consideration will be given to practices, including energy conservation measures, recommended by agricultural colleges, ES, SCS or other reliable sources. All land and water development will conform to applicable laws, ordinances, zoning and other applicable regulations including those related to soil and water conservation and pollution abatement. The County Supervisor or District Director also will encourage the applicant to use any cost-sharing and planning assistance that may be available through agricultural conservation programs.

(2) Site and subdivision planning and development should also be guided by the requirements of Subpart D of Part 1804 of this chapter (FmHA Instruction 424.5).

(3) Plans and descriptive material will fully describe the work.

(4) The site planning design, development, installation and set-up of manufactured home sites, rental projects and subdivisions shall be guided by Exhibit J of this subpart.

(i) Plans for land leveling, irrigation, or drainage should include a map of the area to be improved showing the existing conditions with respect to soil, topography, elevations, depth of topsoil, kind of subsoil, and natural drainage, together with the proposed land development.

(ii) When land development consists of, or includes, the conservation and use of water for irrigation or domestic purposes, the information submitted to the County Supervisor will include a statement as to the source of the water supply, right to the use of the water, and the adequacy and quality of the supply.

(f) *Responsibilities for planning development.* Planning construction and land development and obtaining technical services in connection with drawings, specifications and cost estimates are the sole responsibility of the applicant, with such assistance from the County Supervisor or District Director (whichever is the appropriate loan processing and servicing officer for the type of loan involved), as may be necessary to be sure that the development is properly planned in order to protect FmHA's security.

(1) *Responsibility of the applicant.* (i) The applicant will arrange for obtaining any required technical services from qualified technicians, tradespeople, and recognized plan services, and the applicant will furnish the FmHA sufficient information to describe fully

the planned development and the manner in which it will be accomplished.

(ii) When items of construction or land development require drawings and specifications, they will be sufficiently complete to avoid any misunderstanding as to extent, kind, and quality of work to be performed. The applicant will provide FmHA with one copy of the drawings and specifications. Approval will be indicated by the applicant and acceptance for the purposes of the loan indicated by the County Supervisor or District Director on all sheets of the drawings and at the end of the specifications, and both instruments will be a part of the loan docket. After the loan is closed, the borrower will retain a conformed copy of the approved drawings and specifications, and provide another conformed copy to the contractor. Items not requiring drawings and specifications may be described in narrative form.

(iii) FmHA will accept final drawings and specifications and any modifications thereof only after the documents have been certified in writing as being in conformance with the applicable development standard, if required under paragraph (d)(1) of this section.

(A) Certifications may be accepted from licensed architects, professional engineers, authorized building officials, or certified code authorities. A building permit is not an acceptable substitute for this certification.

(B) The modifications of certified drawings or specifications must be certified by the same individual or organization that certified the original drawings and specifications. If such individual or organization is not available, the entire set of modified drawings and specifications must be recertified.

(C) The certification of modifications for single family housing (SFH) construction may be waived if the builder provides a written statement that the modifications are not regulated by the applicable development standard. The County Supervisor may consult with the State Office Architect/Engineer as to acceptance of the statement and granting a waiver.

(D) The following format is suggested for this certification and contains the minimum representation acceptable to FmHA:

Being (a licensed architect, authorized building official, etc.) in the State of _____, (I am) (we are) qualified to evaluate the technical sufficiency of construction documents for residential properties.
I/We have examined: —

— the drawings and specifications dated _____ prepared by (name of firm or individual) and related to the development of the (project name and location)

— the modifications listed below, that have been clearly indicated on the drawings and specifications dated _____ prepared by _____, certified by _____ and related to the development of the _____.

Based upon this examination, to the best of my/our knowledge and belief, these documents conform to the (names and editions of applicable development standards), designated as the development standard for the project.

(This statement must be signed by the certifying official and dated. FmHA reserves the right to determine whether or not the statement is acceptable.)

(E) The following format is suggested for the statement that must accompany a request to waive the certification of a modification. This format contains the minimum representation acceptable to FmHA:

Being a home builder in the State of _____, I/we have examined the modification(s) listed below that have been clearly indicated on the dwellings and specifications dated _____, prepared by _____ and certified by _____.

The listed modification(s) is/are not, to the best of my/our knowledge and belief, regulated by the (names and editions of the applicable development standards), which is/are designated as the development standards for this dwelling.

(This statement must be signed by the builder and dated. FmHA reserves the right to determine whether or not the statement is acceptable.)

(2) *Responsibility of the County Supervisor or District Director.* In accordance with program regulations for loans and grants they are required to process, the County Supervisor or District Director, for the sole benefit of FmHA, will:

(i) Visit each farm or site on which the development is proposed. For an FO loan, the County Supervisor and the applicant will determine the items of development necessary to put the farm in a livable and operable condition at the outset. Prepare Form FmHA 1924-1, when applicable in accordance with the Forms Manual Insert (FMI) for the form, after a complete understanding has been reached between the applicant and the County Supervisor regarding the development to be accomplished, including the dates each item of development will be started and completed.

(ii) Notify the loan or grant applicant in writing immediately if, after reviewing the preliminary proposal and inspecting the site, the proposal is not acceptable. If the proposal is acceptable,

an understanding will be reached with the applicant concerning the starting date for each item of development.

(iii) Discuss with the applicant the FmHA requirements with respect to good construction and land development practices.

(iv) Advise the applicant regarding drawings, specifications, cost estimates, and other related material which the applicant must submit to the FmHA for review before the loan can be developed. Advise the applicant of the information necessary in the drawings, how the cost estimates should be prepared, the number of sets of drawings, specifications, and cost estimates required, and the necessity for furnishing such information promptly. Advise the applicant that FmHA will provide appropriate specification forms, Form FmHA 1924-2, "Description of Materials," and Form FmHA 1924-3, "Service Building Specifications." The applicant may, however, use other properly prepared specifications.

(v) Advise the applicant regarding publications, plans, planning aids, engineering data, and other technical advice and assistance available through local, state, and Federal agencies, and private individuals and organizations.

(vi) Review the information furnished by the applicant to determine the completeness of the plans, adequacy of the cost estimates, suitability and soundness of the proposed development.

(vii) When appropriate, offer suggestions as to how drawings and specifications might be altered to improve the facility and better serve the needs of the applicant. The County Supervisor or District Director may assist the applicant in making revisions to the drawings. When appropriate, the contract documents will be forwarded to the State architect/engineer for review. For revisions requiring technical determinations that FmHA is not able to make, the applicant will be requested to obtain additional technical assistance.

(viii) Provide the applicant with a written list of changes required in the contract documents. The applicant will submit two complete revised (as requested) sets of contract documents, for approval. On one set, the County Supervisor or District Director will indicate acceptance on each sheet of the drawings, and on the cover of the specifications and all other contract documents. At least the date and the initials of the approval official must be shown. On projects where a consulting architect or engineer has been retained, this acceptance will be indicated only after the State Director has given written authorization. The marked set of documents shall be available at the job

site at all times for review by FmHA. The second set will become part of the loan docket.

(ix) Review the proposed method of doing the work and determine whether the work can be performed satisfactorily under the proposed method.

(x) Instruct the applicant not to incur any debts prior to loan closing for materials or labor or make any expenditures for such purposes with the expectation of being reimbursed from loan funds.

(xi) Instruct the applicant not to commence any construction nor cause any supplies or materials to be delivered to the construction site prior to loan closing.

(xii) Under certain conditions prescribed in Exhibit H of this subpart, provide the applicant with a copy of the leaflet, "Warning—Lead-Based Paint Hazards," which is Attachment 1 of Exhibit H (available in any FmHA office), and the warning sheet, "Caution Note on Lead-Based Paint Hazard," which is Attachment 2 of Exhibit H (available in any FmHA office).

(g) *Surplus structures and use or sale of timber, sand, or stone.* In planning the development, the applicant and the County Supervisor or District Director should, when practicable, plan to use salvage from old buildings, timber, sand, gravel, or stone from the property. The borrower may sell surplus buildings, timber, sand, gravel, or stone that is not to be used in performing planned development and use net proceeds to pay costs of performing planned development work. In such a case:

(1) An agreement will be recorded in the narrative of Form FmHA 1924-1 which as a minimum will:

(i) Identify the property to be sold, the estimated net proceeds to be received, and the approximate date by which the property will be sold.

(ii) Provide that the borrower will deposit the net proceeds in the supervised bank account and apply any funds remaining after the development is complete as an extra payment on the loan, or in accordance with § 1965.13(f) of Subpart A of Part 1965 of this chapter for farm program loans.

(2) The agreement will be considered by the Government as modifying the mortgage contract to the extent of authorizing and requiring the Government to release the identified property subject to the conditions stated in the agreement without payment or other consideration at the time of release, regardless of whether or not the mortgage specifically refers to Form FmHA 1924-1 or the agreement to release.

(3) If the FmHA loan will be secured by a junior lien, all prior lienholders must give written consent to the proposed sale and the use of the net proceeds before the loan is approved.

(4) Releases requested by the borrower or the buyer will be processed in accordance with applicable release procedures in Subpart A or Subpart C of Part 1965 of this chapter, as appropriate.

(h) *Review prior to performing development work.* For the sole benefit of FmHA, prior to beginning development work, the County Supervisor or District Director will review planned development with the borrower. Adequacy of the drawings and specifications as well as the estimates will be checked to make sure the work can be completed within the time limits previously agreed upon and with available funds. Items and quantities of any materials the borrower has agreed to furnish will be checked and dates by which each item of development should be started will be checked in order that the work may be completed on schedule. If any changes in the plans and specifications are proposed, they should be within the general scope of the work as originally planned. Changes must be approved and processed in accordance with § 1924.10 of this subpart. The appropriate procedure for performing development should be explained to the borrower. Copies of FmHA forms that will be used during the period of construction should be given to the borrower. The borrower should be advised as to the purpose of each form and at what period during construction each form will be used.

(i) *Time of starting development work.* Development work will be started as soon as feasible after the loan is closed. Except in cases in which advance commitments are made in accordance with Subpart A of Part 1944 of this chapter or according to Section § 1924.13(e)(1)(vi)(A) or § 1924.13(e)(2)(ix)(A) of this subpart, no commitments with respect to performing planned development will be made by the County Supervisor, District Director, or the applicant before the loan is closed. The applicant will be instructed that before the loan is closed, debts should not be incurred for labor or materials, or expenditures made for such purposes, with the expectation of being reimbursed from loan funds except as provided in Subpart A of Part 1943 of this chapter and Subparts A and E of Part 1944 of this chapter. However, with the prior approval of the National Office, a State Supplement may be issued authorizing County Supervisors to permit applicants to commence

well drilling operations prior to loan closing, provided: (1) It is necessary in the area to provide the water supply prior to loan closing, (2) the applicant agrees in writing to pay with personal funds all costs incurred if a satisfactory water supply is not obtained, (3) any contractors and suppliers understand and agree that loan funds may not be available to make the payment, (4) such action will not result under applicable State law in the giving of priority to mechanics and materialmen's liens over the later recorded FmHA mortgage, and (5) FmHA does not guarantee that the cost will be paid.

§ 1924.6 Performing development work.

All construction work will be performed by one, or a combination, of the following methods: Contract, borrower, mutual self-help, or owner-builder. All development work must be performed by a person, firm or organization qualified to provide the service. Conditional commitment construction is covered under Subpart A of Part 1944 of this chapter.

(a) *Contract method.* This method of development will be used for all major construction except in cases where it is clearly not possible to obtain a contract at a reasonable or competitive cost. Work under this method is performed in accordance with a written contract.

(1) *Forms used.* Form FmHA 1924-6, "Construction Contract," will be used for SFH construction. Other contract documents for more complex construction, acceptable to the loan approval official and containing the requirements of Subpart F of Part 1901 of this chapter, may be used provided they are customarily used in the area and protect the interest of the borrower and the Government with respect to compliance with items such as the drawings, specifications, payments for work, inspections, completion, nondiscrimination in construction work and acceptance of the work. If needed, the Office of the General Counsel (OGC) will be consulted. The United States (including FmHA) will not become a party to a construction contract or incur any liability under it.

(2) *Contract provisions.* Contracts will have a listing of attachments and the provisions of the contract will include:

- (i) The contract sum.
- (ii) The dates for starting and completing the work.
- (iii) The amount of liquidated damages to be charged.
- (iv) The amount, method, and frequency of payment.
- (v) Whether or not surety bonds will be provided.

(vi) The requirement that changes or additions must have prior written approval of FmHA.

(3) *Surety requirements.* (i) Unless an exception is granted in accordance with paragraph (a)(3)(iii) of this section or when interim financing will be used, surety that guarantees both payment and performance in the amount of the contract will be furnished when one or more of the following conditions exist:

- (A) The contract exceeds \$100,000.
- (B) The loan approval official determines that a surety bond appears advisable to protect the borrower against default of the contractor.
- (C) The applicant requests a surety bond.

(D) The contract provides for partial payments in excess of the amount of 60 percent of the value of the work in place.

(E) The contract provides for partial payments for materials suitably stored on the site.

(ii) If surety bonds are required the construction contract must indicate that the contractor will furnish properly executed surety bonds prior to the start of any work. Exhibits F and G of this subpart as revised by OGC if necessary to comply with local or state statutory requirements will be used as the forms of payment bond and performance bond to be provided. Unless noncorporate surety is provided, the surety bonds may only be obtained from a corporate bonding company listed on the current Department of the Treasury Circular 570 (published annually in the *Federal Register*), as holding a certificate of authority as an acceptable surety on Federal bonds and as legally doing business in the State where the land is located. Noncorporate sureties are not recommended and the State Director will be responsible for determining the acceptability of the individual or individuals proposed as sureties on the bonds. The State Director must determine that an individual or individuals proposed as sureties must have cash or other liquid assets easily convertible to cash in an amount at least equal to 25 percent more than the contract amount in order to be acceptable. The individual(s) will pledge such liquid assets in an amount equal to the contract amount. Fees charged for noncorporate sureties may not exceed fees charged by corporate sureties on bonds of equal amount and, in no case, may surety be provided by the applicant or any person or organization with an identity of interest in the applicant's operation. The United States (including FmHA) will incur no liability related in any way to a performance or payment bond provided in connection with a

construction contract. FmHA will be named as co-obligee in the performance and payment bonds unless prohibited by state law.

(iii) When an experienced and reliable contractor cannot obtain payment and performance bonds meeting the surety requirements of paragraph (a)(3)(ii) of this section, the State Director may entertain a request from the applicant for an exception to the surety requirements. The applicant's request must specifically state why the proposed contractor is unable to obtain payment and performance bonds meeting the surety requirements, and why it is financially advantageous for the applicant to award the contract to the proposed contractor without the required bonds.

If the applicant's request is reasonable and justified, and if the proposed contractor is reliable and experienced in the construction of projects of similar size, design, scope, and complexity, the State Director may grant an exception to the surety requirements for loans or grants within the State Director's approval authority and accept one or a combination of the following:

(A) An unconditional and irrevocable letter of credit issued by a lending institution which has been reviewed and approved by OGC. In such cases, the construction contract must indicate that the contractor will furnish a properly executed letter of credit from a lending institution acceptable to FmHA prior to the start of any work. The letter of credit must remain in effect until the date of final acceptance of work by the owner and FmHA. In addition, the letter of credit must stipulate that the lending institution, upon written notification by FmHA of the contractor's failure to perform under the terms of the contract, will advance funds up to the amount of the contract (including all FmHA approved contract change orders) to satisfy all prior debts incurred by the contractor in performing the contract and all funds necessary to complete the work. Payments may be made to the contractor in accordance with paragraph (a)(12)(i)(C) of this section as if full surety bonds were being provided.

(B) If a letter of credit satisfying the conditions of paragraph (A) cannot be obtained, the State Director may accept a deposit in the amount of the contract, into an interest or non-interest bearing supervised bank account. In such cases, the construction contract must indicate that the contractor will furnish the required deposit prior to the start of any work and that the funds shall remain on deposit until final acceptance of work by the owner and FmHA. Payments may

be made to the contractor in accordance with paragraph (a)(12)(i)(C) of this section as if full surety bonds were being provided.

(C) When the provisions of paragraphs (a)(3)(iii) (A) or (B) of this section can be met except that a surety bond, a letter of credit, and/or deposits are not obtainable in full amount of the contract, the State Director may accept an amount less than the full amount of the contract provided all of the following conditions are met:

(1) The contractor provides a surety bond, a letter of credit, or deposits in the greatest amount possible, and provides documentation indicating the reasons why amounts exceeding the proposed amount cannot be provided.

(2) The applicant agrees to the amount of the surety bond, letter of credit, or deposits proposed, and the State Director determines that the applicant has the financial capability to withstand any financial loss due to default of the contractor.

(3) In the opinion of the State Director, the proposed amount and the method of payment will provide adequate protection for the borrower and the Government against default of the contractor.

(4) The contract provides for partial payments not to exceed 90 percent of the value of the work in place for that portion of the total contract which is guaranteed by an acceptable surety bond, letter of credit, or deposits, and partial payments not to exceed 60 percent of the value of the work in place for that portion of the total contract which is not guaranteed by surety, letter of credit, or deposits.

Example:

Contractor has a surety bond which guarantees payment and performance in an amount of \$150,000 which represents 75 percent of the total contract amount of \$200,000. The contractor's first request for payment appears thus:

- Value of work in place is \$10,000.
- Payment for work guaranteed by surety is 75 percent times \$10,000 times 90 percent is \$6,750.
- Payment for work not guaranteed by surety is 25 percent times \$10,000 times 60 percent is \$1,500.
- Authorized payment is \$8,250.

(Each partial payment shall reflect values for work guaranteed by surety, letter of credit, or deposits, and work not so guaranteed).

(iv) In cases where the contractor does not obtain payment and performance bonds in accordance with the surety requirements of paragraph (a)(3)(ii) of this section, or where an exception to the surety requirements is granted by the State Director, the

following steps will be taken to protect the borrower and the government against latent obligations and/or defects in connection with the construction:

(A) The contractor will furnish a properly executed corporate latent defects bond or a maintenance bond in the amount of 10 percent of the construction contract; or

(B) An unconditional and irrevocable letter of credit in the amount of 10 percent of the construction contract issued by a lending institution which has been reviewed and approved by OGC; or

(C) A cash deposit into an interest or non-interest bearing supervised bank account in the amount of 10 percent of the construction contract;

(D) The period of protection against latent obligations and/or defects shall be one year from the date of final acceptance of work by the owner and FmHA;

(E) Final payment shall not be rendered to the contractor until the provisions of paragraphs (a)(3)(iv) (A), (B) or (C) of this section have been met;

(F) The contract will contain a clause indicating that the contractor agrees to provide surety or guarantee acceptable to the owner and FmHA against latent obligations and/or defects in connection with the construction.

(4) *Equal opportunity.* Section 1901.205 of Subpart E of Part 1901 of this chapter applies to all loans or grants involving construction contracts and subcontracts in excess of \$10,000.

(5) *Labor provisions.* The provisions of Subpart D of Part 1901 of this chapter concerning wage and labor requirements will apply when the contract involves either LH grant assistance, or 9 or more units in a project being assisted under the HUD Section 8 housing assistance payment program for new construction.

(6) *Historical and archaeological preservation.* The provisions of Subpart F of Part 1901 of this chapter concerning the protection of historical and archaeological properties will apply to all construction financed, in whole or in part, by FmHA loans and grants. These provisions have special applicability to development in areas designated by SCS as Resource Conservation and Development (RC&D) areas. (See Part 1942, Subpart I of this chapter.)

(7) *Air and water acts.* Under Executive Order 11738, all loans or grants involving construction contracts for more than \$100,000 must meet all the requirements of Section 114 of the Clean Air Act (42 U.S.C. 7414) and Section 308 of the Water Pollution Control Act (33 U.S.C., Section 1813). The contract should contain provisions obligating the

contractor as a condition for the award of the contract as follows:

(i) To notify the owner of the receipt of any communication from Environmental Protection Agency (EPA) indicating that a facility to be utilized in the performance of the contract is under consideration to be listed on the EPA list of Violating Facilities. Prompt notification is required prior to contract award.

(ii) To certify that any facility to be utilized in the performance of any nonexempt contractor subcontract is not listed on the EPA list of Violating Facilities as of the date of contract award.

(iii) To include or cause to be included the above criteria and requirements of paragraphs (a)(7) (i) and (ii) of this section in every nonexempt subcontract, and that the contractor will take such action as the Government may direct as a means of enforcing such provisions.

(8) *Architectural barriers.* In accordance with the Architectural Barriers Act of 1968 (Pub. L. 90-480), as implemented by the General Services Administration regulations (41 CFR 101-19.6) and section 504 of the Rehabilitation Act of 1973 (Pub. L. 93-112) as implemented by 7 CFR, Parts 15 and 15b, all facilities financed with FmHA loans and grants and which are accessible to the public or in which physically handicapped persons may be employed or reside must be developed in compliance with this Act. Copies of the Act and Federal accessibility design standards may be obtained from the Executive Director, Architectural and Transportation Barriers Compliance Board, Washington, DC 20201.

(9) *National Environmental Policy Act.* The provisions of Subpart G of Part 1940 of this chapter concerning environmental requirements will apply to all loans and grants including those being assisted under the HUD section 8 housing assistance payment program for new construction.

(10) *Obtaining bids and selecting a contractor.* (i) The applicant may select a contractor and negotiate a contract or contact several contractors and request each to submit a bid. For complex construction projects, refer also to § 1924.13(e) of this subpart.

(ii) When a price has already been negotiated by an applicant and a contractor, the County Supervisor, District Director or other appropriate FmHA official will review the proposed contract. If the contractor is qualified to perform the development and provide a warranty of the work and the price compares favorably with the cost of similar construction in the area, further

negotiation is unnecessary. If the FmHA official determines the price is too high or otherwise unreasonable, the applicant will be requested to negotiate further with the contractor. If a reasonable price cannot be negotiated or if the contractor is not qualified, the applicant will be requested to obtain competitive bids.

(iii) When an applicant has a proposed development plan and no contractor in mind, competitive bidding will be encouraged. The applicant should obtain bids from as many qualified contractors, dealers or tradespeople as feasible depending on the method and type of construction.

(iv) If the award of the contract is by competitive bidding, Form FmHA 1924-5, "Invitation for Bid (Construction Contract)," or another similar invitation bid form containing the requirements of Subpart E of Part 1901 of this chapter, may be used. All contractors from whom bids are requested should be informed of all conditions of the contract including the time and place of opening bids. Conditions shall not be established which would give preference to a specific bidder or type of bidder. When applicable, copies of Forms FmHA 1924-6 and FmHA 400-6, "Compliance Statement," also should be provided to the prospective bidders.

(11) *Awarding the contract.* The borrower, with the assistance of the County Supervisor or District Director, will consider the amount of the bids or proposals, and all conditions which were listed in the "Invitation for Bid." On the basis of these considerations, the borrower will select and notify the lowest responsible bidder.

(i) Before work commences, the County Supervisor, District Director or other FmHA employee having knowledge of contracts and construction practices will hold a preconstruction conference with the borrower(s), contractor and architect/engineer (if applicable). The purpose of the conference is to reach a mutual understanding of each party's responsibilities under the terms and conditions of the contract documents and the loan agreement during the construction and warranty periods. Form FmHA 1924-16, "Record of Preconstruction Conference," may be used as a guide for an agenda.

(ii) A summary of the items covered will be entered in the running case record.

(iii) The contract will then be prepared, signed and copies distributed in accordance with the FMI for Form FmHA 1924-6.

(iv) After a borrower/contractor's contract or subcontract in excess of

\$10,000 is received in the FmHA County or District Office, the responsible FmHA official will send within 10 calendar days of the date of the contract or subcontract, a report similar in form and content to Exhibit C of Subpart E of Part 1901 of this chapter to the Area Director, Office of Federal Contract Compliance Programs, U.S. Department of Labor, at the applicable address listed in Exhibit E, Subpart E of Part 1901 of this chapter. The report must contain, at least, the following information: contractor's name, address and telephone number; employer's identification number; amount, starting date and planned completion date of the contract; contract number; and city and DOL region of the contract site. The information for this report should be obtained from the contractor when the contract is awarded.

(12) *Payments for work done by the contract method.* (i) Payments will be made in accordance with one of the following methods unless prohibited by state statute, in which case the State Director shall issue a State Supplement to this section:

(A) The "One-Lump-Sum" payment method will be used when the payment will be made in one lump-sum for the whole contract.

(B) The "Partial payments not to exceed 60 percent of the value of the work in place" payment method will be used when the contractor does not provide surety bond, a letter of credit, or deposits.

(C) The "Partial payments in the amount of 90 percent of the value of the work in place and of the value of the materials suitably stored at the site" payment method will be used when the contractor provides a surety bond equal to the total contract amount.

(D) The "Partial payments which reflect the portions of the contract amount which is guaranteed" method will be used when the contractor provides surety bonds, a letter of credit, or deposits less than the total amount of the contract in accordance with the provisions of paragraph (a)(3)(iii)(C) of this section.

(ii) When Form FmHA 1924-6 is used, the appropriate payment clause will be checked and the other payment clauses not used will be effectively crossed out.

(iii) When a contract form other than Form FmHA 1924-6 is used, the payment clause must conform with paragraph (a)(12)(i) of this section and the appropriate clause as set forth in Form FmHA 1924-6.

(iv) The borrower and FmHA must take precautionary measures to see that all payments made to the contractor are properly applied against bills for

materials and labor procured under the contract. Prior to making any partial payment on any contract where a surety bond is not used, the contractor will be required to furnish the borrower and the FmHA with a statement showing the total amount owed to date for materials and labor procured under the contract. The contractor also may be required to submit evidence showing that previous partial payments were applied properly. When the borrower and the County Supervisor or District Director have reason to believe that partial payments may not be applied properly, checks may be made jointly to the contractor and persons who furnished materials and labor in connection with the contract.

(v) When partial payments are requested by the contractor and approved by the owner, the amount of the partial payment will be determined by one of the following methods:

(A) Based upon the percentage completed as shown on a recently completed and properly executed Form FmHA 1924-12, "Inspection Report."

(B) When the structure will be covered by an insured 10-year warranty, the insurer's construction inspector must provide FmHA with any available copies of inspection reports showing percentage of completion immediately after the inspections are completed. To make partial payments when copies of inspection reports are not available, the responsible FmHA official will make the inspections or will be guided by the provisions of § 1924.6(a)(12)(v)(C) of this subpart. If further assurance is deemed necessary to justify partial payments, the FmHA official may make onsite inspections or require additional information.

(C) Based upon an application for payment containing an estimate of the value of work in place which has been prepared by the contractor and accepted by the borrower and FmHA. When the contract provides for partial payments for materials satisfactorily stored at the site, the application for payment may include these items. Prior to receiving the first partial payment, the contractor should be required to submit a list of major subcontractors and suppliers and a schedule of prices or values of the various phases of the work aggregating the total sum of the contract such as excavation, foundations, framing, roofing, siding, mill work, painting, plumbing, heating, electric wiring, etc., made out in such form as agreed upon by the borrower, FmHA, and the contractor. In applying for payments, the contractor should submit a statement based upon this schedule. See Exhibit A

of this subpart for guidance in reviewing the contractor's schedule of prices and estimating the value of the work in place.

(vi) *Final payment.* (A) When the structure will be covered by an insured 10-year warranty, the insurer must provide and insured 10-year warranty policy (or a binder if the policy is not available) before final payment is made to the builder.

(B) Final payment of the amount due on the contract or disbursement of the FmHA loan funds where an interim loan was used will be made only upon completion of the entire contract, final inspection by FmHA, acceptance of the work by FmHA and the borrower, issuance of any and all final permits and approvals for the use and occupancy of the structure by any applicable state and local governmental authorities, and compliance by the contractor with all terms and conditions of the contract. In the event the work of construction is delayed or interrupted by reason of fire, flood unusually stormy weather, war, riot, strike, an order, requisition or regulation of any governmental body (excluding delays related to possible defects in the contractor's performance and excluding delays caused by the necessity of securing building permits or any required inspection procedures connected therewith) or other contingencies reasonably unforeseeable and beyond the reasonable control of the contractor, then with the written consent of FmHA, the date of completion of the work may be extended by the owner by the period of such delay, provided that the contractor shall give the owner and FmHA written notice within 72 hours of the occurrence of the event causing the delay or interruption.

(C) Prior to making final payment on the contract when a surety bond is not used or disbursing the FmHA loan funds when an interim loan was used, FmHA will be provided with a Form FmHA 1924-9, "Certificate of Contractor's Release," and Form FmHA 1924-10, "Release by Claimants," executed by all persons who furnished materials or labor in connection with the contract. The borrower should furnish the contractor with a copy of the "Release by Claimants" form at the beginning of the work in order that the contractor may obtain these releases as the work progresses.

(1) If such releases cannot be obtained, the funds may be disbursed provided all the following can be met:

(i) Release statements to the extent possible are obtained;

(ii) The interests of FmHA can be adequately protected and its security position is not impaired; and

(iii) Adequate provisions are made for handling the unpaid account by withholding or escrowing sufficient funds to pay any such claims or obtaining a release bond.

(2) The State Director may issue a State Supplement which will:

(i) Not require the use of Form FmHA 1924-10, if, under existing state statutes, the furnishing of labor and materials gives no right to a lien against the property, or

(ii) Provide an alternative method to protect against mechanic's and materialmen's liens. In this case, the use of Form FmHA 1924-10 is optional.

(b) *Borrower method.* The borrower method means performance of work by or under the direction of the borrower, using one or more of the ways specified in this paragraph. Development work may be performed by the borrower method only when it is not practicable to do the work by the contract method; the borrower possesses or arranges through an approved self-help plan for the necessary skill and managerial ability to complete the work satisfactorily; such work not interfere seriously with the borrower's farming operation or work schedule, and the County Office caseload will permit a County Supervisor to properly advise the borrower and inspect the work.

(1) *Ways of performing the work.* The borrower will:

(i) Purchase the material and equipment and do the work.

(ii) Utilize lump-sum agreements for (A) minor items or minor portions of items of development, the total cost of which does not exceed \$5,000 per agreement, such as labor, material, or labor and material for small service buildings, repair jobs, or land development; or (B) material and equipment which involve a single trade and will be installed by the seller, such as the purchase and installation of heating facilities, electric wiring, wells, painting, liming, or sodding. All agreements will be in writing, however, the County Supervisor may make an exception to this requirement when the agreement involves a relatively small amount.

(2) *Acceptance and storage of material on site.* The County Supervisor will advise the borrower that the acceptance of material as delivered to the site and the proper storage of material will be the borrower's responsibility.

(3) *Payment for work done by the borrower method.*—(i) *Payments for labor.* Before the County Supervisor

countersigns checks for labor, the borrower must submit a completed Form FmHA 1924-11, "Statement of Labor Performed," for each hired worker performing labor during the pay period. Ordinarily, checks for labor will be made payable to the workers involved. However, under justifiable circumstances, when the borrower has paid for labor with personal funds and has obtained signatures of the workers on Form FmHA 1924-11 as having received payment, the County Supervisor may countersign a check made payable to the borrower for reimbursement of these expenditures. Under no circumstances will the County Supervisor permit loan funds or funds withdrawn from the supervised bank account to be used to pay the borrower for the borrower's own labor or labor performed by any member of the borrower's household.

(ii) *Payment for equipment, materials or lump-sum agreements.* (A) Before countersigning checks for equipment or materials, the County Supervisor must normally have an invoice from the seller covering the equipment or materials to be purchased. When an invoice is not available at the time the check is issued, an itemized statement of the equipment or materials to be purchased may be substituted until a paid invoice from the seller is submitted, at which time the prepurchase statement may be destroyed.

(B) When an invoice is available at the time the check is drawn, the check will include a reference to the invoice number, the invoice date if unnumbered and, if necessary, the purpose of the expenditure.

(C) The check number and date of payment will be indicated on the appropriate Form FmHA 1924-11, invoice, itemized statement of equipment or materials and/or lump-sum agreement.

(D) Ordinarily, checks for equipment or materials will be made payable to the seller. Under justifiable circumstances, when the borrower has paid for equipment or materials with personal funds and furnished a paid invoice, the County Supervisor may countersign a check made payable to the borrower for reimbursement of these expenses.

(E) When an invoice includes equipment or materials for more than one item of development, the appropriate part of the cost to be charged against each item of development will be indicated on the invoice by the borrower, with the assistance of the County Supervisor.

(F) Payment made under lump-sum agreements will be made only when all

items of equipment and materials have been furnished, labor has been performed as agreed upon, and the work has been accepted by the borrower and FmHA.

(G) Each paid Form FmHA 1924-11, invoice, itemized statement for equipment or material and/or lump-sum agreement will be given to the borrower in accordance with the FMI.

(c) *Mutual self-help method.* The mutual self-help method is performance of work by a group of families by mutual labor under the direction of a construction supervisor, as described in Exhibit E of Subpart A of Part 1944 of this chapter. The ways of doing the work, buying materials, and contracting for special services are like those used for the borrower method. Materials can be bought jointly by the group of families, but payments will be made individually by each family. In the case of RH loans to families being assisted by Self-Help Technical Assistance (TA) grants in accordance with Subpart I of Part 1933 of this chapter, the County Supervisor may countersign checks for materials and necessary contract work made payable directly to the TA grantee, provided the District Director determines that:

(1) The grantee acts in the same capacity as a construction manager in the group purchase of material and services.

(2) The grantee has an adequate bookkeeping system approved by the District Director to assure that funds in each RH account are properly distributed and maintained.

(3) The grantee receives no compensation in the way of profit or overhead for this service and all discounts and rebates received in connection with the purchase of materials or services are passed on to the participating families.

(4) The grantee has a record-keeping system which shows that the costs of the materials and services were prorated to each borrower's account in relation to the actual material and service used by each borrower.

(d) *Owner-builder method.* This method of construction applies only to RRH loans made under Subpart E of Part 1944 of this chapter. Regulations governing this method are found at § 1924.13(e)(2) of this subpart.

§ 1924.7 [Reserved]

§ 1924.8 Development work for modular/panelized housing units.

(a) Exhibit B of this subpart applies to all loans involving modular/panelized housing units.

(b) Complete drawings and specifications will be required as prescribed in Exhibit C of this subpart. Each set of drawings will contain the design of the foundation system required for the soil and slope conditions of the particular site on which the modular/panelized house is to be placed.

(c) The manufacturer will provide a certification (Exhibit B, Attachment 5 of this subpart), stating that the building has been built substantially in accordance with the drawings and specifications. The builder will also provide a certification that the onsite work complies with drawings, specifications, and the applicable development standard (Exhibit B, Attachment 5 of this subpart).

(d) Responsibility for field inspections will be in accordance with § 1924.9(a) of this subpart. Frequency and timing of inspections will be in accordance with § 1924.9(b) of this subpart, except that the Stage 2 inspection should be made during the time and in no case later than two working days after the crews commence work on the site and the house is being erected or placed on the foundation, to determine compliance with the accepted drawings and specifications.

(e) Periodic plant inspections will be performed in accordance with paragraphs II and III of Exhibit B of this subpart. FmHA employees responsible for inspections in the area in which the manufacturing plant or material supply yard is located will perform such inspections as deemed necessary under paragraph III of Exhibit B of this subpart.

(1) Plant inspections will be made if the type construction method used could restrict adequate inspections on the building site.

(2) Plant inspections will be made as often as necessary; however, after initial inspection and acceptance of the unit, only when it appears advisable to ascertain the performance and continuing stability of accepted materials and construction.

(f) Only one contract will be accepted for the completed house on the site owned or to be bought by the borrower. The manufacturer of the house or the manufacturer's agent may be the prime contractor for delivery and erection of the house on the site or a builder may contract with the borrower for the complete house in place on the site. Such contracts should provide that payments will be made only for work in place on the borrower's site.

(g) Payments for modular/panelized units will be made in accordance with the terms of the contract and in

compliance with § 1924.6(a)(12) of this subpart.

§ 1924.9 Inspection of development work.

The following policies will govern the inspection of all development work.

(a) *Responsibility for inspection.* The County Supervisor or District Director, accompanied by the borrower when practicable, will make final inspection of all development work and periodic inspections as appropriate to protect the security interest of the government. In this respect, inspections other than final inspections, may be conducted by other qualified persons as authorized in paragraph (b)(3) of this section, in Section 1944.17(a)(2)(iv) of Subpart A of Part 1944 of this chapter, in Subpart A of Part 2024 of this chapter (available in any FmHA office) and as authorized under other agreements executed by, or authorized by, the National Office.

The borrower will be responsible for making inspections necessary to protect the borrower's interest. FmHA inspections are not to assure the borrower that the house is built in accordance with the plans and specifications. The inspections create or imply no duty or obligation to the particular borrower. FmHA inspections are for the dual purpose of determining that FmHA has adequate security for its loan and is achieving the statutory goal of providing adequate housing. If difficult technical problems are encountered, the County Supervisor or District Director should request the assistance of the State Office or a qualified technician from SCS or the State University Cooperative Extension Service.

(b) *Frequency of inspections.* The County Supervisor or District Director will inspect development work as frequently as necessary to assure that construction and land development conforms to the drawings and specifications. The final inspection will be made at the earliest possible date after completion of the planned development. When several major items of development are involved, final inspection will be made upon completion of each item.

(1) For new buildings and additions to existing buildings, inspections will be made at the following stages of construction and at such other stages of construction as determined by the County Supervisor or District Director except as modified by paragraph (b)(3) of this section.

(i) *Stage 1.* Customarily, the initial inspection in construction cases is made just prior to or during the placement of concrete footings or monolithic footings

and floor slabs. At this point, foundation excavations are complete, forms or trenches and steel are ready for concrete placement and the subsurface installation is roughed in. However, when it is not practicable to make the initial inspection prior to or during the placement of concrete, the County Supervisor or District Director will make the initial inspection as soon as possible after the placement of concrete and before any backfill is in place.

(ii) *Stage 2.* The Stage 2 inspection will be made when the building is enclosed, structural members are still exposed, roughing in for heating, plumbing, and electrical work is in place and visible, and wall insulation and vapor barriers are installed.

Customarily, this is prior to installation of brick veneer or any interior finish which would include lath, wallboard and finish flooring.

(iii) *Stage 3.* The final inspection will be made when all on-site and off-site development has been completed and the structure is ready for occupancy or its intended use.

(2) For rehabilitation of existing buildings, inspections will be made in accordance with paragraphs (b)(1) (ii) and (iii) of this section, and at such other stages of construction to assure that construction is being performed in a professional manner and in accordance with the FmHA approved drawings and specifications.

(3) For new construction when the structure will be covered by an insured 10-year warranty plan as described in Exhibit L of this subpart, only the final inspection is required, except in cases when partial payments are required when the provisions of § 1924.6(a)(12)(v) of this subpart will be followed.

(4) Arrangements should be made to have the borrower join the County Supervisor or the District Director in making periodic inspections as often as necessary to provide a mutual understanding with regard to the progress and performance of the work.

(5) The Borrower should make enough periodic visits to the site to be familiar with the progress and performance of the work, in order to protect the borrower's interest. If the borrower observes or otherwise becomes aware of any fault or defect in the work or nonconformance with the contract documents, the borrower should give prompt written notice thereof to the contractor with a copy to the County Supervisor or District Director responsible for servicing the type of loan or grant involved.

(6) The borrower should, when practicable, join the County Supervisor

or District Director in making all final inspections.

(7) When irrigation equipment and materials are to be purchased and installed, a performance test under actual operating conditions by the person or firm making the installation should be required before final acceptance is made. The test should be conducted in the presence of the borrower, a qualified technician, and, when practicable, the County Supervisor or District Director. If the FmHA official is not present at the performance test, he or she should request the technician to furnish a report as to whether or not the installation meets the requirements of the plans and specifications.

(8) For irrigation and drainage construction or any dwelling construction where part or all of the work will be buried or backfilled, interim inspections should be made at such stages of construction that compliance with plans and specifications can be determined.

(c) *Recording inspections and correction of deficiencies.* All periodic and final inspections made by the County Supervisor or District Director will be recorded on Form FmHA 1924-12 in accordance with the FMI. The County Supervisor or District Director will be responsible for following up on the correction of deficiencies reported on Form FmHA 1924-12. When an architect/engineer is providing services on a project, the District Director should notify the architect/engineer immediately of any fault or defect observed in the work or of any nonconformance with the contract document. If the borrower or the contractor refuses to correct the deficiencies, the District Director will report the facts to the State Director who will determine the action to be taken. No inspection will be recorded as a final inspection until all deficiencies or nonconforming conditions have been corrected.

(d) *Acceptance by responsible public authority.* When local (city) county, state, or other public authority codes and ordinances require inspections, final acceptance by the local authority having jurisdiction will be required prior to final inspection or acceptance by FmHA.

(e) *Acceptance by project architect.* If architectural services pursuant to § 1924.13(a) of this subpart have been obtained, final acceptance by the project architect pursuant to § 1924.13(a)(5)(v) of this subpart will be required prior to acceptance by FmHA.

§ 1924.10 Making changes in the planned development.

The borrower may request changes in the planned development in accordance with this section.

(a) *Authority of the County Supervisor.* The County Supervisor is authorized to approve changes in the planned development involving loans and grants within the County Supervisor's approval authority provided:

(1) The change is for an authorized purpose and within the scope of the original proposal.

(2) Sufficient funds are deposited in the borrower's supervised bank account or with the interim lender, as appropriate, to cover the contemplated changes when the change involves additional funds to be furnished by the borrower.

(3) The change will not adversely affect the soundness of the operation or FmHA's security. If uncertain as to the probable effect the change would have on the soundness of the operation or FmHA security, the County Supervisor will obtain advice from the District Director on whether to approve the change.

(4) If a surety bond has been provided on the full amount of the construction contract, the aggregate amount of all contract change orders on Form FmHA 1924-7, "Contract Change Order," or other acceptable form will not exceed 20 percent of the original contract amount. Change orders for contracts on which a surety bond has been provided which increases the original contract amount by more than 20 percent may only be approved if additional surety is provided in the full revised amount of the contract. For purposes of this paragraph, letters of credit and deposits are not considered surety.

(5) Change orders for contracts on which letters of credit or deposits have been provided on the full amount of the contract which will increase the original contract amount are approved only if additional letters of credit or deposits are provided in the full revised amount of the contract.

(6) Modifications have been certified in accordance with § 1924.5(f)(1)(iii) or certification has been waived in accordance with § 1924.5(f)(1)(iii)(C) of this subpart.

(b) *Authority of the District Director.* The District Director is authorized to approve changes in the development planned with RRH, RCH, and RHS loans and LH loans and grants within the District Director's approval authority, provided the conditions in § 1924.10(a) have been met. For such loans in excess

of the District Director's approval authority, the borrower's request with the District Director's recommendation will be forwarded to the State Director for consideration.

(c) *Recording changes in the planned development.* (1) Changes should be accomplished only after FmHA written approval. Changes will not be included in payment requests until approved by the borrower; the contractor, if applicable; the architect/engineer, if applicable; and the FmHA loan approval official. Examples of changes requiring documentation are:

- (i) Any changes in labor and materials and their respective costs.
- (ii) Changes in facility design.
- (iii) Any decrease or increase in unit-price on final measurements that are different from those shown in the bidding schedule.

(iv) Any increase or decrease in the time to complete the project.

(2) All changes shall be recorded in chronological order as follows:

(i) Contract method. Changes shall be numbered in sequence as they occur using Form FmHA 1924-7 with necessary attachments.

(ii) Borrower method. An increase or decrease in the cash cost, extension of time, transfer of funds between items, or an addition or deletion of items of development, will be summarized on the front of Form FmHA 1924-1 by striking through the original figures on items and writing in the changes. Changes made in the "Development Plan" in the working drawings, or in the plans and specifications will be dated and initialed by all parties.

(iii) Mutual self-help method. [See paragraph (c)(2)(ii) of this section.]

(iv) Owner-builder method. [See paragraph (c)(2)(i) of this section.]

(3) All changes in facility design and/or materials must be certified in accordance with § 1924.5(f)(1)(iii) of this subpart.

§ 1924.11 District Director's review of incomplete development.

During monthly District Office work organization meetings and during regular visits to the County Office, the District Director will review the progress that is being made in completing development financed with loans within the District Director's and County Supervisor's responsibility.

(a) Once each year the District Director will make a comprehensive review of all development work not completed within the time scheduled. For incomplete development financed with loan or grant funds within the responsibility of the District Director, the District Director will take the

necessary actions to assure that the borrower or grantee completes the planned development. For incomplete development financed with loan or grant funds within the responsibility of the County Supervisor, the District Director will give the necessary direction to the County Supervisor to assure completion of the work. In connection with these responsibilities, the District Director will consider:

- (1) The current farm and home operations with respect to the need for the development as originally planned.
- (2) Revisions to the development plan.
- (3) Funds remaining in the supervised bank account.
- (4) Need for additional funds.
- (5) Personal funds that could be furnished by the borrower.
- (6) Estimated completion dates.
- (7) The borrower's attitude with respect to completing the development.

(b) After a complete review of the status of development in both the District and County Offices has been made, the District Director will make a written report to the State Director which will include observations and recommendations regarding incomplete development. The report may be included in the District Director's regular report, and will include:

- (1) The number of cases in which borrowers have not completed their development within 9, 15 or 24 months when authorized, and also the number of cases in which funds have been exhausted and the work is incomplete.
- (2) The number of borrowers who have not completed their development within 3 years from the loan closing, and indicate the action that was taken in each such case.

(c) If the borrower has not completed development work within 3 years after the date of loan closing and the District Director has determined that the borrower cannot or will not complete the development, the District Director will so indicate on Form FmHA 1924-1 and request the State Director to withdraw, for application on the loan, any unused development funds remaining in the borrower's supervised bank account, if the borrower will not sign a check for a refund to the loan account.

§ 1924.12 Warranty of development work.

(a) Form FmHA 1924-19, "Builder's Warranty," or an insured 10-year home warranty as described in Exhibit L of this subpart, and normal trade warranties on items of equipment will be issued to the borrower at the completion of new building construction, dwelling rehabilitation by the contract method, all cases of newly completed

and previously unoccupied dwellings or construction under conditional commitments issued to builders and sellers.

(b) If the warranty is not an insured 10-year warranty, a completed Form FmHA 1924-19, with warranty protection for 1 year, must be provided by the builder upon final acceptance of the work by the owner and FmHA. If an insured 10-year warranty is provided, the requirements of Exhibit L of this subpart apply, and a copy of the warranty insurance policy or a binder must have been received by FmHA prior to disbursement of the final payment to the builder.

(c) If, for some reason, the warranty insurance policy cannot be issued, the contractor will be required to execute Form FmHA 1924-19 and the case will be forwarded to the State Director for consideration of debarment under the provisions of Subpart E of Part 1924 of this chapter. The County Supervisor will assist the borrower to the extent necessary under the provisions of the warranty and Subpart F of Part 1924 of this chapter.

(d) The County Supervisor will take the following action prior to the expiration of the first year of the warranty period:

(1) As soon as the warranty has been executed, the follow-up date for sending Form FmHA 1924-21, "Notice of Expiration of First Year of Warranty," which will be used for the 1 year warranty or the first year of the insured 10-year warranty, will be posted to the "Servicing and Supervision" section of the Management System card.

(2) Form FmHA 1924-21 is provided for use in notifying the borrower of the expiration date of the first year of the warranty. This letter will be mailed to the borrower early in the second month preceding the expiration date of the first year of the warranty period.

(3) If the County Supervisor or District Director does not hear from the borrower within 30 days, it can reasonably be assumed that no complaint exists or that any complaint has been satisfied unless information to the contrary has been received.

(4) If the borrower notifies FmHA that any complaint has not been satisfied, an onsite inspection shall be made as early as possible, but not later than 1 month preceding the expiration date of the first year of the warranty. The results of the inspection will be recorded on Form FmHA 1924-12. If the borrower has complaints, the case should be handled in accordance with the provisions of Subpart F of Part 1924 of this chapter, or as otherwise provided in this subpart.

§ 1924.13 Supplemental requirements for more complex construction.

This section includes additional provisions that apply to planning and conduct of construction work on all multiple family housing projects and other projects that are more extensive in scope and more complex in nature than individual housing units or farm buildings. This section will apply in addition to all other requirements contained elsewhere in this subpart.

(a) *Architectural services.* Complete architectural services, as defined in § 1924.4(o)(1) of this subpart are recommended on all projects. They are required for projects involving an LH grant and for all loans for RRH, RCH, and LH projects consisting of more than 4 units unless prior consent to making an exception to the requirements for complete architectural services is obtained from the National Office. If the applicant or contractor is an architect or organization with architectural capability, the applicant must, nevertheless, hire an independent qualified architect or architectural firm to inspect the construction work and perform other needed services during the construction and warranty phases. See Guide 4, Attachment 1, "Attachment to AIA Document—Standard Form of Agreement Between Owner and Architect," for further information (available in any FmHA office).

(1) *Exception.* Any request for National Office consent to an exception being made for complete architectural services should include the proposed drawings and specifications, method of providing specific services, the comments and recommendations of the FmHA State Architect, and any other pertinent information. The State Director must determine that any services for which an exception is requested can be performed by qualified State or District Office staff members.

(2) *Selecting the architect.* The applicant is responsible for selecting the architect. The District Director with the advice of the State architect/engineer should discuss with the applicant the selection of the architect for the job as early as possible to assist in the site selection and participate in early consultations regarding project scope and design.

(3) *Architectural fees.* Fees for architectural services shall not exceed the fee ordinarily charged by the profession for similar work when FmHA financing is not involved. The fee should cover only the architectural services rendered by the architect. Fees for special services rendered by architects, such as the packaging of the loan application or additional non-

architectural services, will not be authorized to be paid with loan funds.

(4) *Agreement between borrower and architect.* The borrower and the architect will execute a written agreement. The agreement must provide:

- (i) The services listed in paragraph (a)(5) of this section.
- (ii) The amount of the fee and how it will be determined and paid.
- (iii) That the agreement and any amendments to the agreement shall not be in full force and effect until concurred with in writing by the State Director or the State Director's delegate, and it will contain the following provision:

The Farmers Home Administration, as potential lender or insurer of funds to defray the costs of this agreement and without liability for any payments thereunder, hereby concurs in the form, content and the execution of this agreement.

Date _____
FmHA Approval Official _____
Title _____

(5) *Specific services.* Architectural services will include six consecutive phases as follows:

(i) *Schematic design phase.* The architect will:

(A) Consult with the applicant to obtain available information pertinent to the project requirements.

(B) Consult with FmHA State architect/engineer about FmHA requirements and procedures.

(C) Assist in preparing the project design after analyzing engineering and survey data on the site selected by applicant.

(D) Prepare schematic design studies consisting of drawings and other documents illustrating the scale and relationship of project components for the applicant's approval.

(E) Submit estimates of current development costs based on current area, volume, or other unit costs.

(F) When the applicant and FmHA have accepted the schematic design studies and estimated development costs, the project architect may be authorized to proceed with the next phase.

(ii) *Design development phase.* The architect will:

(A) Prepare the design development exhibits from the accepted schematic design studies for approval by the applicant. These exhibits should consist of drawings and other documents to fix and describe the size and character of the entire project as to structural, mechanical, and electrical systems, materials, and other essentials as appropriate.

(B) Submit a further statement of probable construction cost.

(C) Obtain applicant and FmHA approval of drawings, specifications, and authorization to proceed with next phase.

(iii) *Construction documents phase.* The architect will:

(A) Prepare the working drawings and specifications from the approved design development drawings and set forth in detail the requirements for the construction of the entire project in accordance with applicable regulations and codes; for example, necessary bidding information, assistance in preparing bidding forms, conditions of the construction contract, and the form of agreement between applicant/owner and contractor.

(B) Submit a final and more comprehensive statement of probable development cost. It should show a breakdown of the estimated total development cost of the project and the various trades in enough detail for an adequate review.

(C) Obtain the acceptance of the applicant and FmHA for contract documents, including approval of the final drawings and specifications and authorization to proceed.

(D) Discuss with the applicant various items as they develop.

(iv) *Bidding or negotiation phase.* The architect will, as appropriate, for a bid or negotiated contract:

(A) Assist in review and selection of bidders and submission of contract documents to selected bidders.

(B) Assist in the interpretation of drawings and specifications, and other contract documents.

(C) Receive and tabulate all bids.

(D) Review the bids and the negotiated proposals and assist in the award and preparation of construction contracts.

(v) *Construction phase.* This phase includes the administration of the construction contract. It will commence with the award of the construction contract and end when the borrower makes final payment to the contractor. The architect will:

(A) Attend the preconstruction conference. Advise and consult with the borrower (or the borrower's representative) and issue the borrower's instructions to the contractor.

(B) Prepare change orders.

(C) Keep construction accounts and work as the general administrator of the project during construction.

(D) Interpret the contract documents and have the authority to reject all work and materials which do not comply.

(E) Review and approve shop drawings, samples, and other submissions of the contractor for

conformance with the design concept and for compliance with the contract documents.

(F) Conduct periodic inspections of all phases of construction to determine compliance with the contract documents and certify as to the amount in place and materials suitably stored on site for partial payment estimates. These inspections will be augmented, when necessary, by inspections performed by structural, mechanical, and electrical representatives. Periodic inspections should be made as frequently as is necessary to verify that the work conforms with the intent of the contract documents and that a high quality of workmanship is maintained. The State Director may require a full-time project representative on projects with a total development cost of \$750,000 or more, when in the opinion of the State Director there is a need for such representative, and the State Director states the reasons for such need to the borrower.

(G) Determine, based on the inspections, the dates of substantial completion and final completion; receive on the borrower's behalf all written guarantees and related documents assembled by the contractor; and issue a final certificate for payment.

(vi) *Warranty phase.* The architect will advise and consult with the borrower, as the borrower's representative, about items to be corrected within the warranty period. The architect will accompany the FmHA representative during the inspection required one month prior to expiration of the warranty period.

(b) *Other professional services.* The State Director, on the recommendation of the State architect/engineer, may request that additional professional services be provided.

(1) Professional services typically include soils engineering, structural engineering, civil engineering, surveying, land planning, or professional cost estimation or certification. Fees for these services may be paid directly by the borrower or by the architect as reimbursable expenses.

(2) When a project representative is utilized, unless otherwise agreed, the representative will be provided by the consulting architect/engineer. Prior to the preconstruction conference, the architect/engineer will submit a resume of qualifications of the project representative to the applicant and to FmHA for acceptance in writing. If the applicant provided the project representative, the applicant must submit a resume of the representative's qualifications to the project architect/engineer and FmHA for acceptance in writing, prior to the preconstruction

conference. The project representative will attend the preconstruction conference where duties and responsibilities will be fully discussed. The project representative will work under the general supervision of the architect/engineer. The project representative will maintain a daily diary in accordance with the following:

(i) The diary shall be maintained in a hard-bound book.

(ii) The diary shall have all pages numbered and all entries in ink.

(iii) All entries shall be on daily basis, beginning with the date and weather conditions.

(iv) Daily entries shall include daily work performed, number of men and equipment used in the performance of the work, and all significant happenings during the day.

(v) The diary shall be made available to FmHA personnel and will be reviewed during project inspections.

(vi) The project representative's diary will become the property of the owner after the project is accepted and final payments are made.

(c) *Drawings.* The type and kinds of drawings should be in accordance with Exhibit C of this subpart and Subpart D of Part 1944 of this chapter.

(1) The drawings must be clear, accurate, with adequate dimensions and of sufficient scale for estimating purposes.

(2) Construction sections and large-scale details sufficient for accurate bidding and for the purpose of correlating all parts of the work should be part of the general drawings. This is particularly important where the size of a project makes necessary the preparation of the general drawings at a scale of 1/8 inch equals 1 foot or less.

(3) Mechanical and electrical work should be shown on separate plans.

(4) Schedules should be provided for doors, windows, finishes, electrical fixtures, finish hardware, and any other specialty items necessary to clarify drawings.

(d) *Specifications.* Trade-type specifications (specifications divided into sections for various trades) should be used. The specifications should be complete, clear, and concise, with adequate description of the various classes of work shown under the proper sections and headings.

(e) *Methods of administering construction.* Projects involving a total development cost of less than \$100,000 which do not include an LH grant may, with the approval of the State Director, follow the contract procedure in § 1924.6(a) of this subpart without modification. Construction of all other projects, however, will be administered

by the contract method or owner-builder method as set forth in this section.

(1) *Contract method.* This method of development will be used for all complex construction except in cases where owner-builder method is authorized. Development under this method is done in accordance with § 924.6(a) of this subpart except as modified by this paragraph. All construction work will be completed under one written construction contract. Guide 1, "Contract Documents," of this subpart (available in any FmHA office) is provided to assist FmHA personnel and applicants in assembling and reviewing contract documents for more complex construction such as that administered under this section.

(i) *Competitive bidding methods.* (A) All construction contracts must be awarded on the basis of competitive bidding unless an exception is granted in accordance with paragraph (e)(1)(vii) of this section thereby permitting contract negotiation. The applicant's architect should prepare the bidding documents. Public notice must be given inviting all interested bidders to submit a bid. Prospective bidders may be contacted asking for their bids; however, public notice is necessary so that all local contractors have the opportunity to submit bids.

(B) A bid bond is required from each bidder in the amount of 5 percent of the bid price as assurance that the bidder will, upon acceptance of the bid, execute the required contract documents within the time specified.

(C) The construction contract will be awarded based on the contract cost, and all conditions listed in the "Invitation to Bid."

(D) If advertising does not provide a satisfactory bid in the opinion of the applicant and FmHA, the applicant shall reject all bids and will then be free to negotiate with bidders on anyone else to obtain a satisfactory contract. The following conditions must be met:

(1) The State Director determines that the original competitive bid process was handled in a satisfactory manner and that there is no advantage to advertising for competitive bid again.

(2) The requirements of paragraph (e)(1)(vii) of this section are met.

(E) If there is no agreement by FmHA and the applicant as to the construction cost, the State Director will cease any further action on the preapplication and inform the applicant of the right to appeal in accordance with Subpart B of Part 1900 of this chapter.

(ii) *Contract documents.* Contract documents will conform with recognized professional practices as prescribed in

this paragraph. Such contract documents will contain substantially the following:

- Item I Invitation for Bids (Form FmHA 1924-5)
- Item II Information for Bidders
- Item III Bid
- Item IV Bid Bond
- Item V Agreement (Construction Contract)
- Item VI Compliance Statement (Form FmHA 400-6)
- Item VII General Conditions
- Item VIII Supplemental General Conditions
- Item IX Payment Bond (Exhibit F of this subpart)
- Item X Performance Bond (Exhibit G of this subpart)
- Item XI Notice of Award
- Item XII Notice of Proceed
- Item XIII Drawings and Specifications
- Item XIV Addenda
- Item XV Contract Change Order (Form FmHA 1924-7)
- Item XVI Labor Standards Provisions [Exhibit A to Subpart D of Part 1901 of this chapter, where applicable]
- Item XVII Monthly Employment Utilization Report (Form CC-257)
- Item XVIII Partial Payment Estimate (Form FmHA 1924-18)
- Item XIX Builder's Warranty (Form FmHA 1924-19)

(A) Substitution of term "architect" for "engineer" may be necessary on some of the forms. Other modifications may be necessary in some cases to conform to the nature and extent of the project. All such contract documents and related items will be concurred with by the State Director, with the assistance of OGC prior to the release of invitations to bid.

(B) Items listed as I through IV and item XI of paragraph (e)(1)(ii) of this section may be omitted when an exception to the competitive bidding requirement is granted in accordance with paragraph (e)(1)(vii) of this section, thereby permitting a negotiated contract.

(C) All negotiated contracts shall include a provision to the effect that the borrower, USDA, the Comptroller General of the United States, or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the contractor which are directly pertinent to a specific Federal loan program for the purpose of making audit, examination, excerpts, and transcriptions.

(D) A provision of liquidated damages will be included in all contracts. The liquidated damage amount must be reasonable and represent the best estimate possible of how much interest or other costs will accrue on the loan, and also represent any loss of rent or other income which would result from a delay in the completion of the project beyond the estimated completion date.

(E) All contracts shall include a provision for compliance with the Copeland "Anti-Kickback" Act (18 U.S.C. 874) as supplemented in Department of Labor regulations (29 CFR Part 3). This Act prohibits anyone from inducing any person in connection with the construction to give up any part of the compensation to which the person is otherwise entitled.

(F) All contracts will contain a certification by the applicant indicating that there is not now nor will there be an identity of interest between the applicant and any of the following: contractor, architect, engineer, attorney, subcontractors, material suppliers, equipment lessors, or any of their members, directors, officers, stockholders, partners, or beneficiaries unless specifically identified to FmHA in writing prior to the award of the contract. All contracts must also indicate that when any identity of interest exists or comes into being, the contractor agrees to provide certification as to the actual cost of the work performed under the construction contract and to have all construction records audited by an independent Certified Public Accountant (CPA) or Licensed Public Accountant (LPA) (licensed prior to December 31, 1970) who will provide an unqualified opinion as to the actual cost of construction.

(G) All contracts on any form other than Form FmHA 1924-6, must contain the language of clause (D) of Form FmHA 1924-6, which is available in all FmHA offices. The language of clause (D) of Form FmHA 1924-6 sets forth the Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity required by Executive Order 11246, the Equal Opportunity clause published at 41 CFR 60-1.4 (a) and (b), and the Standard Federal Equal Employment Opportunity Construction Contract Specifications required by Executive Order 11246. For contract forms other than Form FmHA 1924-6, Form AD 767, "Equal Employment Opportunity Contract Compliance Notices," which can be obtained from the Finance Office, should be attached and made a part of the contract.

(H) All contracts will contain a provision that they are not in full force and effect until concurred with by the State Director or the State Director's delegate, in writing. Therefore, before loan closing or before the start of construction, whichever occurs first, the State Director or the State Director's delegate will concur in the contract form, content, and execution if acceptable, by including the following paragraph at the end of the contract:

The Farmers Home Administration, as potential lender or insurer of funds to defray to costs of this contract, and without liability for any payments thereunder, hereby concurs in the form, content, and execution of this contract.

Date _____

FmHA Official _____

Title _____

(I) The requirements of § 1924.6 (a)(11)(iv) of this subpart apply to all contracts or subcontracts in excess of \$10,000.

(iii) *Surety*. When multiple advances of loan or grant funds are utilized, surety that guarantees both payment and performance in the full amount of the contract will be provided in accordance with § 1924.6(a)(3)(ii) of this subpart. Exceptions to the surety requirements shall be governed by the following:

(A) In accordance with the guidance and recommendations of OMB Circulars A-102 and A-110, exceptions to the surety requirements of § 1924.6(a)(3)(ii) of this subpart will not be granted for nonprofit organization or public body applicants.

(B) For loans or grants to applicants other than non-profit organizations or public bodies that are within the State Director's approval authority, the State Director may, upon request of the borrower or grantee, grant exceptions to the surety requirements in accordance with the provisions of § 1924.6(a)(3)(iii) of this subpart. Before granting such an exception, however, the State Director should be provided the following information from the proposed contractor in order to fully evaluate the experience and capabilities of the contractor:

(1) A resume indicating the contractor's history, ability and experience.

(2) A current, dated, and signed financial statement indicating the payment status of the contractor's accounts and any contingent liabilities that may exist.

(3) A credit report (obtained at no expense to FmHA) attesting to the contractor's credit standing.

(4) A listing of trade references that could be contacted to substantiate the contractor's experience and good standing.

(5) Statements from owners for whom the contractor has done similar work, indicating the scope of the work and the owner's evaluation of the contractor's performance.

(C) For loans or grants to applicants other than non-profit organization or public bodies that are in excess of the State Director's approval authority, the

State Director may request National Office authorization to grant one of the exceptions to the surety requirements as indicated in § 1924.6(a)(3)(iii) of this subpart. The following information must be submitted with the request to the National Office:

(1) An explanation of why interim financing is not available.

(2) An explanation of why the proposed contractor cannot obtain surety bonds meeting the requirements of § 1924.6(a)(3)(ii) of this subpart.

(3) The information listed in paragraph (e)(1)(iii)(B) of this section.

(4) The drawings and specifications for the proposed project, together with the comments of the State architect/engineer.

(5) The applicant's written request for an exception.

(6) An explanation of why the requirements of § 1924.6(a)(3)(iii) (A) or (B) of this subpart cannot be met in those cases where the State Director requests authorization to grant an exception as indicated in § 1924.6(a)(3)(iii)(C) of this subpart. When such a request is made, the documentation required of the contractor under the provision must also be forwarded.

(7) The State Director's recommendation.

(D) Adequate steps will be taken to protect the interests of the borrower and the government in accordance with the payment provisions of § 1924.6(a)(12)(i) of this subpart and any alternative as outlined in § 1924.6(a)(3)(iii)(c) of this subpart.

(iv) *Contract cost breakdown.* In any case where the loan approval official feels it appropriate, and prior to the award or approval of any contract in which there is an identity of interest as defined in § 1924.4(i) of this subpart, the contractor and any subcontractor, material supplier or equipment lessor sharing an identity of interest must provide the applicant and FmHA with a trade-item cost breakdown of the proposed contract amount for evaluation. The cost of any surety as required by § 1944.222 (k) and (l) of Subpart E of Part 1944 of this chapter and § 1924.6(a)(3) of this subpart, or cost certification fee will be included in the proposed contract amount. Form FmHA 1924-13, "Estimate and Certificate of Actual Cost," which is available in all FmHA offices, may be used for this purpose.

(v) *Cost certification.* Whenever the State Director determines it appropriate, and in all situations where there is an identity of interest as defined in § 1924.4(i) of this subpart, the borrower, contractor and any subcontractor,

material supplier or equipment lessor having an identity of interest must each provide certification using Form FmHA 1924-13 as to the actual cost of the work performed in connection with the construction contract. All construction records must also be audited by an independent CPA, or by an LPA licensed on or before December 31, 1970, except for owner-builders not required to provide cost certification who must follow the instructions provided in § 1924.13(e)(2)(viii) of this subpart.

(A) Prior to the start of construction, the borrower, contractor and any subcontractor, material supplier or equipment lessor sharing an identity of interest must submit the accounting system that the borrower, contractor, subcontractor, material supplier or equipment lessor and/or the CPA or LPA proposes to set up and use in maintaining a running record of the actual cost. In order to be acceptable, it must allow for a trade-item basis comparison of the actual cost as compared to the estimated cost submitted in accordance with paragraph (e)(1)(iv) of this section.

(B) The CPA or LPA will audit the books, accounts, and records of the borrower and the contractor (and any subcontractor, material supplier or equipment lessor sharing an identity of interest) concerning the work performed, services rendered, and materials supplied in connection with the construction contract. Upon completion of construction and prior to final payment, the CPA or LPA will provide an unqualified opinion concerning the actual cost. The CPA or LPA must also certify that the examination has been made in accordance with generally accepted auditing standards, that to the best of the CPA or LPA's knowledge and belief the actual cost of construction performed under the contract is accurate and correct as represented, and that the CPA or LPA has no identity of interest with the borrower, contractor, architect, engineer, attorney, subcontractors, material suppliers or equipment lessors. FmHA reserves the right to determine, upon receipt, whether or not the certified statement of cost is satisfactory to FmHA.

(C) If the auditor is able to express an unqualified opinion the following format is suggested for the certification:

We have examined the books and records of (contractor) related to the development of the (project name and case number).

Our examination was made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion the accompanying documentation, including Form FmHA 1924-13, "Estimate and Certificate of Actual Cost," presents fairly the actual cost in the amount of \$_____, of the (project name), in conformity with generally accepted accounting principles and the instructions issued by FmHA for the recognition of such costs.

Amounts paid and to be paid are shown as of the close of business—, 19—.

We certify that we have no financial interest in or with the borrower, contractor, architect, engineer, attorney, subcontractors, material suppliers or equipment lessors, other than in the practice of our profession.

(D) Prior to final payment to anyone required to cost certify, a trade-item breakdown showing the actual cost compared to the estimated cost must be provided to the owner and FmHA. Form FmHA 1924-13 is the form of comparative breakdown that should be used, and contains the certifications required of the applicant and contractor prior to final payment. The amount for builder's general overhead and builder's profit shall not exceed the amounts represented on the estimate of cost breakdown provided in accordance with paragraph (e)(1)(iv) of this section for any contractor, subcontractor, material supplier, or equipment lessor having or sharing an identity of interest with the applicant. Contract change orders will be processed to adjust the contract amount downward prior to final payment to the contractor, if necessary, to assure that the amounts shown in the certificate of actual cost do not exceed the amounts represented in the contract cost breakdown.

(vi) *Method of payments.* Partial payments may be requested in accordance with the terms of the construction contract on Form FmHA 1924-18, "Partial Payment Estimate," or other professionally recognized form that contains the architect's certification, approval of the owner, and conditional acceptance of FmHA as shown in Form FmHA 1924-18.

(A) If interim financing is available at reasonable rates and terms for the construction period, such financing shall be obtained. Exhibit D of Subpart E of Part 1944 of this chapter shall be used to inform the interim lender that FmHA will not close its loan until the project is substantially complete, ready for occupancy, evidence is furnished indicating that all bills have been paid or will be paid at loan closing for work completed on the project, all inspections have been completed and all required approvals have been obtained from municipal and governmental authorities having jurisdiction over the project. Upon presentation of proper partial

payment estimates approved by the applicant and accepted by FmHA, the interim lender may advance construction funds in accordance with the payment terms of the contract. It is suggested that partial payments not exceed 90 percent of the value of work in place and materials suitably stored on site.

(B) When interim financing is not available, payments will be made in accordance with § 1924.6(a)(12) of this subpart.

(vii) *Exception to competitive bidding.*—(A) *For all applicants.* An applicant may negotiate a construction contract provided the State Director grants an exception and documentation shows that:

(1) The contract price is competitive with other projects similar in construction and design being built in the area.

(2) The proposed contractor is experienced in construction of projects of similar size, scope, and complexity, and is recognized as a reliable builder.

(3) The proposed development work meets all requirements of this subpart.

(4) If appropriate for nonprofit organizations and public bodies, the applicant provides a copy of a duly authorized resolution by its governing body requesting FmHA to permit awarding the construction contract without formal bidding.

(5) The applicant is permitted by state law, local law and/or organizational by-laws to negotiate a construction contract.

(6) The requirements of paragraphs (e)(1)(ii), (iii), (iv) and (v) of this section are met.

(B) In considering an exception to competitive bidding, the following additional steps will be taken in all cases.

(1) If after a full review of the case documents by the appropriate members of the State Office staff, the State Director determines that the requirements have been met and the costs are reasonable, an exception to competitive bidding will be granted.

(2) If after the full review by the State Office staff, the State Director determines that the negotiated contract price is not competitive with other similar projects in construction and design being built in the area, the applicant will be requested to competitively bid the construction of the project in accordance with paragraph (e)(1)(i) of this section.

(3) If there is no agreement by FmHA and the applicant as to the construction cost, the State Director will cease any further action on the preapplication and inform the applicant of the right to

appeal in accordance with Subpart B of Part 1900 of this chapter.

(C) Any requests for exceptions to competitive bidding that are not covered in this section may be submitted to the National Office for consideration.

(viii) *Exception to contract method—public body.* With the approval of the National Office, the State Director may grant to a public body an exception to the requirement for using contract method construction under the following circumstances:

(A) The loan or grant is for repair or rehabilitation of existing facilities and it is not practicable to perform all work by the contract method.

(B) The applicant has the managerial ability and qualified employees necessary to complete the work successfully.

(C) That applicant submits a written request to the District Director indicating:

(1) The scope of work and construction timetable;

(2) What phases of work can be contracted and what cannot;

(3) Why it is not practicable to contract all phases;

(4) Management ability and employee qualifications for performing the work;

(5) Proposed method of fund control and frequency of payments;

(6) How changes in scope of work and construction timetable will be approved; and,

(7) Proposed method of certifying progress and requesting payments.

(D) The request, recommendations of the District Director, appropriate members of the State Office staff and the State Director and the application file will be sent to the National Office.

(2) *Owner-builder method.* This method of development is used only when requested by profit or limited profit RRH applicants when the applicant or any of its controlling principals (such as stockholders, members, partners other than limited partners, directors, or officers), are general contractors by profession, and will serve as the builder of the project without a written construction contract. The State Director may make an exception to the contract method of construction and authorize proceeding by the owner-builder method of construction in accordance with the provisions of this section if the amount of the loan(s) does not exceed the State Director's approval authority. For projects over the State Director's authority, prior written consent of the National Office is required. In such cases, the drawings, specifications, cost estimates, copy of the State Architect/Engineer's review and detailed

information on the applicant's qualifications will be submitted to the National Office along with the State Director's recommendations.

(i) The applicant's request to construct a project by the owner-builder method of construction shall be in the form of a letter giving specific and detailed information concerning the owner-builder's proposal, and the qualifications and past experience of the owner-builder. The following information must be included with the request:

(A) A resume indicating the owner-builder's history, ability, and experience.

(B) Dated and signed financial statements (including balance sheets and statements of income and expense) from current and prior years indicating the payment status of the owner-builder's accounts and any contingent liabilities that may exist.

(C) A written, dated, and signed statement agreement to provide any funds necessary in excess of the applicant's contribution and the loan amount to complete the project.

(D) A credit report (obtained at no expense to FmHA) attesting to the owner-builder's credit standing.

(E) A listing of trade references that could be contacted to substantiate the owner-builder's experience and good standing.

(F) Statements from other persons for whom the owner-builder has done similar work, indicating the scope of the work and that person's evaluation of the owner-builder's performance.

(G) A current, dated and signed trade-item cost breakdown of the estimated total development cost of the project which has been prepared by the owner-builder. Form FmHA 1924-13 will be used for this purpose. If cost certification or cost estimation services are required by FmHA, the cost of such services may be included in the total development cost of the project. Any subcontractor, material supplier or equipment lessor sharing an identity of interest with the applicant/owner-builder as defined in § 1924.4(i) of this subpart must also provide a trade-item cost breakdown of the proposed amount.

(H) An example of the ledger-type accounting system that the owner-builder and/or the owner-builder's CPA or LPA proposes to set up and use in maintaining a running record of the actual cost of the project. In order to be acceptable, it must allow for a trade item basis comparison of the actual cost as compared to the estimated cost

submitted in accordance with paragraph (e)(2)(i)(C) of this section.

(I) A written, dated, and signed statement agreeing to permit U.S. Department of Agriculture, the Comptroller General of the United States, or any of their duly authorized representatives, to have access to any books, documents, papers, and records which are directly pertinent to the specific Federal program for the purpose of making audit, examination, excerpts and transcriptions.

(ii) In order to grant an exception to the contract method of construction and proceed with the owner-builder method of construction, the State Director must determine that the following conditions exist:

(A) The applicant or at least one of its principals is a fully qualified and licensed (if necessary under applicable local law) builder by profession, has adequate experience in constructing the type of units proposed as well as projects of similar size, scope, and complexity and will be able to complete the work in accordance with the FmHA approved drawings and specifications.

(B) Based upon the information presented in the applicant's financial statements, the applicant is presently able and is likely to continue to be able to provide any funds necessary in excess of the applicant's contribution and the loan amount to complete the project.

(C) The total development cost of the project does not exceed that which is typical for similar type projects in the area. When the State Director determines it advisable, the State Director may require independent cost estimation by a professionally recognized cost estimation firm to help substantiate the total development cost of this project. The total development cost recognized by FmHA for each individual case will be determined by the MFH Coordinator with the advice of the State Architect.

(D) The owner-builder has provided sufficient information on all contracts or subcontracts in excess of \$10,000 to permit compliance with § 1924.6(a)(11)(iv) of this subpart.

(iii) In addition to the requirements for the State Director to authorize the owner-builder method of construction as indicated in § 1924.13(e)(2)(i) and (ii) of this subpart, the following additional steps will be taken by the State Director.

(A) If, after a full review of the case documents by the appropriate members of the State Office staff, the State Director determines that the requirements have been met and the construction cost is reasonable, an

exception to competitive bidding will be granted.

(B) If, after the full review by the State Office staff, the State Director determines that the construction cost is not competitive with other similar projects in construction and design being built in the area, the applicant will be requested to competitively bid the construction of the project in accordance with paragraph (e)(1)(i) of this section.

(C) If there is no agreement by FmHA and the applicant as to construction cost and the applicant is not agreeable to any of the aforementioned alternatives, the State Director will cease any further action on the preapplication and inform the applicant of the right to appeal, in accordance with Subpart B of Part 1900 of this chapter.

(iv) The development cost of the project may include a typical allowance for general overhead and a builder's profit. These amounts may be determined by local investigation and also from HUD data for the area. The applicant/owner-builder and any subcontractors, material suppliers and equipment lessors having or sharing an identity of interest with the applicant/owner-builder may not be permitted a builder's profit or general overhead which exceed the amounts represented on their cost breakdown.

(v) Under no circumstances will loan funds be used to pay the applicant or its stockholders, members, directors or officers, directly or indirectly, any profits from the construction of the project except a typical builder's fee for performing the services that would normally be performed by a general contractor under the contract method of construction. Discounts and rebates given the owner-builder in advance must be deducted before the invoices are paid. If discounts or rebates are given after the invoices are paid, the funds must be returned to the supervised bank account or applied on the interim construction loan, as appropriate.

(vi) The plan and specifications must be specific and complete so that there is a clear understanding as to how the facility will be constructed and the materials that will be used.

(vii) When architectural services are required by § 1924.13(a) during the construction and warranty phases they must be provided by an architect who has no identity of interest with the applicant/owner-builder. The services to be rendered during the construction and warranty phases include, but are not limited to inspections, changes in the scope of project or work to be done, administration of construction accounts,

rejection of work and materials not conforming to the FmHA approved drawings and specifications, and other appropriate service listed in § 1924.13(a)(5) (v) and (vi) of this subpart.

(viii) The applicant/owner-builder and any subcontractor, material supplier or equipment lessor sharing an identity of interest as defined in § 1924.4(i) of this subpart must each provide certification as to the actual cost of the work performed in connection with the construction of the project on Form FmHA 1924-13 prior to final payment. For all such projects involving a total development cost of more than \$350,000, and any other project where the State Director determines it appropriate, the applicant/owner-builder must provide an audit of all construction records by an independent CPA (or by an LPA licensed on or before December 31, 1970).

(A) The CPA or LPA will audit the books, accounts and records of the applicant/owner-builder (and any subcontractor, material supplier or equipment lessor sharing an identity of interest) concerning the work performed, services rendered, and materials supplied in connection with the construction of the project. Upon completion of construction and prior to final payment, the CPA or LPA will provide an unqualified opinion concerning the actual cost. The CPA or LPA must also certify that examination has been made in accordance with generally accepted auditing standards, that to the best of the CPA or LPA's knowledge and belief the actual cost of construction is accurate and correct as represented, and that the CPA or LPA has no identity of interest with the applicant/owner-builder, architect, engineer, attorney, subcontractors, material suppliers or equipment, lessors. FmHA reserves the right to determine, upon receipt, whether or not the certified statement of cost is satisfactory to FmHA.

(B) If the auditor is able to express an unqualified opinion, the following format is suggested for the certification:

We have examined the books and records of (owner-builder) related to the development of the (project name and case number).

Our examination was made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying documentation, including Form FmHA 1924-13, "Estimate and Certificate of Actual Cost," presents fairly the actual cost in the amount of \$—, of the ——— (project name)

—, in conformity with generally accepted accounting principles and the instructions issued by FmHA for the recognition of such costs.

Amounts paid and to be paid are shown as of the close of business —, 19—.

We certify that we have no financial interest in or with applicant/owner-builder, architect, engineer, attorney, subcontractors, material suppliers or equipment lessors, other than in the practice of our profession.

(C) Prior to final payment to anyone required to cost certify, FmHA must be provided with a certification and trade-item breakdown showing the actual cost compared to the estimated cost furnished in accordance with paragraph (e)(2)(i)(G) of this section. Form FmHA 1924-13 is the form of comparative breakdown that must be used, and contains the certification required of the applicant/owner-builder prior to final payment. The amount for builder's general overhead and builder's profit shall not exceed the amounts represented on the estimate of cost breakdown provided in accordance with paragraph (e)(2)(i)(G) of this section for the owner-builder or any contractor, subcontractor, material supplier or equipment lessor having or sharing an identity of interest with the applicant/owner-builder. Final payment to the owner-builder will be adjusted, if necessary, to assure that the amounts shown on the certificate of actual cost do not exceed the amounts represented on the cost breakdown.

(ix) Requests for payment for work performed by the owner-builder method, shall be permitted to the FmHA District Director for review and approval prior to each advance of funds in order to insure that funds are used for authorized purposes. Requests for payment shall be made on Form FmHA 1924-18 or other professionally recognized form containing the following certification to FmHA:

The undersigned certifies that the work has been carefully inspected and to the best of their knowledge and belief, the quantities shown in this estimate are correct and the work has been performed in accordance with the contract documents.

(Name of Architect)

By: _____

(Title) (Date)

Approved by Owner's Representative: By: _____

(Title)

Accepted by FmHA Representative: By: _____

(Title)

The review and acceptance of partial payment estimates by FmHA does not attest

to the correctness of the quantities shown or that the work has been performed in accordance with the plans and specifications.

(A) If interim financing is available at reasonable rates and terms for the construction period, such financing shall be obtained. Exhibit D of Subpart E of Part 1944 of this chapter shall be used to inform the interim lender that FmHA will not close its loan until the project is complete, ready for occupancy, evidence is furnished indicating that all bills have been paid for work completed on the project, all inspections have been completed and all required approvals have been obtained from any governmental authorities having jurisdiction over the project. Upon presentation of proper partial payment estimates containing an estimate of the value of work in place which has been prepared and executed by the owner-builder, certified by the applicant's architect, and accepted by FmHA, the interim lender may advance construction funds in accordance with the provisions of this section. It is suggested that the partial payment not exceed 90 percent of the value of work in place and material suitably stored on site.

(B) If interim financing is not available, partial payments not to exceed 90 percent of the value of work in place and materials suitably stored on site may be made to the owner-builder for that portion of the estimated cost of development guaranteed by a letter of credit or deposits meeting the requirements of § 1924.6(a)(3)(iii) (A), (B) or (C) of this subpart. Partial payments may not exceed 60 percent of the value of work in place in all other cases. The determination of the value of work in place will be based upon an application for payment containing an estimate of the value of work in place which has been prepared and executed by the owner-builder, certified by the borrower's architect, and accepted by FmHA. Prior to receiving the first partial payment, the owner-builder must submit a schedule of prices or values of the various trades or phases of the work aggregating the total development cost of the project as required in § 1924.13(e)(2)(i) (G) and (H) of this subpart. Each application for payment must be based upon this schedule, and show the total amount owed and paid to date for materials and labor procured in connection with the project. With each application for payment, the owner-builder must also submit evidence showing how the requested partial payment is to be applied, evidence showing that previous partial payments were properly applied, and a signed statement from the applicant's attorney,

title insurance company, or local official in charge of recording documents certifying that the public records have been searched and that there are no liens of record. When the District Director has reason to believe that partial payments may not be applied properly, checks will be made payable to persons who furnish materials and labor for eligible purposes in connection with the project.

(x) Under no circumstances shall funds be released for final payment or to pay any items of the builder's profit until the project is 100 percent complete, ready for occupancy, and the owner-builder has completed and properly executed Form FmHA 1924-13 or complied with the cost certification procedures of § 1924.13(e)(2)(viii) of this subpart.

§§ 1924.14—1924.48 [Reserved]

§ 1924.49 State Supplements.

State Supplements or policies will not be issued or adopted to either supplement or set requirements different from those of this subpart, unless specifically authorized in this subpart, without prior written approval of the National Office.

§ 1924.50 OMB control number.

Collection of information requirements contained in this subpart have been approved by the Office of Management and Budget and have been assigned OMB control number 0575-0042.

EXHIBIT A—ESTIMATED BREAKDOWN OF DWELLING COSTS FOR ESTIMATING PARTIAL PAYMENTS

[In percent]

	With slab on grade	With crawl space	With basement
1. Excavation	3	5	6
2. Footings, foundations			
3. Floor slab or framing	8	8	11
4. Subflooring	6	4	4
5. Wall framing, sheathing	0	1	1
6. Roof and ceiling framing, sheathing	7	7	6
7. Roofing	6	6	5
8. Siding, exterior trim, porches	5	5	4
9. Windows and exterior doors	7	7	6
10. Plumbing—roughed in	9	9	8
11. Sewage disposal	3	2	3
12. Heating—roughed in	1	1	1
13. Electrical—roughed in	1	1	1
14. Insulation	2	2	2
15. Dry wall or plaster	2	2	2
16. Basement or porch floor, steps	8	8	7
17. Heating—finished	1	1	6
18. Flooring	3	3	3
19. Interior carpentry, trim, doors	6	6	5
20. Cabinets and counter tops	6	6	5
21. Interior painting	1	1	1
22. Exterior painting	4	4	3
	1	1	1

EXHIBIT A—ESTIMATED BREAKDOWN OF DWELLING COSTS FOR ESTIMATING PARTIAL PAYMENTS—Continued

(In percent)

	With slab on grade	With crawl space	With basement
23. Plumbing—complete fixtures	4	4	3
24. Electrical—complete fixtures	1	1	1
25. Finish hardware	1	1	1
26. Gutters and downspouts	1	1	1
27. Grading, paving, landscaping	3	3	3
Total	100	100	100

Exhibit B—Requirements for Modular Panelized Housing Units

For the benefit of FmHA this Exhibit prescribes evaluation, acceptance, inspection and certification procedures for modular/panelized housing units proposed for use in Farmers Home Administration (FmHA) Rural Housing programs. It applies to proposed development packages provided either under a contract between an FmHA borrower and a single contractor or under a conditional commitment. This Exhibit also describes the use of background information available through the Department of Housing and Urban Development (HUD) for analysis of manufactured products. This Exhibit also applies to the evaluation of manufactured farm service buildings in paragraph XI, below. For the purpose of this Exhibit, County Supervisor and County Office also mean District Director and District Office, respectively.

I. Applicable Standards and Manuals.

A. The HUD Handbook 4950.1, Technical Suitability of Products Program Technical and Processing Procedures, must be followed by housing manufacturers to obtain acceptance of their products. Acceptance documents issued by HUD include: Structural Engineering Bulletins (SEB) on a national basis, Area Letters of Acceptance (ALA) which when accepted by all Area HUD Offices in a HUD region will, in essence, become Regional Letters of Acceptance (RLA), Truss Connector Bulletins (TCB); and, Mechanical Engineering Bulletins (MEB). These documents as well as the Use of Material Bulletins (UM) and Materials Release Bulletins (MR) are addendums to the HUD Minimum Property Standards (MPS). Under handbook guidelines, HUD also examines state agency regulations concerning design, construction and labeling of modular/panelized housing units and designates those states having procedures acceptable for use under HUD programs. Modular/panelized housing produced in these states is called *Category III* and is considered technically suitable for use without further structural analysis.

B. All State FmHA Offices should maintain a close working relationship with each HUD office in their jurisdiction to assure coordination. Any deviations in structure, materials or design from HUD acceptance documents must comply with one of the other applicable development standards.

II. Modular Housing Units that Require Factory Inspections.

Only those types which cannot be completely inspected on site are required to obtain acceptance from HUD. Those that receive acceptance will be periodically factory inspected by HUD or HUD's designated agency, usually about every 6 months.

III. Panelized Housing Units that Do Not Require Factory Inspections.

A. Housing completely assembled on the building site does not require HUD acceptance. This includes housing that is manufactured but is assembled on the site such as: precut pieces, log wall houses, trussed roof rafters or floor trusses; open panel walls, and other types that can be completely inspected on site.

B. Housing that is assembled in local materials dealers' yards for moving to local sites and to be purchased by an FmHA applicant, will be inspected during construction in the yard by the local FmHA County representative. These units must be constructed according to the applicable development standard and not transported out of the local FmHA County Office jurisdiction. The inspection must be recorded on Form FmHA 1924-12, "Inspection Report."

IV. Manufacturer's Actions Required for Submissions to FmHA are listed in Attachment 1 to this Exhibit B.

V. State FmHA Office Actions when Manufacturing Facilities are in its Jurisdiction. The State Office, upon receipt of manufacturer's submission, must:

A. Determine that the unit structural system has been accepted by HUD as appropriate under HUD Handbook 4950.1 requirements.

B. Review the thermal characteristics and approach of the calculations to determine actions to be taken in compliance with paragraph IV C of Exhibit D of this subpart.

C. Review the proposal for compliance with § 1924.5(d)(1) of this subpart.

D. Determine that the prerequisites for consideration of acceptance by FmHA are met. The prerequisites include all of the following:

1. A current acceptance document from HUD (SEB, RLA, ALA), except for Category III housing (modular/panelized housing that does not have to have a Structural Engineering Bulletin as designated by HUD). In Category III states, the state government requirements for manufactured housing must be followed.

2. A current HUD Factory Inspection Report, Form No. 2051m, or in the case of Category III housing, a copy of the inspection report from the state government or accepted third party performing the factory inspection. Each report must be made by HUD or a HUD authorized agency, and must be no older than 6 months.

3. A letter from the manufacturer requesting a review for acceptance. Enclosed with the letter shall be all the information listed in Attachment 1 to this Exhibit B.

E. Issue acceptance letters to the manufacturer stating the conditions of acceptance in the format of Attachment 2 to this Exhibit B. The letter shall have an attachment listing all models accepted in the

format of Attachment 3 to this Exhibit B. A copy of the acceptance letter and list of models shall be sent to each County Office in the state and, when requested by the manufacturer, to each other FmHA State Office in which the product is to be marketed.

F. After initial review of a submission, maintain a master file of accepted manufacturers and models and review the file twice yearly to determine the currency of the factory inspection reports and HUD or state government acceptance documents.

G. Notify manufacturers of overdue factory inspection reports, for acceptance of documents review and updating, using the format of Attachment 4 to this Exhibit B. Accompanying the notification will be a temporary acceptance sheet (Attachment 3 to this Exhibit B) indicating to the manufacturer that the company models have temporary acceptance for 60 days. If the manufacturer provides evidence that a review is being processed by HUD, a maximum of an additional 90 days may be granted. Otherwise, the acceptance shall terminate on the last extension date and it will be necessary for the manufacturer to resubmit as if for initial acceptance.

H. Distribute a list of added models, deleted models, or notice of deletion of any manufacturer's product to the County Offices and other State FmHA Offices as necessary.

I. Issue an initial supply of Manufacturer's and Builder's Certification forms (Attachment 5 to this Exhibit B) to each existing and newly accepted manufacturer. Manufacturers are to duplicate this form as necessary in their market areas.

J. Resolve any problems with the manufacturer, as reported by the County Office. Action may include coordination, FmHA plant inspections or cancellation of acceptance letters when problems persist.

VI. County Office Actions:

A. When an application is received involving any of the manufacturer's products on the accepted list, the County Office FmHA authorized personnel will:

1. Review the drawings and description of materials described in paragraphs A and B of Attachment 1 to this Exhibit B. The floor plans and elevations must be identifiable with the model listed in the accepted list issued by the State Office.

2. Require the builder/dealer or manufacturer to provide any drawings necessary to adapt the house to the site conditions where the house will be located.

3. Require site plan drawing such as those illustrated in Attachments 1 and 2 to Exhibit C of this subpart (available in any FmHA office).

4. Inspect and identify the model delivered against the manufacturer's certification and the accepted drawings and description of materials before the unit has been set on the foundation.

5. Require the builder/dealer to certify that the work for which the builder/dealer is responsible has been erected in compliance with the applicable development standard. This certification will be completed on a copy of Attachment 5 to this Exhibit B, and filed in County Office case file.

6. Observe any noncompliance with the applicable development standard or with paragraphs IV and V of this Exhibit B. In this respect:

a. Minor noncompliance will be resolved by the manufacturer through the builder/dealer. In cases where there is no builder/dealer, the County Office may resolve such issues with the manufacturer directly.

b. Noncompliance that cannot be resolved at the County Office level will be reported to the State Office.

7. Inspect manufactured housing according to § 1924.8(d) of this subpart.

8. Be aware that the accepted list may include many models from which loan applicants may choose. No changes from accepted model designs are permitted. The model selected by an applicant should be appropriate to the needs of that particular family in accordance with Subpart A of Part 1944 of this chapter.

VII. Noncompliance Issues.

A. When minor issues are noted, the County Office will attempt to resolve them as described above. If they cannot be resolved locally, they will be referred to the State Office. When any issues cannot be resolved at State Office level, the National Office Program Support Staff (PSS) will be contacted for guidance.

B. The National Office PSS coordinating with HUD, will take the appropriate actions to resolve the issues reported.

C. Manufacturers and builder/dealers must be aware that if the FmHA inspector finds any of the following conditions, the inspector may refuse to accept the construction until corrections have been made:

1. Evidence of noncompliance with any option of the method described in the HUD—SEB, RLA, or ALA.

2. Faulty shop fabrication, including surface defects.

3. Damage to shop fabricated items or materials due to transportation, improper storage, handling or assembly operation.

4. Unsatisfactory field or site workmanship.

VIII. Actions by Other State Offices. When a State Office receives a copy of the accepted list from the State Office in which a manufacturing plant is located, it will:

A. Maintain a file, by manufacturer, of each accepted list of models.

B. Provide copies of the accepted list of models to each County Office in the State.

C. Request a copy of the drawings, description of materials, and thermal calculations to determine compliance with the thermal requirements for the county in which the house is to be located according to Exhibit D of this subpart.

D. Check to see that County Offices within the state will act as prescribed in paragraph VI of this Exhibit B.

E. When two or more State Offices have different interpretations of the acceptability of a particular model, there must be an agreement between the states so that they will have the same requirements. If the states cannot agree, the National Office PSS will be consulted for guidance.

IX. Subsequent Review.

FmHA will make periodic reviews of houses, both site-built and houses manufactured offsite, to determine

acceptability of the finished product. If, in the judgment of the FmHA, the product has failed to perform satisfactorily, acceptance may be withdrawn. The State Director will notify the manufacturer and/or the builder/dealer of the reasons for the withdrawal no later than the time of withdrawal. Negotiations for corrections will be carried out by the County Office with the assistance of the State Office or National Office, as necessary.

X. Materials and Products Acceptance—Material Release Bulletins, Use of Materials Bulletins, Manufacturer's Instructions.

A. The Materials Release (MR) and Use of Materials Bulletins (UM) provide for the national acceptance of specific nonstandard materials and products not covered in the current HUD MPS.

B. When contractors or builders intend to use products or materials not listed as approved in the MPS, the FmHA personnel reviewing or concerned with the approval of construction in which the product is to be used, will require the contractor or builder to furnish a Materials Release Bulletin or Use of Materials Bulletin on the materials or products. If the product has been accepted, the supplier should be able to obtain the bulletin for the contractor or builder from the manufacturer. These bulletins describe the products or materials limitations to use, method of installing or applying, approved type of fasteners, if used, etc. and will provide the contractor with instructions as to proper installation or application.

C. When FmHA personnel are unfamiliar with any materials or products which have been accepted in the MPS, they will request the contractor or builder to furnish the manufacturer's instructions to assure that the materials or products are properly installed or applied. Any questions on any product that cannot be resolved in the County Office should be referred to the State Office. When the question cannot be resolved at the State Office level, the National Office PSS should be consulted for guidance.

XI. Manufactured Farm Service Buildings.

A. When a loan application is received that involves a manufactured building or special equipment that cannot be completely inspected on the site, the local State Land Grant University recommendations should be requested.

B. When the County Office questions the advisability of making a loan on a manufactured building, the State Office should also be consulted.

C. The State Office should review and make recommendations to the County Office. If doubt still exists, the National Office PSS should be consulted for guidance.

Required Information for Acceptance of Modular/Panelized Housing Units

The manufacturer or sponsor of modular/panelized housing units wishing to participate in the Farmers Home Administration (FmHA) Rural Housing programs shall submit to the FmHA State Director having jurisdiction over the state in which the proposed housing is to be manufactured, two complete sets of the information listed below for evaluation. Submissions not including all the information requested will be returned.

A. Statements:

1. Name and location of organization, including titles and names of its principal officers.

2. A brief description of plant facilities.

3. Extent of intended market distribution, including a list of any other states in which units will be marketed.

4. The method of quality control during site installation.

5. A copy of the applicable current HUD Structural Engineering Bulletin (SEB), Regional Letter of Acceptance (RLA), or Area Letter of Acceptance (ALA).

6. A current factory inspection report made within 6 months by HUD or HUD authorized agency.

7. Name and address of any third party inspection agency.

8. Location of nearest assembled product for inspection.

9. Field manuals for site installation and/or set-up procedures.

10. Specifications or descriptions of materials using either Form FmHA 1924-2, (HUD-FHA Form 2005), "Description of Materials," including sizes, species and grade of all building and finishing materials. All blanks should be filled and additional sheets may be attached as well as equipment manufacturer's brochures. Use an asterisk (*) to denote all items of onsite construction that will be provided by the builder-dealer. The builder-dealer must complete a form for the builder-dealer's portion of the work. Use N/A in any blank which is not applicable.

11. Names and addresses of other public and private agencies which have rendered or been asked to render a technical suitability or acceptance determination with respect to the products or structural methods employed.

12. Written certification that construction drawings and specifications conform with the applicable development standard.

13. Any other pertinent information.

14. An index of all documents submitted.

B. *Working Drawings.* For emphasis as to the details required for modular/panelized housing proposals, the following items are listed in addition to and in more detail than the requirements in Exhibit C of this subpart. In some cases, the drawing presentation sheets may be required to be reduced to 200 mm by 266 mm (8 x 10½ inches) sheet size:

1. Foundation and/or Basement Plan. This plan shall include anchorage details, exterior and interior dimensions, typical footings, wall thickness, plaster sizes and locations, column or pier sizes and locations and girders required to support the structures. Show location of all equipment (furnace, water heater, laundry tubs, sump, etc.) floor drains, electrical outlets, electrical entrance panels, and all doors and windows or crawl space vents with all sizes indicated.

2. Floor Plans of all levels. Show square footage of each habitable room with square footage of each area of natural light and ventilation. In addition, a design sketch scaled properly to illustrate a typical furniture arrangement for all habitable levels is required to indicate intended occupancy functions of the design. A window and door schedule should also be provided indicating glazed size, sash size, and thermal conductance of each type.

3. All exterior elevations including opening and sizes; wall finish materials, flashing, finish grades intended, depth of footings when known, finish floor, ceiling heights, roof slope, location of downspouts, gutters, vents for both structural spaces and for equipment. Indicate construction joint locations and details of connections between sections, modules or components.

4. Building cross sections showing size and spaces of all framing members from lowest member (bottom of footing) to highest point of roof (ridge) plus:

(a) Type of material and method of application of all covering materials, such as subflooring, combination subflooring and underlayment, sheathing, interior and exterior finishes;

(b) Complete details including computations of trussed rafter systems with the architect/engineer's stamp of those responsible for the design.

(c) Details of insulation and vapor barrier installation and attic ventilation. If the thermal characteristics to be provided are determined according to optional method for overall structure performance allowed in Exhibit D of this subpart, the submission and complete engineering calculations with all details of construction shall be sent to Administrator, Attn. PSS, FmHA Washington, D.C. 20250, for analysis as prescribed in paragraph IV C of Exhibit D of this subpart.

(d) Special details as necessary to show any special features of construction, including method of fabricating, erection, joining, and finishing of all elements; and

(e) Details and sections of stairways including all critical dimensions, such as, riser, run and headroom.

5. Interior elevations of kitchen cabinets and bathroom elevations with schedule of all shelf, counter-top and drawer footage. Indicate whether kitchen cabinets are to be custom made for each model or made for any model by a cabinet manufacturing company.

6. Plumbing schematics, including pipe materials, sizes and plumbing code compliance.

7. Heating plan, including heat loss of each room, is needed for heating systems, sizings and capacities, forced air, electric baseboard, or electric space heaters and, if applicable, heat gain. For forced air systems, include supply and return duct layout and location of appropriate diffusers.

8. Electrical plan, including circuit chart or diagram.

9. Any other pertinent facts or drawings that will better explain why and how certain unusual materials or structural methods are employed.

John Dough Manufacturing Company,
3444 Residence Avenue,
Elkton, Indiana 00051.

Dear Sirs: Although the documents submitted to this office have only received a cursory review, they appear to be in substantial compliance to qualify your firm for the type of acceptance indicated on the attached list.

The acceptance being issued is subject to this letter of conditions, compliance with HUD Handbook 4950.1 Technical Suitability of Products Program Technical and Processing Procedures, compliance with

Farmer Home Administration (FmHA) Thermal Performance Construction Standards, and compliance with the conditions set forth in the HUD acceptance document, if applicable, whose number appears on the acceptance.

The manufacturer and the authorized builder-dealer bear the responsibility of complying with the above, the exhibits submitted and the applicable development standards.

The manufacturer and/or builder-dealer also shall:

1. Provide positive identification of the modular unit by model, date of manufacture and factory in which the unit was manufactured.

2. Furnish with each home to be financed by FmHA in—(State)—, a written certificate (Attachment 5 to this Exhibit B) endorsed by the builder-dealer certifying that all requirements have been satisfied.

3. Furnish the local FmHA County Supervisor with a complete set of drawings including site plans, description of materials, structural engineering bulletins when applicable in the state, and documentation relating to the manufacture, transportation, erection, and installation for each model of modular/paneled housing to be financed in the county. Electrical, plumbing and heating plans must be furnished for each model in addition to the basic drawings. Floor plans and elevation drawings may vary from those listed in Attachment 1 of Exhibit B to FmHA Instruction 1924-A to reflect each of the manufacturer's models provided they are in compliance with the applicable development standard and the FmHA Thermal Performance Construction Standards and provided they have been accepted and listed in this state's approval of manufactured structures. No field alterations to the accepted models will be allowed.

4. Furnish, when required by the County Supervisor, foundation drawings (including special foundation design considerations when the unit is to be erected in seismic zones 1, 2 or 3) adapting the modular home to any unusual site conditions needing information additional to that furnished by the standard drawings.

5. Furnish the County Office with a copy of inspection reports of the manufacturing facilities immediately after the inspection reports have been completed.

6. Allow FmHA personnel to inspect the manufacturing facilities at any time and furnish all FmHA State Offices, where acceptance has been obtained, with a copy of any FmHA inspection reports immediately after the inspection reports have been completed.

7. In the event there are major changes to the submitted drawings, obtain approval under the HUD Technical Suitability of Products Program and submit verification of this approval to the County Office for listing on the state's accepted list. Any modular home shipped with major changes incorporated, without such changes on file at the County Office may be rejected. (Add state and local requirements appropriate to this letter of conditions.)

This acceptance may be subject to corrective action when deficiencies are noted

in the product, field inspections, manufacturing facilities, or when there is noncompliance with the provisions of the HUD Technical Suitability of Products Program.

The inclusion of these models on the accepted list is based only on the material and structural aspects of the manufactured units. Final determination of acceptability rests with FmHA personnel. Other factors relating to the property in its entirety such as appraisal, location, sustained market acceptance, architectural planning and appeal, thermal qualities, mechanical and electrical equipment, etc., must be considered in the final determination.

Your cooperation in this acceptance program is appreciated.

Sincerely,

State Director

Attachment 3

Date _____ File No. _____

Acceptance of Modular/Paneled Housing Units

(Based on HUD Handbook 4950.1)

Manufacturer:

_____ Acceptance Document _____
_____ Type of Acceptance: _____
_____ Regular _____
_____ Temporary, Expires _____

Plant Locations:

Date of Latest Plans _____
Reviewed _____
Date of Latest Factory _____
Inspection _____
Acceptance Document Review _____
Date _____

FmHA Instruction 1924-A, Exhibit D

Thermal Performance Construction Standards State Office Review

(Exh. D, IV, C, 1, a or b)
National Office Review

(Exh. D, IV, C, 2)

Maximum Winter Degree Days for

State _____ Walls R _____

Glazing/Gross Wall Area Ratio _____%

Ceilings R _____

Glazing _____ Pane(s)

Floor R _____

Glazing _____ Pane(s)

Insulated Door _____

Wood and Storm _____

Insulated Door _____

Wood and Storm _____

Models Accepted:

Attachment 4

John Dough Manufacturing Company,
3444 Residence Avenue,
Elkton, Indiana 00051.

Dear Sirs: As set forth in acceptance letters issued by this office, acceptance of modular/paneled homes in this state is based on HUD's Technical Suitability of Products Program and the conditions stated in the acceptance letter. Your file has been reviewed and the following has been noted.

An inspection report of your manufacturing facilities is overdue. Inspections are required twice yearly. The last inspection report on file at this office is dated _____.

Your Structural Engineering Bulletin No. _____ dated _____ has not been reviewed by HUD. Reviews are generally required every three years. Temporary acceptance will be considered when you provide evidence that the review documents have been submitted to HUD.

The drawings being used for the construction of your homes are not listed in your Structural Engineering Bulletin. Drawings used in the field should be those upon which the Structural Engineering Bulletin was issued.

There have been _____ revisions to the development standards since _____, the date of the last drawings we have on file for your homes. It is recommended that you review the revisions to ascertain whether your drawings need to be updated.

Please submit a written response and appropriate documents for the above items within _____ days, or your product will be removed from the accepted list until your firm can again qualify. If you have any problems furnishing the above within the time stated, please contact this office.

We look forward to receiving the materials indicated so that your firm's listing may be continued.

Sincerely,

State Director

Attachment 5

Certification by Manufacturer

Delivery location of structure for component _____

This is to certify that

Model: _____,
Serial # _____,
manufactured _____
(date) _____, 19 _____ in
_____ (location) _____
and being sold to _____
(name of _____

builder-dealer or borrower) has been manufactured in accordance with drawings and specifications on file in the FmHA State Office and that the construction complies with applicable development standards, except as modified by HUD Acceptance Document (SEB, RLA, ALA.)

NO. _____,

dated _____,

and in compliance with the FmHA Thermal Performance Construction Standards.

Date _____

Signature of Authorized Official _____

Title _____

Certification by Builder-Dealer

_____, (Name of builder-dealer) _____ certifies that the foundation and other on-site work has been constructed in accordance

with the drawings and specifications and the above structure or component has been erected, installed or applied in compliance with the applicable development standards.

It is understood that the manufacturer's certification does not relieve the builder/dealer of responsibility under the terms of the builder's warranty required by the National Housing Act.

Date _____

Signature of Authorized Official _____

Title _____

Exhibit C—Guide for Drawing and Specifications

This Exhibit applies to all new buildings to be constructed, including all single family housing and related facilities and, as applicable, farm housing and farm service buildings.

I. GENERAL: The documents recommended in this Exhibit correspond with the list of Exhibits in Chapter 3 of the Department of Housing and Urban Development (HUD) "Architectural Handbook for Building Single-Family Dwellings" No. 4145.2. This Exhibit may be used as a public handout and shall be used as a guide for drawings and specifications to be submitted in support of any type of application involving construction of major new buildings or extensive rehabilitation, alterations or additions to existing buildings. Descriptions of work for minor alterations or repairs need pertain only to work to be done and may be in narrative form when acceptable to the County Supervisor. Complete and accurate drawings and specifications are necessary:

- To determine the acceptability of the proposed development,
- To determine compliance with the applicable standards and codes,
- To prepare a cost estimate, and
- To provide a basis for inspections and the builder's warranty.

II. DRAWINGS FOR A SPECIFIC STRUCTURE: Drawings for individual single dwellings shall provide at least the following:

- Plot Plan. Refer to Example Plot Plan No. 1, Attachment 1 to this Exhibit C (available in any FmHA office). Ratio: 1:240 (1" = 20') (at scale, 1" = 20' or 1/4" = 1'0" minimum):
 - Lot and block number.
 - Dimensions of plot and north point.
 - Dimensions of front, rear and side yards.
 - Location and dimensions of garage, carport and other accessory buildings.
 - Location and sizes of walks, driveways and approaches.
 - Location and sizes of steps, terraces, porches, fences and retaining walls.
 - Location and dimensions of easements and established setback requirements, if any.
 - Elevations at the following points: (a) first floor of dwelling and floor of garage, carport and other accessory building; (b) finish curb or crown of street at points of extension of lot lines; (c) finish grade elevation at each principal corner of structure; (d) finish grade at bottom of drainage swales at extension of each side of structure as feasible.

9. The following additional elevations, as applicable, if the topography of the site or the design of the structure is such that special grading, drainage or foundations may be necessary. Examples are irregular or steeply sloping sites, filled areas on sites, or multi-level structure designs: (a) finish and existing grade elevations at each corner of the plot; (b) existing and finish grade at each principal corner of dwelling; (c) finish grade at both sides of abrupt changes of grade such as retaining walls, slopes, etc.; (d) other elevations that may be necessary to show grading and drainage.

10. Indication of type and approximate location of drainage swales.

11. When an individual water supply and/or sewage system is proposed, drawings, specifications and other items prescribed in Paragraph V of this Exhibit.

B. Floor Plans.

- Scale, 1:50 (1/4" = 1'0").
- Floor plan of each floor and basement, if any. Show typical furniture locations to suggest intended use of each habitable space.
- Plan of all attached terraces and porches, and of garage or carport.
- If dwelling is of crawl-space type, a separate foundation plan. Slab-type foundation may be shown on sections.
- Direction, size and spacing of all floor and ceiling framing members, girders, columns or piers.
- Location of all partitions and indication of door sizes, and direction of door swing.
- Location and size of all permanently installed construction and equipment such as kitchen cabinets, closets, storage shelving, plumbing fixtures, water heaters, etc. Details of kitchen cabinets may be on separate drawing.
- Location and symbols of all electrical equipment, including switches, outlets, fixtures, etc.

9. Heating system on separate drawing, or when it may be shown clearly it may be part of the floor or basement plan showing: (a) layout of system; (b) location and size of ducts, piping, registers, radiators, etc.; (c) location of heating unit and room thermostat; (d) total calculated heat loss of dwelling including heat loss through all vertical surfaces, ceiling and floor. When a duct or piped distribution system is used, calculated heat loss of each heated space is required.

10. Cooling system, on separate drawings or, as part of heating plan, floor or basement plan showing: (a) layout of system; (b) location and size of ducts, registers, compressors, coils, etc.; (c) heat gain calculations, including estimated heat gain for each space conditioned; (d) model number and Btu capacity of equipment or units in accordance with applicable Air Conditioning and Refrigeration Institute (ARI) or American Society of Refrigerating Engineers (ASRE) Standard; (e) Btu capacity and total kilowatt (KW) input at stated local design conditions; (f) if room or zone conditioners are used, provide location, size and installation details.

C. Exterior Elevations.

- Scale, 1:50 (1/4" = 1'0"). Elevations, other than main elevation, which contain no special details may be drawn at 1:100 (1/8" = 1'0").

2. Front, rear and both side elevations, and elevations of any interior courts.

3. Windows and doors—indicate size unless separately scheduled or shown on floor plan.

4. Wall finish materials where more than one type is used.

5. Depth of wall footings, foundations, or piers, if stepped or at more than one level.

6. Finish floor lines.

7. Finish grade lines at buildings.

D. Details and Sections.

1. Section through exterior wall showing all details of construction from footings to highest point of road. Where more than one type of wall material is used, show each type. Scale 1:25 ($\frac{1}{4}'' = 1'0''$) minimum.

2. Section through any portion of dwelling where rooms are situated at various levels or where finished attic is proposed. Scale, 1:50 ($\frac{1}{4}'' = 1'0''$) minimum.

3. Section through stair wells, landings, and stairs, including headroom clearances and surrounding framing. Scale, 1:50 ($\frac{1}{4}'' = 1'0''$) minimum.

4. Details of roof trusses, if proposed, including connections and stress or test data with seal of architect or engineer responsible. Scale of connections, 1:25 ($\frac{1}{4}'' = 1'0''$) minimum.

5. Elevation and section through fireplace. Scale, 1:25 ($\frac{1}{4}'' = 1'0''$) minimum.

6. Elevations and section through kitchen cabinets, indicating shelving. Scale, 1:50 ($\frac{1}{4}'' = 1'0''$) minimum.

7. Sections and details of all critical construction points, fastening systems, anchorage methods, special structural items or special millwork. Scale as necessary to provide information, 1:25 ($\frac{1}{4}'' = 1'0''$) minimum.

III. MASTER DRAWINGS FOR GROUP STRUCTURES. Drawings for a group of structures (such as for several conditional commitments) may be submitted in lieu of drawings for each individual property when a number of applications are simultaneously submitted involving repetition of the same type structure.

A. Master plot plan shall include the following:

1. Scale which will provide the following information in a clear and legible manner.

2. North point.

3. Location and width of streets and rights-of-way.

4. Location and dimensions of all easements.

5. Dimensions of each lot.

6. Location of each dwelling on lot with basic dimensions.

7. Dimensions of front, rear and side yards.

8. Location and dimensions of garage, carports and other accessory buildings.

9. Identification of each lot by number and indication of basic plan and elevation type.

10. Location of walks, driveways and other permanent improvements.

B. Typical plot plan for each basic type dwelling may be submitted in lieu of fully detailing each lot on master plot plan, when topography and lot arrangements present no individual planning or construction problems.

1. Information not shown on the typical plot plan shall be included on the master plot plan

2. Typical plot plans shall not be used for corner lots, lots with irregular boundaries, lots involving pronounced topographic variations or other lots where individual detailing is necessary.

3. Location of dwelling on typical lot and full dimensions.

4. Location and dimensions of all typical improvements, such as garage, carport, accessory buildings, walks, drives, steps, porches, terraces, trees, shrubs, retaining walls, fences, etc.

C. Grading may be shown on separate grading plan or on the master plot plan. Scale shall be sufficiently large to provide the following information in clear and legible manner:

1. Contours of existing grade at intervals of not more than 1.524 m (5 feet). Intervals less than 1.524 m (5 feet) may be required when indicated by the character of the topography.

2. Location of house and accessory buildings on each lot.

3. Identification of each lot by number.

4. Elevations in accordance with individual plot plan including bench mark and datum or, in lieu of finish grade elevations, contours of proposed finish grading may be submitted. Contour intervals selected shall be appropriate to the topography of the site.

5. Lot grading shall be shown by indicating protective slopes and approximate location of drainage swales.

6. Location of drainage outfall, if any drainage is not to a street.

D. Floor plans, elevations, sections and details shall be submitted for each basic plan. Alternate elevations to basic plan may be shown at scale, 1:100 ($\frac{1}{4}'' = 1'0''$).

IV. SPECIFICATIONS. Form FmHA 1924-2, "Description of Materials," or other acceptable and comparable descriptions of all materials forms shall be submitted with the drawings. The forms shall be completed in accordance with the instructions on Form FmHA 1924-2 to describe the materials to be used in the construction.

A. Form FmHA 1924-2 may be reproduced if size, format and printed text are identical to the current official form. When it is reproduced, the following deletions must be made:

1. All lines indicating FmHA form numbers or other Government agency initials and/or numbers, and

2. The United States Government Printing Office (GPO) imprint and reference number.

B. The material identification shall be in sufficient detail to fully describe the material, size, grade and when applicable, manufacturer's model or identification numbers. When necessary, additional sheets must be attached as well as manufacturer's specification sheets for equipment and/or special materials, such as aluminum siding or carpeting.

V. INDIVIDUAL WATER SUPPLY AND SEWAGE DISPOSAL SYSTEMS. When an individual water and/or sewage disposal system is proposed, the following additional information must be submitted:

A. Approval and recommendations of other authorities.

1. A written opinion by the health authority having jurisdiction that the site is suitable and acceptable for the proposed systems(s) and,

2. If available, a soils report from the local USDA-Soil Conservation Service and any recommendations they may have.

3. Approval of appropriate environmental control authority.

4. A signature of the health authority on the plot plan indicating approval of the design of the proposed system.

B. Plot Plan. Refer to Example Plot Plan No. 2, Attachment 2 to this Exhibit C (available in any FmHA office).

1. Location and size of septic tank, distribution box, absorption field or bed, seepage pits and other essential parts of the sewage disposal system and distance to all individual wells, open streams or drainageways.

2. Location of well, service line and other essential parts of the water supply system and distance to other wells and/or sewage disposal systems.

3. Exact location of individual systems (water or sewage) on adjacent properties and description of system, if available.

C. Construction details of all component parts of individual water supply and sewage disposal systems shall clearly indicate material, equipment and construction. Extra sheets and drawings should be added as necessary to fully explain the proposed installation.

Exhibit D—Thermal Performance Construction Standards

I. Purpose: This Exhibit prescribes thermal performance construction standards to be used in all housing loan and grant programs. These requirements shall supersede the thermal performance requirements in any of the development standards in § 1924.4(h) of this subpart.

II. Policy: All loan or grant applications involving new construction and all applications for conditional commitments shall have drawings and specifications prepared to comply with paragraphs IV A or IV C and D of this Exhibit. All existing dwellings to be bought with FmHA loan funds shall be considered in accordance with paragraphs IV B or C of this Exhibit.

III. Definitions:

A. British thermal unit (Btu) means the quantity of heat required to raise the temperature of one pound (.4535 Kg.) of water by one degree Fahrenheit (F). For example, one Btu is the amount of heat needed to raise the temperature of one pound of water from 59 degrees F to 60 degrees F.

B. Glazing is the material set into a sash or door when used as a natural light source and/or for occupant's views of the outdoors.

C. "R" value, thermal resistance, is a unit of measure of the ability to resist heat flow. The higher the R value, the higher the insulating ability.

D. "U" value is the overall coefficient of heat transmission and is the combined thermal value of all the materials in a building section. U is the reciprocal of R. Thus $U=1/R$ or $R=1/U$ or $1/C$ where C is the thermal conductance and is the unit of measure of the rate of heat flow for the actual thickness of a material one square foot in area at a temperature of one degree

Fahrenheit. The lower the U value, the higher the insulating ability.

E. *Winter degree-day* is a unit based on temperature difference and time. For any one day, when the mean temperature is less than 65 degrees F (18.3 degrees Celsius), there are as many degree-days as the number of degrees difference between the mean temperature for the day and 65 degrees F. The daily mean temperature is computed as half

the total of the daily maximum and daily minimum temperatures.

IV. Minimum Requirements:

A. All dwellings, single family or multifamily, to be constructed with FmHA loan and/or grant funds and all repair, remodeling or renovation work performed on dwelling with FmHA loan or grant funds shall be in conformance with the following, except as provided in paragraphs IV B 3 and IV D of this Exhibit:

NEW CONSTRUCTION—MAXIMUM U VALUES FOR CEILING, WALL AND FLOOR SECTION OF VARIOUS CONSTRUCTION

Winter degree days ¹	Ceilings ²	Walls	Floors ³	Glazing ⁴	Doors ⁵
1000 or less.....	0.05	0.08	0.08	1.13	
1001 to 2500	.04	.07	.07	.69	
2501 to 4500	.03	.05	.05	.69	Storm door if hollow core door or if over 25% glass.
4501 to 6000	.03	.05	.05	.47	Storm Door.
6001 or more	.026	.05	.05	.47	Storm Door.

Note.—U values are not adjusted for framing. Values calculated for components may be rounded. For example, a total R Value of 18.88 converts to a U value of .0529 rounded to .05.

¹ Winter degree-days may be obtained from the ASHRAE Handbook; the "NAHB Insulation Manual for Homes/Apartments"; local utilities; and the National Climatic Center, Federal Building, Asheville, NC. Manuals are available from NAHB RF, Rockville, MD 20850, or NMWIA, 382 Springfield Avenue, Summit, NJ 07901. Other sources of degree day data may be used if available from a recognized authority.

² Insulation must be continuous (i.e. no gaps) above all ceiling joists. In pitched roof construction, compression of insulation at the outside building walls is permitted to allow a 1" ventilation space under the roof sheathing. For any loose fill insulation, a baffle must be provided. Raised trusses are not required.

³ For floors of heated spaces over unheated basements, unheated garages or unheated crawl spaces, the U value of floor section shall not exceed the value shown. A basement, crawl space, or garage shall be considered unheated unless it is provided with a positive heat supply to maintain a minimum temperature of 50 degrees F. Positive heat supply is defined by ASHRAE as "heat supplied to a space by design or by heat losses occurring from energy-consuming systems or components associated with that space."

Where the walls of an unheated basement or crawl space are insulated in lieu of floor insulation, the total heat loss attributed to the floor from the heated area shall not exceed the heat loss calculated for floors with required insulation.

Insulation may be omitted from floors over heated basement areas or heated crawl spaces if foundation walls are insulated. The U value of foundation wall sections shall not exceed the value shown. This requirement shall include all foundation wall area, including header joist (band joist), to a point 50 percent of the distance from a finish grade to the basement floor level. Equivalent Uo configurations are acceptable.

MAXIMUM U VALUES OF THE FOUNDATION WALL SECTIONS OF HEATED BASEMENT NOT CONTAINING HABITABLE LIVING AREA OR HEATED CRAWL SPACE

Winter degree-days (65 F base)	Maximum U value	Glazing*
2500 or less.....	No requirement.....	1.13
2501 to 4500	0.17	1.13
4501 or more	0.10	.69

*Glazing in heated basement shall be limited to 5 percent of floor area unless alternative Uo combination is documented.

⁴ Sliding glass doors are considered as glazing. The glazing value is for glass only. Glazing shall be limited to 15 percent of the gross area of all exterior walls enclosing heated space, except when demonstrated that the winter daily solar heat gain exceeds the heat loss and the glass area is properly screened from summer solar heat gain.

⁵ 1 3/4 inch metal-faced door systems with rigid insulation core and durable weatherstripping providing a "U" value equivalent to a wood door with storm door and an infiltration rate no greater than .50 cfm per foot of crack length tested according to ASTM E-283 at 1.567 psf of air pressure, may be substituted for a conventional door and storm door. All doors shall be weatherstripped. Any glazed areas must be double-glazed.

MINIMUM R VALUES OF PERIMETER INSULATION FOR SLABS-ON-GRADE

Winter degree-days (65 F base)	Minimum R values*	
	Heated slab	Unheated slab
500 or less.....	2.8	
1000	3.5	
2000	4.0	2.5
3000	4.8	2.8
4000	5.5	3.5
5000	6.3	4.2
6000	7.0	4.8
7000	7.8	5.5
8000	8.5	6.2
9000	9.2	6.8
10000 or greater.....	10.0	7.5

*For increments between degree days shown, R values may be interpolated.

B. All existing dwellings to be purchased with RH loan and grant funds shall be insulated in accordance with the following:

EXISTING CONSTRUCTION—MAXIMUM U VALUES FOR CEILING, WALL AND FLOOR SECTION OF VARIOUS CONSTRUCTION

Winter degree days ¹	Ceilings	Walls ²	Floors ^{3, 4}	Glazing	Doors ⁵
1000 or less.....	0.05		0.08	1.13	
1001 to 2500	.04		.07	.69	
2501 to 4500	.03		.05	.69	Storm door if hollow core door or if over 25% glass.
4501 to 6000	.03		.05	.69	Storm Door.
6001 to 7000	.026		.05	.69	Storm Door.
7001 or more.....	.026		.05	.69	Storm Door.

Note.—U values are not adjusted for framing. Values calculated for components may be rounded. For example, a wall section with a total R Value of 18.88 converts to a U value of .0529 rounded to .05.

¹ Winter degree days may be obtained from the ASHRAE Handbook; the "NAHB Insulation Manual for Homes/Apartments," local utilities; and the National Climatic Center, Federal Building, Asheville, NC. Manuals are available for NAHB RF, Rockville, MD 20850, or NMWIA, 382 Springfield Avenue, Summit, NJ 07901. Other sources of degree day data may be used if available from a recognized authority.

² Walls shall be insulated as near to new construction standards as economically feasible. Any exterior wall framing exposed during repair or rehabilitation work shall have vapor barrier installed and be fully insulated.

³ For floors of heated spaces over unheated basements, unheated garages or unheated crawl spaces the U value of floor section shall not exceed the value shown.

A basement, crawl space or garage shall be considered unheated unless it is provided with a positive heat supply to maintain a minimum temperature of 50 degrees F. Positive heat supply is defined by ASHRAE as "heat supplied to a space by design or by heat losses occurring from energy-consuming systems or components associated with that space."

Where the walls of an unheated basement or crawl space are insulated in lieu of floor insulation, the total heat loss attributed to the floor from the heated area shall not exceed the heat loss calculated for floors with required insulation.

Insulation may be omitted from floors over heated basement areas or heated crawl spaces if foundation walls are insulated. The U value of foundation wall sections shall not exceed the value shown. This requirement shall include all foundation wall area, including header joist (band joist), to a point 50 percent of the distance from a finish grade to the basement floor level. Equivalent Uo configurations are acceptable.

MAXIMUM U VALUES OF THE FOUNDATION WALL SECTIONS OF HEATED BASEMENT NOT CONTAINING HABITABLE LIVING AREA OR HEATED CRAWL SPACE

Winter degree days (65 F base)	Maximum U value	Glazing*
2500 or less.....	No requirement	1.13
2501 to 4500	0.17	1.13
4501 or more.....	0.10	.69

* Glazing in heated basement shall be limited to 5 percent of floor area unless alternative Uo combination is documented.

⁴ Slab edge insulation should be provided wherever practical in areas of 2500 or more winter degree-days. Rigid insulation placed on the exterior face of the slab shall be protected by a durable and weather resistant material.

⁵ Storm doors are not required for double doors, sliding doors or others where installation would be economically infeasible. 1 1/4 inch metal-faced door systems with rigid insulation core and durable weatherstripping providing a "U" value equivalent to a wood door with storm door and an infiltration rate no greater than .50 cfm per foot of crack length, tested according to ASTM E-283 at 1.567 psf of air pressure may be substituted for a conventional door and storm door. All doors shall be weatherstripped.

C. *Optional Standards.* Housing design not in compliance with the requirements of paragraphs IV A or B of this Exhibit may be approved in accordance with the provisions of this paragraph. Requests for acceptance proposed under paragraph C 1 below, must be approved by the State Director. Requests for acceptance proposed under paragraph C 2 must be approved by the Administrator. All submissions of proposed options to the State Director or Administrator shall contain complete descriptions of materials, engineering data, test data when U values claimed are lower than the ASHRAE Handbook of Fundamentals, and calculations to document the validity of the proposal. All data and calculations will be based upon the current edition of the ASHRAE Handbook of Fundamentals or other universally accepted data sources.

1. *Overall "U" values for enveloped components.* The following requirements shall be used in determining acceptable options to the requirements of paragraphs IV A and IV B of this Exhibit.

a. *U_o (gross wall).*—Total exterior wall area (opaque wall and window and door) shall have a combined thermal transmittance value (*U_o* value) not to exceed the values shown in Attachment 1 to this Exhibit D (available in any FmHA office). Equation 1 in Attachment 1 shall be used to determine acceptable combinations to meet the requirements.

b. *U_o (gross ceiling).*—Total ceiling area (opaque ceiling and skylights) shall have a combined thermal transmittance value (*U_o* value) not to exceed the values shown in Attachment 2 to this Exhibit D (available in any FmHA office). Equation 2 in Attachment 2 shall be used to determine acceptable combinations to meet the requirements.

2. *Overall structure performance.* The following requirements shall be used in determining acceptable options to the requirements of paragraphs IV A and B of this Exhibit.

a. The methodology must be cost effective to the energy user, and must not adversely affect the structural capacity, durability or safety aspects of the structure.

b. All data and calculations must show valid performance comparisons between the proposed option and a structure comparable in size, configuration, orientation and occupant usage designed in accordance with paragraphs IV A or B. Structures may be considered for FmHA loan consideration which can be shown by accepted engineering practice to have energy consumption equal to or less than those which would be attained in a representative structure utilizing the requirements of paragraphs IV A or B.

3. *Special consideration for seasonally occupied farm labor housing.* The following sets forth the minimum acceptable options to the requirements of paragraphs IV A or B of this Exhibit for seasonally occupied housing serving as security for farm labor housing loans and grants.

a. When the period of occupancy does not encounter 500 or more heating degree-days (HDD) as determined by an average of the previous 10 years based upon local climatological data published by the National Oceanic and Atmospheric Administration, Environmental Data Service, the standards of paragraphs IV A or B will not apply.

b. When the period of use exceeds 500 HDD, the 10-year average value for the period of occupancy shall be used to determine the degree to which the thermal insulation requirements of paragraphs IV A or B shall apply.

c. If mechanical cooling is provided and the period of occupancy encounters more than 700 cooling degree-days (CDD), as determined by an average of the previous 8 years based upon local climatological data published by the same source cited in paragraph IV C3a above, the thermal insulation requirements for 1,000 and less degree-days as stated in paragraph IV A or B shall apply.

D. *Energy efficient construction practices.* This section prescribes those items of design and quality control which are necessary to guarantee the energy efficiency of homes built according to the standards of this Exhibit. Also included are recommendations for extra energy efficiency in dwellings.

1. *Infiltration.* a. Requirements: All construction shall be performed in such a manner as to provide a building envelope free of excessive infiltration.

(i) Caulking and sealants. Exterior joints around windows and door frames, between wall cavities and window or door frames, between wall and foundation, between wall and roof, between wall panels, at penetrations of utility services through walls, floors and roofs, and all other openings in the exterior envelope shall be caulked, gasketed, weatherstripped, or otherwise sealed. Caulking shall be silicone rubber base or butyl rubber base, conforming to Federal Specifications TT-S-1543 and TT-S-1657 respectively, or materials demonstrating equivalent performance in resilience and durability.

(ii) Windows shall comply with ANSI 134.1, NWMA 15-2; the air infiltration rate shall not exceed 0.5 ft³/min per ft. of sash crack.

(iii) Sliding glass doors shall comply with ANSI 134.2, NWM 15-3; the air infiltration rate shall not exceed .5 ft³/min per square ft. of door area.

(iv) All insulation placed in open cavity walls shall be installed so that all space behind electrical switches and receptacles, plumbing, ductwork and other obstructions in the cavity are insulated as completely as possible. Insulation shall be omitted on the side facing the conditioned area; however, the vapor barrier in walls must not be cut or destroyed.

b. Recommendations: (i) Wrap outside corners of wall sheathing with 15 lb. asphalt impregnated building felt before siding application.

(ii) Utilize vestibules for entry doors, especially those facing into the direction of winter wind.

(iii) Install plumbing, mechanical and electrical components in interior partitions as much as possible. All water piping should be insulated from freezing temperatures.

2. *Heating and/or Cooling Equipment.* a. Requirements: All mechanical equipment for heating and/or cooling habitable space shall be designed to provide economy of operations.

(i) All space heating equipment (including fireplaces) requiring combustion air shall be sealed combustion types, or be located in a nonconditioned area (such as unheated basements) or adequate combustion air must be provided from outside the conditioned space.

(ii) All ductwork shall be designed and installed to minimize leakage. All metal to metal connections shall be mechanically joined and taped.

b. Recommendations: (i) Whenever possible, locate ductwork inside of conditioned areas in dropped ceilings, interior partitions or other similar areas.

(ii) Locate outside cooling units in areas not subject to direct sunlight or heat buildup.

3. *Vapor Barrier.* a. Requirements: Adequate vapor barriers must be provided adjacent to the interior finish material of the wall or other closed envelope components which do not have ventilation space on the non-conditioned side of the insulation.

(i) A vapor barrier at the inside of the wall or other closed envelope component must have a permeability (perm) rating less than that of any other material in the component and in no case have a perm rating greater than one. All vapor barriers must be sealed around all openings in the interior surface. Vapor barriers are not required in ceilings and floors. Continuous vapor barriers on ceilings, walls, and floors require adequate moisture vapor control in the conditioned space.

(ii) All vapor producing or exhaust equipment shall be ducted to the outside and equipped with dampers. This equipment includes rangehoods, bathroom exhaust fans and clothes dryers. If a dwelling design proposes the use of windows to satisfy the kitchen and/or bathroom ventilation requirements of the development standards, the incorporation of dehumidification equipment should be considered in accordance with paragraph IV D 3 b. Exhaust of any equipment shall not terminate in an attic or crawl space.

b. Recommendation: Forced air heating/cooling systems should include humidification/dehumidification systems where conditions indicate.

V. *General Design Recommendations:*

A. Orient homes with greatest glass area facing south with adequate overhangs to control solar gain during non-heating periods.

Examples of proper roof overhangs are given in Attachment 3 to this Exhibit D (available in any FmHA office).

B. Arrange plantings with evergreen wind buffers on north side and deciduous trees on south.

C. Whenever possible, orient entry door away from winter winds.

D. Design house with simple shape to minimize exterior wall area.

E. Minimize glass areas within constraints of required light and ventilation, applicable safety codes and other appropriate consideration.

F. Minimize the amount of paved surface adjacent to the structure where heat gain is not desirable.

VI. *State Supplements:* State supplements or policies will not be issued or adopted to either supplement or set requirements different from those of this Exhibit without the prior written approval of the National Office.

Exhibit E—Voluntary National Model Building Codes

The following documents address the health and safety aspects of buildings and related structures and are voluntary national model building codes as defined in § 1924.4(h)(2) of this subpart. Copies of these documents may be obtained as indicated below:

Building code	Plumbing code	Mechanical code	Electrical code
BOCA Basic/National Building Code ¹	BOCA Basic/National Plumbing Code ¹	BOCA Basic/National Mechanical Code ¹	National Electrical Code ²
Standard Building Code ³	Standard Plumbing Code ³	Standard Mechanical Code ³	
Uniform Building Code ⁴	Uniform Plumbing Code ⁴	Uniform Mechanical Code ⁴	
CABO One and Two Family Dwelling Code ⁵			

¹ Building Officials and Code Administrators International, Inc., 4051 West Flossmoor Road, Country Club Hills, Illinois 60477.

² Southern Building Code Congress International, Inc., 900 Montclair Road, Birmingham, Alabama 35213-1206.

³ International Conference of Building Officials, 5360 South Workman Mill Road, Whittier, California 90601.

⁴ Council of American Building Officials, 5203 Leesburg Pike, Falls Church, Virginia 22041.

⁵ National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269.

Exhibit F—Payment Bond

KNOW ALL PERSONS BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a _____,
(Corporation, Partnership or Individual)
hereinafter called
PRINCIPAL and

(Name of Surety)

hereinafter called SURETY, are held and firm bound unto

(Name of Owner)

(Address of Owner)

hereinafter called OWNER and the United States of America acting through the Farmers Home Administration hereinafter referred to as GOVERNMENT, and unto all persons, firms, and corporations who or which may furnish labor, or who furnish materials to perform as described under the contract and to their successors and assigns in the total aggregate penal sum of _____ Dollars (\$ _____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the PRINCIPAL entered into a certain contract with the OWNER, dated the _____ day of _____, 19____, a copy of which is hereto attached and made a part hereof for the construction of:

NOW, THEREFORE, if the PRINCIPAL shall promptly make payment to all persons, firms, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery; equipment and tools, consumed or used in connection with the construction of such WORK, and for all labor cost incurred in such WORK including that by a SUBCONTRACTOR, and to any mechanic or materialman lienholder whether it acquires its lien by operation of State or Federal law; then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, that beneficiaries or claimants hereunder shall be limited to the SUBCONTRACTORS, and persons, firms, and corporations having a direct contract with the PRINCIPAL or its SUBCONTRACTORS.

PROVIDED, FURTHER, that the said SURETY for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of this contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no suit or action shall be commenced hereunder by any claimant: (a) Unless claimant, other than one having a direct contract with the PRINCIPAL

(or with the GOVERNMENT in the event the GOVERNMENT is performing the obligations of the OWNER), shall have given written notice to any two of the following: The PRINCIPAL, the OWNER, or the SURETY above named within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by register mail or certified mail, postage prepaid, in an envelope addressed to the PRINCIPAL, OWNER, or SURETY, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer. (b) After the expiration of one (1) year following the date of which PRINCIPAL ceased work on said CONTRACT, it being understood, however, that if any limitation embodied in the BOND is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the Contract as so amended. The term "Amendment", wherever used in this BOND and whether referring to this BOND, the contract or the loan Documents shall include any alteration, addition, extension or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER or GOVERNMENT and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in [number] counterparts, each one of which shall be deemed an original, this the _____ day of _____.

ATTEST:

Principal

(Principal) Secretary

(SEAL)

By _____ (s)

(Address)

Witness as to Principal

(Address)

Surety

ATTEST:

Witness as to Surety

(Address)

By Attorney-in-Fact

(Address)

Note.—Date of BOND must not be prior to date of Contract.

If CONTRACTOR is partnership, all partners should execute BOND.

Important: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

Exhibit G—Performance Bond

KNOW ALL PERSONS BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a (Corporation, Partnership, or Individual) hereinafter called PRINCIPAL, and

(Name of Surety)

(Address of Surety)

hereinafter called SURETY, are held and firmly bound unto

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, and the United States of America acting through the Farmers Home Administration hereinafter referred to as the GOVERNMENT in the total aggregate penal sum of

Dollars (\$)

in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the PRINCIPAL entered into a certain contract with the OWNER, dated the — day of — 19 —, a copy of which is hereto attached and made a part hereof for the construction of:

NOW, THEREFORE, if the PRINCIPAL shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, or GOVERNMENT, with or without notice to the SURETY and during the guaranty period and if the PRINCIPAL shall satisfy all claims and demands incurred

under such contract, and shall fully indemnify and save harmless the OWNER and GOVERNMENT from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER and GOVERNMENT all outlay and expense which the OWNER and GOVERNMENT may incur in making good any default, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the liability of the PRINCIPAL AND SURETY hereunder to the GOVERNMENT shall be subject to the same limitations and defenses as may be available to them against a claim hereunder by the OWNER, provided, however, that the GOVERNMENT may, at its option, perform any obligations of the OWNER required by the contract.

PROVIDED, FURTHER, that the said SURETY, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that it is expressly agreed that the BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the CONTRACT as so amended. The term "Amendment", wherever used in this BOND, and whether referring to this BOND, the Contract or the Loan Documents shall include any alteration, addition, extension, or modification of any character whatsoever.

PROVIDED, FURTHER, that no final settlement between the OWNER or GOVERNMENT and the PRINCIPAL shall abridge the right of the other beneficiary hereunder, whose claim may be unsatisfied. The OWNER and GOVERNMENT are the only beneficiaries hereunder.

IN WITNESS WHEREOF, this instrument is executed in [Number] counterparts, each one of which shall be deemed an original, this the — day of —.

ATTEST:

Principal

(Principal) Secretary
(SEAL)

Witness as to Principal

(Address)

By (s)

(Address)

Surety

ATTEST:

Witness as to Surety

(Address)

By Attorney-in-Fact

(Address)

Exhibit H—Prohibition of Lead-Based Paints

I. Purpose: This Exhibit prescribes the methods to be used to comply with the requirements of the Lead-Based Paint Poisoning Prevention Act, Public Law 91-695, as amended, (42 U.S.C. 4801 et seq.) and the amendment to Section 501 (3) of Public Law 91-695 (42 U.S.C. 4841 (3)) as amended by the National Consumer Health Information and Health Promotion Act of 1976, Public Law 94-317.

II. Policy: The Farmers Home Administration (FmHA) shall not permit the use of lead-based paint on applicable surfaces of any housing or buildings purchased, repaired, or rehabilitated for human habitation with financial assistance provided by this agency. Paints used on applicable surfaces shall not contain more than 0.06 percent lead by weight calculated as lead metal in the total nonvolatile content of liquid paints or in the dried film of paint already applied.

III. Definitions:

A. Housing and buildings mean any house, apartment, or structure intended for human habitation. This includes any institutional structure where persons reside, such as an orphanage, boarding school, dormitory, day care center or extended care facility, college housing, domestic or migratory labor housing, hospitals, group practice facilities, community facilities, and business or industrial facilities.

B. Applicable surfaces means all interior surfaces, whether accessible or not, and those exterior surfaces which are readily accessible to children under 7 years of age, such as stairs, decks, porches, railings, windows, and doors.

C. Lead-based paint means any paint containing more than .5 of 1 percentum lead by weight, or with respect to paint manufactured after June 22, 1977, lead-based paint containing more than six one-hundredths of 1 percentum lead by weight.

IV. Requirements:

A. All new housing and buildings shall comply with paragraph II of this Exhibit H.

B. For all existing housing and buildings built after 1950, on which a loan is closed after July 19, 1978, FmHA requires that the applicant, borrower or tenant be notified of the potential hazard of lead-based paints, of the symptoms and treatment of lead poisoning, and of the importance and availability of maintenance and removal techniques for eliminating such hazards. This will be accomplished by providing each applicant, borrower and/or tenant with a copy of Attachment 1 to this Exhibit H, "Lead-based Paint Hazards, Symptoms, Treatment and Techniques for Eliminating Hazards," available in any FmHA County

Office. Copies of Attachment 1 may be obtained by the County Supervisor from the Finance Office, 1520 Market Street, St. Louis, MO 63103.

C. For all existing housing or buildings built before 1950 on which a loan is closed after July 19, 1978, FmHA requires that the applicant, borrower and/or tenant be notified as in paragraph IV B and a copy of Attachment 2 to this Exhibit H, "Caution Note on Lead-Based Paint Hazard," available in any FmHA County Office, shall be delivered to the hands of the applicant, borrowers and/or tenant.

D. For all property transfers and inventory property sales, Attachments 1 and 2 to this Exhibit H (available in any FmHA office) shall be handed to the purchaser by the FmHA representative.

E. All inventory housing or buildings built before 1950 to be repaired, renovated, or rehabilitated shall have tests for lead content, and where found to be hazardous, shall have any interior lead-based paint removed entirely. Loose or cracked surfaces shall be cleaned down to the base surface before repainting with a paint containing not more than six one-hundredths of 1 percentum lead by weight in the total nonvolatile content of the paint or the equivalent measure of lead in the dried film of paint already applied or both. Contracting officers shall include the following provision prohibiting the use of lead-based paint in all contracts and subcontracts for construction or rehabilitation of housing or buildings:

Lead-Based Paint Prohibition

No lead-based paint containing more than .5 of 1 percentum lead by weight (calculated as lead metal) in the total nonvolatile content of the paint, or the equivalent measure of lead in the dried film of paint already applied, or both, or with respect to paint manufactured after June 22, 1977, no lead-based paint containing more than .06 of 1 percentum lead by weight (calculated as lead metal) in the total nonvolatile content of the paint, or the equivalent measure of lead in the dried film of paint already applied, or both, shall be used in the construction or rehabilitation of residential structures under this contract or any subsequent subcontracts.

Authority: This amendment is made under provisions of 5 U.S.C. 301, 40 U.S.C. 486 (c).

Done at _____ this _____ day of _____, 19____.

FmHA Representative

V. Summary: Section 401 of the Lead-Based Paint Poisoning Prevention Act as amended by the National Consumer Health Information and Health Promotion Act of 1978, PL 94-317, provides a requirement that each federal agency issue regulations and to take such other steps necessary to prohibit the use of lead-based paint on all applicable surfaces in Federal and Federally-assisted construction or rehabilitation of residential structures. The Lead-Based Paint Poisoning Prevention Act, PL 91-695, January 13, 1971, provides for grants to units of general local government in any state for the purpose of detecting and treating incidents of lead-based paint poisoning. Title II of this Act also

provides for grants to the same units to identify those areas of risk including testing to detect the presence of lead-based paint on surfaces of residential housing.

Exhibit I—Guidelines for Seasonal Farm Labor Housing

Section 100

General—This Exhibit sets forth the guidelines and minimum standards for planning and construction of new Labor Housing (LH) that will be occupied on a seasonal basis. Rehabilitation LH projects will be in substantial conformance with these guidelines and standards. A "seasonal basis" is defined as 6 months or less per year. Seasonal housing for the farmworker need not be convertible to year-round occupancy; however, the living units shall be designed for the intended type of tenant, the time of occupancy, the location, the specific site, and the planned method of operation. It is important that the design of the LH site and buildings will help to create a pleasing lifestyle which will promote human dignity and pride among its tenants.

Section 200

Codes and Regulations—Compliance is required with National, state and local codes or regulations affecting design, construction, mechanical, electrical, fire prevention, sanitation, and site improvement.

Section 300

Planning

300-1 Complete architectural/engineering services in accordance with this subpart will be required if an LH grant is involved or the LH loan will involve more than four individual family units, or any number of group living units, or dormitory units accommodating 20 or more persons.

300-2 Buildings and site design shall provide for a safe, secure, economical, healthful, and attractive living facility and environment suited to the needs of the domestic farm laborer and his/her family.

300-3 At least 5 percent of the individual family units in a project, or one unit, whichever is greater, and all common use facilities will be accessible to or adaptable for physically handicapped persons. This requirement may be modified if a recipient/borrower shows, through a market survey acceptable to FmHA, that a different percentage of accessible or adaptable units is more appropriate for a particular project and its service area.

Site Design

301-1 General—The site design shall be arranged to utilize and preserve the favorable features and characteristics of the property and to avoid or minimize the potential harmful effect of unfavorable features. Particular attention is directed to § 1944.164(k), (l) and (m) of Subpart D of Part 1944 of this chapter with reference to compliance with Subpart G of Part 1940 of this chapter. Some of the features which must be considered are the topography, drainage, access, building orientation to sun and breezes; and advantageous features, such as vegetation, trees, good views, etc. or disadvantageous features, such as offensive

odors, noxious plants, noise, dust, health hazards, etc.

301-2 Drainage—Surface and subsurface drainage systems shall be provided in accordance with the applicable development standard and Subpart D of Part 1804 of this chapter (FmHA Instruction 424.5.)

301-3 Water and Sewage Disposal—Water supply and sewage disposal installations shall comply with subpart D of Part 1804 of this chapter (FmHA Instruction 424.5), the applicable development standard and all governing state and local department of health requirements. Where environmentally and economically feasible, the LH facility shall connect to public water and waste disposal systems.

301-4 Electrical—Adequate electrical service shall be provided for exterior and interior lighting and for the operation of equipment.

301-5 Vehicular Access and Parking.

301-5.1 Safe and convenient all-weather roads shall be provided to connect the site and its improvements to the off-site public road.

301-5.2 All-weather drives and parking shall be provided for tenants, and for trucks and buses as needed within the site. Driveways, parking areas and walkway locations shall be in substantial conformance with the applicable development standard.

301-6 Walks:

301-6.1 Walks shall be provided for safe convenient access to all dwellings and for safe pedestrian circulation throughout the development between locations and facilities where major need for pedestrian access can be anticipated, such as laundry, parking to dwelling units, common dining rooms, etc.

301-6.2 Walkways shall be hard surface, such as concrete, asphalt, or stabilized gravel, and shall be adequately drained.

301-7 Building Location:

301-7.1 Side and rear yards and distances between buildings shall conform to the applicable development standard.

301-8. Garbage and Refuse:

301-8.1 Garbage and refuse containers for individual units are required and shall be stored on durable functional racks or shall be located in a central screened area with easily cleaned surfaces. Single containers for multiple units shall be screened and in locations designed to accommodate collection vehicle functions.

301-9 Fencing:

301-9.1 Fencing used in the site design for project privacy or building security shall be harmonious in appearance with other fences and surrounding facilities which fall within the same view.

301-10 Outdoor living:

301-10.1 All public areas where pedestrian use can be anticipated after sunset shall be adequately lighted for security purposes, such as walkways to common use facilities—laundry, dining halls, building entrances, parking areas, etc.

301-11 Planting and Landscaping:

301-11.1 Planting and lawns or ground covers shall be provided as required to protect the site from erosion, control dust, for active and passive recreation areas, and provide a pleasant environment.

Building Design

302-1.1 Living Units Design:

302-1.1 *Individual Family Unit*—One family or extended family to a unit which shall contain adequate space for living, dining, kitchen, bath and bedrooms. Multifamily type units are required whenever possible for economy of site and building construction.

a. The minimum total net living unit size shall be 400 square feet. This size assumes occupancy of four persons. Units planned for additional occupants shall include an additional 60 square feet of living area per person.

b. A living/dining area shall be provided to accommodate a table and chairs with adequate dining and circulation space for the intended number of occupants. The living/dining area should be combined with the kitchen area.

c. The kitchen shall contain a sink, cooking range and refrigerator. A minimum free countertop area of six square feet is required. A minimum of 40 square feet of shelf area is required.

d. Each bathroom shall contain adequate space and circulation for a bathtub and/or shower, water closet and lavatory. Access to the bathroom shall not be through another bedroom in dwelling units containing more than one bedroom.

e. Bedroom areas separate from living areas are required. The design of the unit shall provide a minimum of 50 square feet of sleeping area per intended occupant including storage. Housing for families with children shall have a separate bedroom or sleeping area for the adult couples. A two foot by two foot shelf with a two foot long clothes hanging rod is required for each occupant.

302-1.2 *Group Living Unit*—A living unit designed for the occupancy of more than one family or for separate occupancy of male and/or female groups. Common bath spaces shall be contained in the same building. Group living units for families shall have separate bedrooms for each adult couple.

a. The design of the unit shall provide for a minimum of 620 square feet of total net living area for eight persons and an additional 60 square feet for each additional occupant. Additional area shall be planned for a second bathroom when anticipated occupancy will exceed eight persons, or if it will be occupied by persons of both sexes.

b. The kitchen shall contain an adequate sink, cooking range, refrigerator, and space the size of which is commensurate with the needs of the group living unit. A minimum of free countertop area of eight square feet is required. A minimum of 50 square feet of shelf area is required.

c. Refer to paragraph 302-1.1 b for living/dining requirements.

d. Each bathroom shall contain adequate space and circulation for comfortable access to, and use of, fixtures which will include a bathtub and/or shower, water closet and lavatory. In no case shall minimum fixtures be less than that required per paragraph 302-1.3 c below.

e. Refer to paragraph 301-1.1 e for bedroom requirements.

302.1.3 *Dormitory Living Unit*—A building which provides common sleeping quarters for

persons of the same sex and may or may not contain kitchen and/or dining facilities in the same building as the sleeping quarters.

a. The design of areas for sleeping purposes, using single beds, shall provide for not less than 72 square feet per occupant including storage.

b. The design of areas for sleeping purposes, using double bunk beds, shall provide for not less than 40 square feet per occupant. Triple bunk beds will not be allowed.

c. The design of each dormitory building must include a water closet and a bathtub or shower for each 12 occupants, and a lavatory for each 8 persons. Urinals may be substituted for men's water closets on the basis of one urinal for one water closet, up to maximum of one-third of the required water closets.

d. Adequate kitchen and dining facilities must be provided which may be in the dormitory building or detached at a distance of not more than 200 feet from the sleeping quarters. In either case, the space must contain adequate cooking ranges, refrigerators, sinks, countertop, food storage shelves, tables and chairs, and circulation space. These facilities will comply with the requirements of the "Food Service Sanitation Ordinance and Code," Part V of the "Food Service Sanitation Manual," U.S. Public Health Service Publication 934 (1965).

302-2 Other Facilities:

302-2.1 *General*—Other facilities, authorized by Subpart D of Part 1944 of this chapter, needed by farm workers may be provided in several ways: part of a living unit, located in the project, or, with the exception of laundry facilities, available nearby.

302-2.2 *Laundry Facilities*—Laundry facilities shall be required on-site. Drying yards shall be provided if dryer units are not provided. The design of washing facilities shall plan for a minimum rate of one washer for each 20 occupants. One drying unit may be provided for every two washers, if automatic dryers are customarily provided for rental housing in the community. Laundry facilities shall have adequate space for loading the units, circulation, and clothes folding.

302-2.3 *Office and Maintenance*—An office and maintenance space shall be provided or available, commensurate with the number of living units served, and shall meet the criteria of the FmHA Manual of Acceptable Practices. If necessary, the maintenance space shall have sufficient area to accommodate furniture storage.

302-2.4 *Child Care Center*—Where feasible, a child care center may be included to provide supervised activity and safety for children while the parents work. Supervisors and workers for such centers are sometimes enlisted on a volunteer basis and the cost borne by nonprofit associations or community organizations. Grants are sometimes available through Federal or state programs. Consequently, the design of the child care center should meet the requirements of those sources providing organizational personnel and/or financing.

302-2.5 *Manager's Dwelling*—If a manager's dwelling unit is to be provided as

a part of the FmHA loan or grant, it will meet these guidelines. However, if it is necessary to provide a year-round caretaker/manager dwelling unit with FmHA loan or grant funds, it will meet the applicable development standard.

302-2.6 *Recreation*—Outdoor recreation space is required and shall be commensurate with the needs of the occupants. Active and passive recreation areas will be provided which may consist of outdoor sitting areas, playfields, tot lots and play equipment.

General Requirements

303-1 *Materials and Construction*—All materials and their installation in a LH facility shall meet the applicable development standard. Any exceptions to these requirements for materials and their installation must be obtained with the approval of the FmHA National Office. Material should be selected that is durable and easily cleaned and maintained.

303-2 *Fire Protection*—Fire protection and egress shall be provided to comply with the applicable development standard.

303-3 *Light, Ventilation, Screening*—Natural light and ventilation requirements as specified in the applicable development standard shall be followed. Screening of all exterior openings is required.

303-4 *Ceiling Heights*—Ceiling heights of habitable rooms shall be a minimum of seven feet six inches clear, and seven feet in halls or baths in dwelling units. Public rooms shall have a minimum of eight feet clear ceiling height. Sloping ceilings shall have at least seven feet six inches for 1/2 the room with no portion less than five feet in height.

303-5 *Heating and Cooling*—Heating and cooling and/or air circulation equipment shall be installed as needed for the comfort of the tenants, considering the climate and time of year the facility will be in operation. Maximum feasible use of passive solar heating and cooling techniques shall be required. All equipment installed will be in accordance with the applicable development standard to protect the health and safety of occupants.

303-6 *Plumbing*—Plumbing materials and their installation shall meet the applicable development standard. Hot water will be required to all living units, baths, kitchens and laundry facilities.

303-7 *Insulation, Thermal Standards, Winterization*—Insulation will be required where either heating or cooling is provided as per paragraph 303-5 above or when climatic conditions dictate a need for insulation. Insulation Standards will comply with Exhibit D, paragraph IV C 3, of this subpart, or the state insulation standards, whichever are the more stringent.

303-8 *Electrical*—Electrical design, equipment and installation shall comply with the requirements of the latest edition of the National Electrical Code, and the applicable development standard for materials and their installation. Individual family units may be separately metered; other types of dwelling units may be separately metered as required.

303-9 *Security and Winterization*—Adequate management and physical measures will be provided as necessary to protect the facility during off-season periods.

including adequate heating and insulation as required.

Exhibit K—Classifications for Multi-Family Residential Rehabilitation Work

I. General

This Exhibit distinguishes between what FmHA considers maintenance and repair work, moderate rehabilitation and substantial rehabilitation. In all cases, the building or project to be rehabilitated shall be structurally sound. The applicant shall have a structural analysis of the existing building made to determine the adequacy of all structural systems for the proposed rehabilitation.

II. Definitions

Maintenance and Repair—Work involved in the selective replacement and general maintenance and repair of certain materials, appliances or components of an existing residential building.

Moderate Rehabilitation—All work directly involved in the rearrangement of interior space, the replacement of finish materials or components of the electrical, plumbing, heating or conveyance systems of an existing multi-family residential building. Work and improvements are considered to be more than routine maintenance and repair.

Substantial Rehabilitation—All work directly involved in the rearrangement of interior space that involves alteration of load bearing partitions and columns; the replacement of the electrical, plumbing, heating or conveyance systems; and the addition to and/or major conversion of existing multi-family residential buildings or other building structures.

Moderate rehabilitation and repair shall not be limited to building changes for cosmetic or convenience purposes. In all cases moderate rehabilitation shall involve a minimum of three (3) components of building rehabilitation listed as moderate. Unless combined with other improvements in a project that are considered to be moderate or substantial rehabilitation the items identified as maintenance and repair are considered to be cosmetic and convenience changes.

When a rehabilitation project consists of both moderate and substantial rehabilitation components, those substantial rehabilitation components shall be in accordance with FmHA's development standards and local codes and regulation requirements. Where the majority of project components of building rehabilitation are considered substantial the project shall be considered in the substantial rehabilitation category.

Those site components of rehabilitation such as landscaping, grading, drainage, fencing, parking areas, recreation areas, water and waste disposal systems, etc., whether considered either maintenance and repair, moderate rehabilitation or substantial rehabilitation shall be in accordance with FmHA's development standards for site development work; all local codes and regulation requirements; and sound engineering and architectural practices.

Any alteration of a structure listed or eligible for listing on the National Register of Historic Places may be considered either moderate or substantial rehabilitation;

however, it shall conform first to the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings and then to FmHA's requirements. In cases where the Secretary of the Interior's standards cannot be met, rehabilitation will conform to the agreed upon approaches, treatments and techniques resulting from the consultation process between FmHA, the borrower, the State Historic Preservation Officer and the Advisory Council of Historic Preservation.

III. Components of Multi-Family Building Rehabilitation

The components of multi-family building rehabilitation necessary and generally considered by FmHA to be either maintenance and repair, moderate rehabilitation or substantial rehabilitation include but are not limited to those listed in the following chart.

COMPONENTS OF MULTI-FAMILY BUILDING REHABILITATION

Components	Maintenance and repair	Moderate rehabilitation	Substantial rehabilitation
Air conditioning.....	o		
Appliance replacement or repair.....	o		
Cabinet replacement or repair.....	o		
Carpeting.....	o		
Caulking.....	o		
Ceiling framing.....	o		
Clothes closets or shelving improvements.....	o		
Door repair.....	o		
Drywall repair.....	o		
Gutters and downspouts.....	o		
Hardware replacement or repair.....	o		
Kitchen cabinet improvement.....	o		
Lighting fixture replacement or repair.....	o		
Mail boxes.....	o		
Painting.....	o		
Paneling.....	o		
Partition repair.....	o		
Roof repair.....	o		
Signage.....	o		
Stair repair.....	o		
Tile work.....	o		
Wallpapering.....	o		
Window shades and curtains.....	o		
Door replacement.....		o	
Drywall replacement.....		o	
Elevator components replacement.....		o	
Exterior entrance redesign, relocation.....		o	
Finish flooring materials.....		o	
Flashing.....		o	
Furnace replacement.....		o	
Gas pipes.....		o	
Insulation.....		o	
Lath and plaster replacement.....		o	
New shingles or roof replacement.....		o	
Partition (non bearing) replacement, or relocation.....		o	
Plumbing fixture replacement.....		o	
Pointing.....		o	
Porch and steps alteration or replacement.....		o	
Stair replacement, or relocation.....		o	
Storm windows and weatherstripping.....		o	

COMPONENTS OF MULTI-FAMILY BUILDING REHABILITATION—Continued

Components	Maintenance and repair	Moderate rehabilitation	Substantial rehabilitation
Subfloor material replacement.....		o	
Trim—exterior and interior.....		o	
Window replacement.....		o	
New or alteration to the:			
Mechanical system.....			o
Soil pipes.....			o
Vent pipes.....			o
Waste pipes.....			o
Alteration or replacement of structural components:			
Beams.....			
Chimneys and vents.....			o
Columns and post.....			o
Electrical service—replacement or new.....			o
Elevator replacement.....			o
Exterior walls.....			o
Floor construction.....			o
Footings.....			o
Foundation wall.....			o
Foundation waterproofing.....			o
Interior walls.....			o

Moderate repair and rehabilitation shall not be limited to building changes for cosmetic purposes. In all cases moderate rehabilitation shall involve a minimum of three (3) components of building rehabilitation listed as moderate. Unless combined with other improvements in a project that are considered to be moderate or substantial rehabilitation the items identified as maintenance and repair are considered to be cosmetic and convenience changes.

Exhibit L—Insured 10-Year Home Warranty Plan Requirements

I. Purpose: In recent years, numerous third-party home warranty plans have been developed offering new homeowners varying degrees of protection against builder default and/or major structural defects in their homes. This exhibit establishes the criteria and procedures by which a warranty plan is found acceptable for new construction of single family homes financed by Farmers Home Administration (FmHA). An acceptable warranty plan will:

A. Assure that FmHA borrowers receive adequate warranty coverage.

B. In certain circumstances, eliminate the requirement for FmHA personnel to make the first two construction inspections, and

C. Permit a loan up to the market value of the security (less the unpaid principal balance and past due interest of any other liens against the security), even though FmHA personnel may not have performed period inspections during construction.

II. Types of Warranty Companies:

A. An insured warranty company is underwritten by an insurance carrier, licensed to operate as an insurer by the states where the warranty company plans to operate, and has an acceptable rating from a

nationally recognized rating company such as A.M. Best Company.

B. A risk retention group is an insurer which is licensed in one state and is authorized, under the Products Liability Risk Retention Act of 1981, to issue its policies in all states. This authority is not challenged by FmHA; however, there remains some question as to the legal propriety of a 10-year insured warranty insurer to be a risk-retention group. If at some future time any state insurance commission or regulatory agency challenges the legal authority of such group, FmHA will reconsider its acceptance of the group.

C. Individual state warranty plans, such as that offered by the State of New Jersey, are backed by the full faith and credit of the state government.

III. Plan Requirements:

To be considered acceptable, a warranty plan must include the following features:

A. The entire cost (fee, premium, etc.) of the coverage is prepaid and coverage automatically transfers to subsequent owners without additional cost.

B. The coverage is not cancellable by the warrantor (builder), warranty company or insurer.

C. The coverage age includes at least the following:

(1) For one year from the effective date, any defects caused by faulty workmanship of defective materials.

(2) During the second year after the effective date, the warranty continues to cover the wiring, piping and duct work of the electrical, plumbing, heating and cooling systems, plus the items in (3).

(3) During the third through the tenth years, the warranty continues to cover major structural defects. A major structural defect is actual damage to the load-bearing portion of the home including damage due to subsidence, expansion or lateral movement of the soil (excluding movement caused by flood or earthquake) which affects its load-bearing function and which vitally effects or is imminently likely to affect use of the home for residential purposes.

D. A system is provided for complaint (claims) handling which includes a conciliation and, if necessary to resolve matters in dispute, arbitration arranged by the American Arbitration Association or similar organization.

E. A construction inspection plan is required if FmHA is to eliminate the first two FmHA inspections or permit a full market value loan when FmHA inspections are not conducted.

IV. Information for Review:

A. Companies submitting warranty plans for a determination of acceptability must support requests with the following information.

(1) Evidence that the insured warranty company has met the applicable state licensing and/or regulatory requirements in the state in which the company plans to operate.

(2) Evidence that the insurance carrier underwriting the warranty plan is licensed to operate as an insurer in the states in which the company plans to operate and has an acceptable rating from a nationally

recognized company such as A.M. Best Company.

(3) State warranty plan agencies will provide evidence that the plan is backed by the full faith and credit of the state.

(4) A full description of the warranty plan including information on the fees, builder and home registration procedures, required construction standards, construction inspection procedures, coverage provided and claims procedures.

(5) A sample copy of the warranty information and/or policy which is provided to the homeowner.

(6) Suggested means by which FmHA field offices can readily assure that the builder is a member in good standing prior to loan approval and that a warrant will be issued upon the completion of construction prior to the final release of funds.

B. Submission and Acceptance:

(1) Insured warranty companies, except those operating as risk retention groups, and state warranty plan agencies will submit their requests and supporting information to the FmHA State Director in the state in which they plan to operate. State Directors will determine the acceptability of insured warranty plans and state warranty plans in their jurisdictions, notify the company or agency of the decision in writing and notify field offices by issuance of a State Supplement including the names and addresses of acceptable warranty companies and any other pertinent information.

(2) Warranty companies claiming authority as risk retention groups will submit their requests and supporting information including certification that it has complied with all requirements of the Products Liability Risk Retention Act of 1981 (Public Law 97-45) and information indicating the state in which it is licensed, information to the FmHA National Office, Single Family Housing Processing Division. The National Office will determine the acceptability of the warranty of a risk retention group, notify the company of the decision in writing and notify field offices by issuance of an attachment to this Exhibit.

V. Warranty Performance:

A. County Supervisors will report inadequate warranty performance through their District Director to the State Director. State Directors will review the situation, assist in resolving any problems and, if necessary, initiate action under Subpart F of Part 1942 of this chapter. State Directors will inform, by memorandum, the Director, Single Family Housing Processing Division, National Office, of any problems with warranty performance and if any debarment action is initiated.

B. State Directors will annually monitor each warranty company and/or its insurer to assure continued compliance with state licensing and/or regulatory requirements.

Attachment 1.—Acceptable Warranty Companies

The warranty company listed below claims authority to act as a risk retention group under the Products Liability Risk Retention Act of 1981 and as such, to operate in all states to provide 10-year home warranties. This authority remains subject to future challenges by any state insurance

commissioner or regulatory agency; however, until such challenge is made, FmHA accepts their warranty.

Name, Address, and Area of Operation

Home Owners Warranty Corporation/HOW Insurance Company, 2000 L Street, N.W., Washington, D.C. 20036, Telephone: 202-463-4600—All states

Subpart F—Complaints and Compensation for Construction Defects

12. In § 1924.253, paragraph (a)(3) is amended by changing the phrase "FmHA's Minimum Property Standards" to "development standards."

13. In § 1942.253, paragraph (c) is revised to read as follows:

§ 1924.253 Definitions

(c) *Newly constructed dwelling.* A newly constructed dwelling is one which (1) is financed with a Section 502 RH loan, (2) was, at the time the loan was closed, not more than one year old and not previously occupied as a residence, and (3) the required construction inspections were made by Farmers Home Administration (FmHA), Department of Housing and Urban Development (HUD), Veterans Administration (VA) or as authorized in Subpart A of Part 1924 of this chapter.

PART 1930—GENERAL

14. The authority citation for Part 1930 continues to read as follows:

Authority: 42 U.S.C. 1480; 7 CFR 2.23 and 2.70.

Subpart C—Management and Supervision of Multiple Family Housing Borrowers and Grant Recipients

15. In Exhibit B, paragraph VD(3)(a) is amended by changing the reference to "§ 1924.4(h)" to "§ 1924.4(i)."

PART 1933—LOAN AND GRANT PROGRAM (GROUP)

16. The authority citation for Part 1933 continues to read as follows:

Authority: 7 U.S.C. 1989, 42 U.S.C. 1480; 7 CFR 2.23 and 2.70.

Subpart I—Self-Help Technical Assistance Grants

17. In § 1933.409, paragraph (f) is revised to read as follows:

§ 1933.409 Other considerations.

(f) Compliance with local codes and regulations. Applicants must be sure that planning and development of self-

help housing will conform with any applicable laws, ordinances, codes and regulations governing such matters as construction, heating, plumbing, electrical installation, fire prevention, health, sanitation and zoning, as well as development standards in accordance within Subpart A of Part 1924 of this chapter.

PART 1940—GENERAL

18. The authority citation for Part 1940 is revised to read as follows:

Authority: 7 U.S.C. 1989, 42 U.S.C. 1480; 5 U.S.C. 301; 7 CFR 2.27 and 2.70.

Subpart G—Environmental Program

19. In § 1940.305, paragraph (j) is added to read as follows:

§ 1940.305 Policy implementation.

(j) *Noise abatement.* For purposes of assessing noise impacts and for determining the acceptability of housing sites in terms of their exposure to noise, FmHA has adopted and follows the standards and procedures developed by HUD and contained in 24 CFR 51 of Subpart B entitled, Noise Abatement and Control.

PART 1942—ASSOCIATIONS

20. The authority citation for Part 1942 continues to read as follows:

Authority: 7 U.S.C. 1989; 16 U.S.C. 1005; 7 CFR 2.23 and 2.70.

Subpart A—Community Facility Loans

§ 1942.17 [Amended]

21. In § 1942.17, paragraph (p) (4) is amended by changing the reference "Form FmHA 424-12," to "Form FmHA 1924-12" in the sixth and seventh sentences.

22. In § 1942.17, paragraph (p) (5) is amended by changing the reference "Form FmHA 424-18" to "Form FmHA 1924-18" in the third and fourth sentences.

23. In § 1942.17, paragraph (r) (3) (i) and (ii) are amended by changing the reference "Form FmHA 424-12" to "Form FmHA 1924-12."

24. In § 1942.18, paragraph (n) (3) is amended by changing the references to "Form FmHA 424-10" and "Form FmHA 424-9," to "Form FmHA 1924-10" and "Form FmHA 1924-9," respectively.

25. In § 1942.18, paragraph (o) (1) is amended by changing the reference "Form FmHA 424-16" to "Form FmHA 1924-16."

26. In § 1942.18, paragraph (o) (3) is amended by changing the reference

"Form FmHA 424-18" to "Form FmHA 1924-18."

27. In § 1942.18, paragraph (o) (5) is amended by changing the reference "Form FmHA 424-12" to "Form FmHA 1924-12."

28. In § 1942.18, paragraph (o) (7) (iii) is amended by changing the reference "Form FmHA 424-7," to "Form FmHA 1924-7."

PART 1943—FARM OWNERSHIP, SOIL AND WATER AND RECREATION

29. The authority citation for Part 1943 continues to read as follows:

Authority: 7 U.S.C. 1989; 5 U.S.C. 301; 7 CFR 2.23 and 2.70.

Subpart A—Insured Farm Ownership Loan Policies, Procedures and Authorizations

§ 1943.32 [Amended]

30. In § 1943.32, paragraph (a) is amended by changing the reference "424-1," to "1942-1."

Exhibit A of Subpart A [Amended]

31. In Exhibit A, paragraph II, B, 1 is amended by changing the reference "Form FmHA 424-1," to "Form FmHA 1924-1" in five places.

Subpart B—Insured Soil and Water Loan Policies, Procedures and Authorizations

§ 1943.82 [Amended]

32. In § 1943.82, paragraph (a) is amended by changing the reference "424-1," to "1924-1."

Subpart C—Insured Recreation Loan Policies, Procedures and Authorizations

§ 1943.132 [Amended]

33. In § 1943.132, paragraph (a) is amended by changing the reference "424-1" to "1924-1."

PART 1944—HOUSING

34. The authority citation for Part 1944 continues to read as follows:

Authority: 42 U.S.C. 1480; 7 CFR 2.23 and 2.70.

Subpart A—Section 502 Rural Housing Loan Policies, Procedures, and Authorizations

35. In § 1944.16, paragraph (a) (1) (i), (a) (5) and (b) are revised to read as follows:

§ 1944.16 Building requirements.

- (a) * * *
- (1) * * *

(i) Living area will include all finished areas as well as unfinished areas that

are designed for or normally considered as living area.

(5) Solid fuel burning devices may be authorized only if the loan approval official determines and documents in the case file that:

(i) A dependable and economical fuel supply is available,

(ii) The device complies with paragraph IV D 2 of Exhibit D of Subpart A of Part 1924 of this chapter,

(iii) The device and installation drawings should be approved and will be inspected upon completion by at least one of the following:

(A) Local fire department official or the authority having jurisdiction,

(B) An insurance company representative that is providing fire coverage on the property; or,

(C) If required by local codes, the code authority having jurisdiction; and

(iv) The State Office policies and guidelines with respect to such devices are being followed.

(b) *Existing dwellings.* Applicants should be counseled regarding the type of housing necessary to meet their needs. Existing dwellings purchased with RH funds must be structurally sound, functionally adequate, either be in good repair or placed in good repair with loan funds. The general paragraphs of Guide 2 of Subpart A of Part 1924 of this chapter, "FHA Design Guide," available in any FmHA office, should be used as a guide to determine whether the dwelling is suitable for this program. All existing dwellings must meet the thermal performance standards required in Exhibit D, paragraph IV B, of Subpart A of Part 1924 of this chapter. The policies stated in paragraph (a) of this section may be used as a guide in making a determination of adequate but modest dwellings; however, modest existing dwellings should contain no more than 1,400 square feet of living area and be modest in cost and design. Loans should not be made on existing dwellings which contain more than one design feature which would not be allowed in new homes. A loan will not be made on an existing manufactured home unless it is already financed with a Section 502 Rural Housing loan or is being sold from FmHA inventory.

§ 1944.22 [Amended]

36. In § 1944.22, paragraph (e)(3) is amended by changing the reference "Form FmHA 424-1" to "Form FmHA 1924-1."

§ 1944.30 [Amended]

37. In § 1944.30, paragraph (a) is amended by changing the reference "FmHA 424-1" to "FmHA 1924-1."

§ 1944.45 [Amended]

38. In § 1944.45, paragraph (f)(5) is amended by changing the reference "Form FmHA 444-11" to "Form FmHA 1944-11."

39. In § 1944.45, paragraphs (h), the first sentence, and (i) (2) are amended by changing "MPS" to "the applicable development standards."

40. In § 1944.45, paragraph (k) is amended by changing the reference "Form FmHA 424-19" to "Form FmHA 1924-19."

§ 1944.46 [Amended]

41. In § 1944.46, paragraph (d) is amended by changing the reference "Form FmHA 424-6" to "Form FmHA 1924-6."

42. In § 1944.46, paragraph (f) is amended by changing the references "Form FmHA 444-11" and "Form FmHA 424-6," to "Form FmHA 1944-11" and "Form FmHA 1924-6," respectively.

43. In § 1944.46, paragraph (g) is amended by changing the reference "Form FmHA 424-12" to "Form FmHA 1924-12."

Exhibit A of Subpart A [Amended]

44. In Exhibit A, paragraph I, E is amended by changing the reference "Form FmHA 424-2" to "Form FmHA 1924-2."

Subpart D—Farm Labor Housing Loan and Grant Policies, Procedures and Authorizations

45. In § 1944.163, paragraph (e) is revised to read as follows:

§ 1944.163 Conditions under which an LH grant may be made.

(e) The housing must be durable and suitable for year round use unless the need for such housing is seasonal and year-round occupancy is not practical and will not be needed. Construction of seasonal farm labor housing will be permitted upon a finding of persistent need for migrant farmworker housing in the area and such housing will be used solely by migrant farmworkers while they are away from their residence. Seasonal farm labor housing that will be occupied for six months or less per year by migrant farmworkers while they are away from their residence, will be constructed in accordance with Exhibit I to Subpart A of Part 1924. Farm labor housing that is to be occupied less than year-round but more than six months shall be in substantial conformance with

and be easily convertible to the applicable development standards as required by § 1924.5(d)(1) of Subpart A of Part 1924 of this Chapter. Such projects that are to be occupied less than year-round but more than six months may be approved after review of the savings in construction costs, the plan for conversion to full compliance with development standards and the long term need for such housing.

§ 1944.175 [Amended]

46. In § 1944.175, paragraph (a)(4) is amended by changing the reference "Form FmHA 424-18" to "Form FmHA 1924-18."

Exhibit A-3 of Subpart D [Amended]

47. In Exhibit A-3, paragraphs II (a)(2) and (b)(1) and (3) are revised to read as follows:

Exhibit A-3 of Subpart D—Labor Housing Construction Guidelines**II. Types of housing and appropriate standards.**

a. * * *

2. All planning and construction other than seasonal farm labor housing and housing to be occupied more than six months but less than year-round shall be in conformance with the applicable development standard as required by § 1924.5(d)(1) of Subpart A of Part 1924 of this chapter and applicable state and local codes.

b. * * *

1. All housing designed for year-round occupancy will be planned in compliance with the applicable development standard and will be compatible with conventional rental type housing.

3. Housing to be occupied more than six months but less than year-round shall be designed and constructed in substantial conformance with and be easily converted to the applicable development standard requirements for year-round housing.

Subpart E—Rural Rental Housing Loan Policies, Procedures and Authorizations.

48. In § 1944.212, paragraph (c)(2)(i) is revised to read as follows:

§ 1944.212 Loan purposes.

(c) * * *

(2) * * *

(i) Meet the applicable development standards, as provided for in § 1924.5(d)(1) of Subpart A of Part 1924 of this chapter, for new construction as approved by the respective loan approving official.

49. In § 1944.215 paragraph (a)(1) introductory text, paragraphs (a)(1) (iii) and (iv), and (a)(3)(v) are revised to read as follows:

§ 1944.215 Special conditions.

(a) * * *

(1) Be economical in construction and not of elaborate or extravagant design or materials and all new construction shall be in conformance with the applicable development standard as provided for in § 1924.5(d)(1) of Subpart A of Part 1924 of this chapter. As a general rule, the square footage living area of new rental units and related facilities to be constructed with RRH loan funds should be within the guidelines listed below.

Type of unit	Maximum living area (ft ²)
0-Bedroom unit.....	425-525
1-Bedroom unit.....	570-700
2-Bedroom unit.....	700-850
3-Bedroom unit.....	850-1,020
4-Bedroom unit.....	1,020-1,200

(iii) Room sizes must be in compliance with the applicable development standard. Minimum room size may be determined by the minimum area or on a required furnishing basis.

(iv) When community rooms or buildings are provided as part of the related facilities, their gross square footage area should be within the guidelines set forth in FmHA Manual of Acceptable Practices (MAP) Vol. 4930.1.

(3) * * *

(v) Elevators will be provided in accordance with the applicable development standards. If elevators are included, the subsoil conditions of the site must be adequate for the installation of hydraulic elevators and sufficient service personnel must be available in the area for service and repair work.

§ 1944.235 [Amended]

50. In § 1944.235, paragraph (c)(1)(v) is amended by changing the reference "Form FmHA 424-18" to "Form FmHA 1924-18."

51. In § 1944.235, paragraph (c)(1)(vii) is amended by changing the reference "Form FmHA 424-10" to "Form FmHA 1924-10."

Exhibit H of Subpart E [Amended]

52. In Exhibit H, paragraphs V. A. 1 and 2 are revised to read as follows:

Exhibit H of Subpart E—RRH Loans and HUD Section 8 Housing Assistance Payments Program (New Construction)

V. * * *

A. Development Standards.

1. No additional requirement other than compliance with Subpart A of Part 1924 of this chapter, shall be necessary to assure that the housing is planned in accordance the applicable development standards; however, appropriate state and local laws, codes, ordinances and regulations must also be met.

2. The borrower's architect/engineer will provide a certification that the final drawings and specifications meet all applicable development standards, state and local laws, codes, ordinances and regulations.

* * * * *

Subpart J—Section 504 Rural Housing Loans and Grants

§ 1944.463 [Amended]

53. In § 1944.463, paragraph (a) is amended by changing the references from "424-66" to "1924-6," from "424-2" to "1924-2, and from "424-19" to "1924-19," respectively.

54. In § 1944.463, paragraph (b) is amended by changing the reference "Form FmHA 424-12" to "Form FmHA 1924-1."

§ 1944.463 [Amended]

55. In § 1944.463, paragraph (c)(4) is amended by changing the reference "Form FmHA 424-12" to "Form FmHA 1924-12."

§ 1944.469 [Amended]

56. In § 1944.469, paragraphs (f)(1) (i) and (ii) and (g)(1)(iii)(A) (1) are amended by changing the references "Form FmHA 425-12" to "Form FmHA 1924-12."

PART 1945—EMERGENCY

57. The authority citation for Part 1945 continues to read as follows:

Authority: 7 U.S.C. 1989; 7 CFR 2.23 and 2.70.

Subpart D—Emergency Loan Policies, Procedures and Authorizations

Exhibit A of Subpart D [Amended]

58. In Exhibit A, paragraph III, B, 7 is amended by changing the references from "424-1" and "424-2" to "1924-1" and "1924-2," respectively.

PART 1955—PROPERTY MANAGEMENT

59. The authority citation for Part 1955 continues to read as follows:

Authority: 7 U.S.C. 1989; 42 U.S.C. 1480 and 2492, 5 U.S.C. 301; 7 CFR 2.23 and 2.70.

Subpart B—Management of Property

60. In § 1955.53, paragraph (o) is revised to read as follows:

§ 1955.53 Definitions.

* * * * *

(o) *Unsuitable property.* Property acquired pursuant to the Housing Act of 1949 that is unfit for a borrower to carry out the objectives of an FmHA loan program; for example, a dwelling that cannot be feasibly repaired to meet FmHA requirements for existing housing as described in § 1944.16(b) of Subpart A of Part 1944 of this chapter. It may be an otherwise suitable SFH property which is so poorly located it will not serve as an adequate residential unit or an older home which is excessively expensive to heat and maintain.

Date: February 17, 1987.

Vance L. Clark,

Administrator, Farmers Home Administration.

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