1990 National Evaluation of the Weatherization Assistance Program: Summary of Final Reports

In 1990, the U.S. Department of Energy sponsored a comprehensive evaluation of its Weatherization Assistance Program based mainly on data from the 1989 program year (supplemented by data from 1991-92). Ten studies were performed as part of the evaluation, and results from the evaluation were documented in a family of 12 reports. Brief descriptions of each report/study are provided below which focus primarily on the data collected and the analysis performed. Table 1 summarizes what data were collected, how the data were collected, when the data were collected, and from whom. Abstracts from each report (unless otherwise noted) are attached that present additional information, especially on findings and conclusions. The full reports can be downloaded from the ORNL Weatherization website (http://weatherization.ornl.gov) by clicking on the link for the Network Planning Committee Meeting.

SUMMARY REPORTS

Weatherization Works: Final Report of the National Weatherization Evaluation (ORNL/CON-395) by Marilyn A. Brown, Linda G. Berry, and Laurence F. Kinney, September 1994 — This 63-page report summarizes the results of the evaluation and illustrates weatherization operation and tactics through photographs and explanations. *No abstract is available*.

Weatherization Works: An Interim Report of the National Weatherization Evaluation (ORNL/CON-373) by Marilyn A. Brown, Linda G. Berry, and Laurence F. Kinney, November 1993 — This 44-page report summarizes interim results of the evaluation and illustrates weatherization operation and tactics through photographs and explanations. *No abstract is available.*

ENERGY AND COST-EFFECTIVENESS REPORTS

National Impacts of the Weatherization Assistance Program in Single-Family and Small Multifamily Dwellings (ORNL/CON-326) by Marilyn A. Brown, Linda G. Berry, Richard A. Balzer, and Ellen Faby, May 1993 — This report documents the results of the first phase of the single-family study and serves as the foundation for the national evaluation. It is based on Program Year 1989 which had a national population of 1103 agencies and about 198,000 weatherized houses. 48 states and the District of Columbia, 400 agencies, and 926 utilities were contacted between September 1990 and November 1991 for information during the course of this study. Agencies were contacted two to three separate times, asked to complete three survey forms, and provided four to five major sets of data. 368 of the 400 agencies provided information on dwelling characteristics, measures installed, costs, and service delivery procedures on 14,971 weatherized single-family and small multifamily homes by completing a survey form on each house. Billing data were requested on 24, 957 natural gas or electrically-heated houses from 926 utilities. However, attrition was such that energy savings were calculated for just 7402 homes (4299 weatherized and 3103 controls) from 230 agencies using billing data analyzed with the

Princeton Scorekeeping Method (PRISM). Cost effectiveness from an installation perspective (installation-related costs only), program perspective (total program costs), and societal perspective (total program costs and including non-energy benefits) were calculated using average installation costs collected on the 14,971 homes and average agency costs collected accurately from just 137 of the 400 agencies. Service delivery procedures, weatherization measures, climates, and other agency and dwelling characteristics associated with higher-than-average savings and cost effectiveness were investigated.

Patterns of Impact in the Weatherization Assistance Program: A Closer Look (ORNL/CON-331) by Linda G. Berry and Marilyn A. Brown, June 1994 — This report documents part of the second phase of the single-family study designed to allow for a more complete understanding of the impacts of weatherization and of factors that produce high or low savings in individual agencies and homes. It builds upon the phase-one study (ORNL/CON-326) by analyzing more detailed post-weatherization data collected between October 1992 and March 1993 on a sub-sample of 765 houses (natural gas or electrically-heated) from 30 agencies (10 agencies with "higher" energy savings and 20 agencies with "lower" energy savings from a random selection of 82 agencies). Of the 765 houses, 477 were weatherized houses (104 from high saving agencies and 373 from low saving agencies) and 288 were control houses (58 from high saving agencies and 230 from low saving agencies). The 288 control houses had to be developed new by the agencies for this study because the original control houses had already been weatherized by the time this study was performed. On-site inspections and diagnostics performed by contractors (not agency personnel) collected detailed audit-level building shell and mechanical system information on each house, air leakages based on blower-door tests, heating system efficiencies based on flue-gas analyses, carbon monoxide (CO) levels, and health and safety information. These data characterized post-weatherization conditions only. The contractors also administered occupant surveys to collect information on occupant perceptions and behavior. Analyses comparing weatherized to control houses, high saving to low savings houses, and high saving to low saving agencies were made. *No abstract is available*.

Keys to Success: Ten Case Studies of Effective Weatherization Programs (ORNL/CON-328) by Marilyn A. Brown, Linda G. Berry, Laurence F. Kinney, James O. Kolb, Thomas C. Wilson, and Dennis L. White, November 1993 — This report documents the remaining part of the second phase of the single-family study (ORNL/CON-331) by focusing on the same 10 agencies with "higher" energy savings and identifying those weatherization practices that explain their documented success. Information on weatherization practices and accomplishments of each of the ten agencies covering the years 1989 through 1992 was compiled in 1993 from records provided by the agencies, one to two-day interviews with agency personnel, on-site visits to agencies and weatherized dwellings, and previously collected data. The report presents its findings through a discussion format for each agency. Topics discussed include agency characteristics, housing stock characteristics, weatherization staff and training, client recruitment and selection, diagnostics and audit procedures, installation of measures and client education, quality control and evaluation, resource leveraging, and cost controls. *No abstract is available.*

Impacts of the Weatherization Assistance Program in Fuel-Oil Heated Houses (ORNL/CON-327) by William P. Levins and Mark P. Ternes, October 1994 — This study complements the first and second phases of the single-family study (ORNL/CON-326 and ORNL/CON-331) by performing similar analyses on houses in the nine northeastern states heated by fuel oil (the single-family study examined dwelling characteristics, measures installed, costs, etc. in all houses but only measured energy savings in houses heated by natural gas and electricity). The study is based on data collected from 41 agencies, 222 weatherized houses, and 115 control houses during 1991 and 1992 program years. Consistent with the first and second phases of the single-family study, the 41 agencies provided information on dwelling characteristics, measures installed, costs, and service delivery procedures by completing a survey form on each of the 222 weatherized houses. Contractors (rather than agency personnel) performed on-site inspections and diagnostics to collect detailed audit-level building shell and mechanical system information on all 376 houses, air leakages based on blower-door tests, heating system efficiencies based on flue-gas analyses, carbon monoxide (CO) levels, and health and safety information. Contractors also administered occupant surveys to collect information on occupant perceptions and behavior. Contractors installed metering in each house to measure heating system energy use and indoor and outdoor temperatures. Energy savings were calculated using linear regressions of daily sub-metered space-heating fuel-oil consumption versus monitored indoor and outdoor temperature differences. Cost effectiveness were again calculated from an installation perspective, program perspective, and societal perspective using average installation costs provided on the 222 weatherized homes by the agencies and average agency costs that each of the 41 agencies provided by completing a survey form. Service delivery procedures, weatherization measures, climates, and other agency and dwelling characteristics associated with higher-than-average savings and cost effectiveness were again investigated. Analyses comparing weatherized to control houses, high saving to low savings houses, and high saving to low saving agencies were again made.

Description of the Weatherization Assistance Program in Larger Multifamily Buildings for Program Year 1989 (ORNL/CON-329) by J. M. MacDonald, April 1993 — This report describes the nature and extent of weatherization activities in larger multifamily buildings (five or more dwelling units) in Program Year 1989 using data collected in 1992 from two national surveys administered to 48 states and 109 agencies that were part of the 400 agencies sampled in the single-family study (ORNL/CON-326). Information was collected from the 48 states using an 8-page, 11-question survey regarding the number of multifamily dwellings weatherized, the priority placed on multifamily building weatherization, measure selection procedures used, partnerships formed focusing on multifamily buildings, difficulties in qualifying multifamily buildings, landlord contributions required, and training programs specific for multifamily buildings. Information on dwelling characteristics, measures installed, costs, and service delivery procedures were ultimately collected on 2,050 weatherized multifamily dwelling units (269 buildings) from 54 of the 109 agencies (24 states) using a14-page, 31-question survey completed for each dwelling. Energy savings and cost effectiveness could not be measured because adequate energy use and cost data could not be obtained from utilities and building owners (only 5% responded to data requests).

Five Case Studies of Multifamily Weatherization Programs (ORNL/CON-434) by L. F. Kinney, T. Wilson, G. Lewis, and J. M. MacDonald, May 1997 — This report builds on the previous multifamily study (ORNL/CON-329) by documenting the approaches taken by agencies in weatherizing large building through five case studies. It is similar to the case studies performed under the single-family study (ORNL/CON-328). Five states were selected based on their high level of multifamily weatherization: New York, Massachusetts, Illinois, Minnesota, and Washington. One agency in each of these five states was selected to provide good information on how practitioners accomplish multifamily weatherization. Information for each case study was collected in 1994 and involved extensive on-site interviews with agency staff and inspections of 4 to 12 buildings weatherized between 1991 and 1993. Each agency provided cost and other data covering all aspects of their weatherization operation. Agencies also provided energy data on each of the buildings inspected; these data were analyzed using PRISM. The report presents its findings through a discussion format for each agency. Topics discussed include principle features of the multifamily weatherization operation and its environment, housing stock, organization structure, outreach, certification, auditing, the work itself, client education, quality control, evaluation, management and policy issues, leveraging funds, dealing with contractors, staff development, integration of new technologies, and descriptions and energy savings for each building inspected.

ELIGIBLE POPULATION, FUNDING, AND OTHER RESOURCES REPORTS

Scope of the Weatherization Assistance Program: The Weatherized Population and the Resource Base (ORNL/CON-325) by Meg Power, Joel F. Eisenberg, Eugene Michels, Marjorie J. Witherspoon, and Marilyn A. Brown, May 1992 — This report describes the size and sources of the investment made in low-income weatherization from Program Year 1978 to 1989, the extent to which non-DOE Weatherization Assistant Program funding has been mobilized, and the number and types of homes weatherized. Data were collected in 1991 through a 16-page survey sent to all state Weatherization Assistant Program managers that requested information on total funds spent, co-funding, and number and types of units weatherized for DOE, LIHEAP, utility, and other low-income weatherization and repair/rehabilitation programs for which they had data. A second 15-page survey was sent to 443 utilities (124 responded) that may have run a low-income weatherization program requesting information on funding, number of units, cost-sharing, types of measures installed, and involvement with the state weatherization program. The report presents findings on total funding resources, funding by program and by funding source, leveraging, number and type of houses served, and regional factors influencing results.

The Scope of the Weatherization Assistance Program: Profile of the Population in Need (ORNL/SUB/92-SK904/V2) by Joel F. Eisenberg, Eugene Michels, David Carrol, and Nancy Berdux, March 1994 — This report presents information on the weatherization-related characteristics of the low-income population eligible for and in need of the DOE Weatherization Assistance Program. The analyses was performed using the Energy Information Administration's (EIA's) Residential Energy Consumption Survey (RECS) for 1990, which is a national survey with a sample size of 5,095 households (1,500 of which are low-income). The population, their

location, housing, energy use, demographics, household income, and energy burden for all eligible low-income households are described. Attributes are highlighted that shed some light on the need for low-income weatherization services. Characteristics are then presented for subsets of eligible households (such as those with high energy expenditures, with high energy burden, with both high energy burden and high energy expenditure, that are persistently eligible, that have been previously weatherized, and those living in "low efficiency" housing) to understand how best to target and allocate limited weatherization resources. *No abstract is available*.

Utility Investments in Low-Income Energy-Efficiency Programs (ORNL/CON-379) by Marilyn A. Brown, Mark A. Beyer, Joel Eisenberg, Edward J. Lapsa, and Meg Power, September 1994 — This report describes the energy-efficiency programs being operated by utilities for low-income customers in 1992. A 6-page survey (14 questions with about 100 entries) was sent to 600 utilities in 1993 and 180 responded. The survey was a separate survey instrument from that sent to utilities as part of ORNL/CON-325, but the list of utilities was coordinated. Information was obtained on the goals of the program, whether the program was mandated by the state's public utility commission, funding levels, number of participants by dwelling type, household selection criteria, average investment per house, method of selecting investment levels and measures, use of non-profit agencies to implement the program, level of interaction with the Weatherization Program, and percent of time different measures were installed.

NETWORK CHARACTERIZATION REPORTS

Characterization of the Weatherization Assistance Program Network (ORNL/CON-324) by Philip E. Mihlmester, Wallace C. Koehler, Jr., Mark A. Beyer, Marilyn A. Brown, and Darrell A. Beschen, Jr., February 1992 — This report describes facts and activities associated with the national network of state and local agencies. Data for Program Year 1989 were collected from two national surveys administered between October 1990 and March 1991. The first survey was sent to 48 states plus the District of Columbia. This survey was 26 pages and had 19 questions with hundreds of entries. It was a different survey than that sent to each state in ORNL/CON-325. The second survey (28 pages, 22 questions, and 500 entries) was sent to all weatherization agencies in the nation (920 of 1148 agencies responded). The report analyses facts on agencies such as number and type of agencies, number of houses weatherized, number of houses on a waiting list, funding and other support, operation of other energy and non-energy programs, referrals to other programs, staffing and staff training, and service improvements recommended by the survey respondents. State analyses include organization structure in state government, funding and other support, and staffing. Interactions of states and agencies in energy initiatives and utility programs are examined. Innovations and initiatives by the agencies and states were categorized for such things as use of different information sources, use of diagnostic and screening techniques, and installation of selected weatherization measures.

Table 1. 1990 National Weatherization Evaluation Data Collection Summary

Who surveyed	When surveyed	Information requested	Survey instrument
National Impacts of the Weatherization Assistance Program in Single-Family and Small Multifamily Dwellings (ORNL/CON-326)			
48 states and DC	September 1990	List of all agencies in state, and contact information and number of homes weatherized for each agency.	None
400 agencies	December 1990	List of all clients weatherized by agency in PY 1989 with address, heating fuel, and dwelling type; names of utilities servicing area with contact information; and sample of utility bill waiver.	None
400 agencies	March to November 1991	Dwelling data, occupant characteristics, measures installed, repairs made, audit/delivery procedures used, installation costs, funding sources, and utility account numbers on 18,748 weatherized houses. Data received from 368 agencies (92%) and on 14,971 houses (80%).	Dwelling-Specific Form (10 pages, 30 questions)
400 agencies	March to November 1991	Programmatic costs and installation-related overhead costs for each agency. Data received from 137 agencies (34%) because 102 agencies (25%) did not respond and 161 agencies (40%) did not provide credible or consistent data.	Agency Information Form (4 pages, 3 questions)
400 agencies	March 1991	List of all clients on the agency's waiting list that heat with gas or electricity with address, utility company, and utility account number (for control group, eventual number being 11,795).	Control Group Form (form not available)
926 utilities	July to December 1991 Heads-up letter sent to 1,500 utilities in April 1991.	Billing data on 24,957 houses along with information on payment records, fuel assistance payments, fuel cutoffs, and participation in forgiveness programs. Reduced to 17,991 (72%) because utility did not respond, to 14,198 (57%) because no data received on house, to 11,882 (48%) or 8,572 (34%) because data incomplete, and to 7,402 (30%) after analysis screens. 689 utilities responded (74%), with final useable data from 230 utilities (25%).	Data provided by utilities in various electronic formats.
Subset of 400 agencies	July 1991	Utility bill waivers for individual clients (subset of the 24,957 houses)	None

Who surveyed	When surveyed	Information requested	Survey instrument
Patterns of Impact in the Weatherization Assistance Program: A Closer Look (ORNL/CON-331)			
765 houses through 30 agencies (subset of 400 agencies) Work performed by contractors	October 1992 to March 1993	Detailed audit-level data on envelope and mechanical systems, space-heating and water-heating system safety inspections, blower-door air leakage measurements, heating system steady-state efficiency measurements, and CO measurements. Agencies had to develop a new set of 288 control houses.	Single-Family Study House Characteristics Survey (9 pages, hundreds of entries)
765 houses through 30 agencies (subset of 400 agencies) Work performed by contractors	October 1992 to March 1993	Occupant interviews covering length of residence, house age, demographics, heating fuels, fuel switching, fuel assistance, fuel affordability, thermostat management, heated areas, and perceptions on comfort, health, and safety Agencies had to develop a new set of 288 control houses.	Single-Family Study Occupant Questionnaire: Weatherized Home and Control Home (two separate surveys, 13 pages each, 52 questions each)
Keys to Success: Ten Case Studies of Effective Weatherization Programs (ORNL/CON-328)			
10 agencies (subset of 30 agencies)	1993 (est.)	One-to-two day on-site interviews with agency personnel and visits to weatherized houses.	None
Impacts of the Weatherization Assistance Program in Fuel-Oil Heated Houses (ORNL/CON-327)			
376 homes through 41 agencies Worked performed by contractors	September 1990 to April 1992	Submetered space-heating energy use and indoor and outdoor temperatures. September 1990 to April 1991 for 25 agencies and 200 homes. September 1991 to April 1992 for 16 agencies and 176 homes.	Metering installed at beginning of each period and removed at end of the period

Who surveyed	When surveyed	Information requested	Survey instrument
376 homes through 41 agencies Worked performed by contractors	September 1990 to April 1992	Floor area, house volume, number of rooms, and space-heating system nozzle size (September 1990 and 1991).	Fuel-Oil Study Pre-Weatherization Data Collection Form (1 page, 12 questions)
		Detailed audit-level data on envelope and mechanical systems (April 1991 1992).	Fuel-Oil Study House Characteristics Survey (9 pages, hundreds of entries)
		Blower-door air leakage measurements (September 1990 and 1991 and April 1991 and 1992).	Blower-Door Test Data Sheet: Infiltec Blower Door (1 page, 37 entries)
		Heating system steady-state efficiency measurements (September 1990 and 1991 and April 1991 and 1992).	Fuel-Oil Study Steady-State Efficiency Data Sheet (1 page, 7 entries)
		Space-heating and water-heating system safety inspections and CO measurements (April 1991 and 1992).	Fuel-Oil Study System Safety Inspection Form (4 pages, 66 entries)
		Occupant interviews covering ownership status, length of residence, house age, demographics, heating fuels, fuel assistance, fuel affordability, thermostat management, conditioned areas, and perceptions on comfort, health, safety, thermostat operation, and affordability (April 1991 and 1992).	Fuel-Oil Study Occupant Questionnaire: Weatherized Home and Control Home (18 pages each, 56 questions each)
41 agencies	April 1991 and 1992	Household income, weatherization dates, measures installed, repairs made, audit/delivery procedures used, installation costs, funding sources, and utility account numbers for 222 weatherized house; and programmatic costs and installation-related overhead costs for each agency	Fuel-Oil Study Weatherization Information Survey (15 pages, 33 questions) Fuel-Oil Study Control House Information Survey (1 page, 4 entries)
41 agencies	May 1991and 1992 (est.)	Number of fuel oil heated homes weatherized in monitored program year in the agency	None
9 northeast states	May 1991 and1992 (est.)	Number of fuel oil heated homes weatherized in monitored program year in state	None

Who surveyed	When surveyed	Information requested	Survey instrument
Description of the Weatherization Assistance Program in Larger Multifamily Buildings for Program Year 1989 (ORNL/CON-329)			
48 States	1992 (est.)	Approach taken by state toward large multifamily buildings and guidelines and training support provided for multifamily buildings. Data received from 33 agencies (69%).	State Grantee Survey: High-Density Multifamily Units (8 pages, 11 questions)
109 agencies (subset of 400 agencies)	1992 (est.)	Building characteristics and equipment, occupant characteristics, measures installed, repairs made, audit/delivery procedures used, installation costs, and funding sources for 6000 dwelling units. Reduced to 4,500 (75%) because agency did not respond, to 3,300 (55%) because dwelling unit incorrectly identified as large multifamily, and 2,100 (35%) because units were public housing. 76 agencies (70%) responded.	Building Specific Data Survey Form: High-Density Multifamily Units for Program Year 1989 (14 pages, 31 questions)
Utilities and building owners	1992 (est.)	Billing data (only 5% return rate)	None
Five Case Studies of Multifamily Weatherization Programs (ORNL/CON-434)			
5 states	1993 (est.)	Background information - number of agencies involved in large multifamily work, use of leveraging, measures installed, and contact information.	None
5 agencies	January to November 1994	Data on recent weatherization jobs in large multifamily buildings - building info, weatherization work, and billing data. 3-5 day site interviews and visits to weatherized buildings.	None
Scope of the Weatherization Assistance Program: The Weatherized Population and the Resource Base (ORNL/CON-325)			
50 states and DC	1991 (est.)	Information on units weatherized between 1978 and 1989 from all major publicly funded federal, state, and local programs - funding, number and type of units, and program descriptions. 47 agencies (92%) responded.	The Scope of Full Scale Low Income Weatherization Programs: State Manager's Survey (16 pages, hundreds of entries)

Who surveyed	When surveyed	Information requested	Survey instrument
443 utilities	1991 (est.)	Information on the utility's low-income weatherization activities between 1978 and 1989 - funding, number and type of units, coordination with WAP, and measures installed. 124 utilities (28%) responded.	The Scope of Utility Low Income Weatherization Programs (15 pages, hundreds of entries)
The Scope of the Weatherization Assistance Program: Profile of the Population in Need (ORNL/SUB/92-SK904/V2)			
None - Used 1990 RECS data.			
Utility Investments in Low-Income Energy-Efficiency Programs (ORNL/CON-379)			
600 utilities	1993 (est.)	Information on the utility's low-income weatherization programs - if mandated by PUC, if must pass cost-effectiveness test, goals, budget, number of participants by dwelling type, household selection criteria, average investment per house, method of selecting investment level/measures per house, use of non-profit agencies to implement, program expenditures made through WAP program, description of direct cooperation with WAP program, and percent of time long list of measures installed in houses. 180 utilities (30%) responded.	U.S. Department of Energy National Weatherization Evaluation (6 pages, 14 questions, about 100 entries)
Characterization of the Weatherization Assistance Program Network (ORNL/CON-324)			
48 states plus DC	October 1990 to March 1991	Information on state characteristics, state staff and training, funding and interaction with other programs, mechanisms for technology transfer, use of diagnostic and screening methods, measures allowed, innovations and initiatives, and organization. All states and DC (100%) responded.	Characterization of the WAP Network: Grantee Questionnaire (26 pages, 19 questions, hundreds of entries)
1,148 agencies	October 1990 to March 1991	Information on agency characteristics, number and types of weatherizations, waiting lists, management of non-WAP energy programs, agency staff and training, funding and in-kind services, services offered by local agency, mechanisms for technology transfer, innovations and initiatives, and use of diagnostic methods, screening techniques, and measures. 920 agencies (81%) responded.	Characterization of the WAP Network: Subgrantee Questionnaire (28 pages, 22 questions, 500 entries)

ATTACHMENTS

Abstracts are attached for the following seven reports:

ORNL/CON-324, *Characterization of the Weatherization Assistance Program Network* by Philip E. Mihlmester, Wallace C. Koehler, Jr., Mark A. Beyer, Marilyn A. Brown, and Darrell A. Beschen, Jr., February 1992.

ORNL/CON-325, *Scope of the Weatherization Assistance Program: The Weatherized Population and the Resource Base* by Meg Power, Joel F. Eisenberg, Eugene Michels, Marjorie J. Witherspoon, and Marilyn A. Brown, May 1992.

ORNL/CON-326, *National Impacts of the Weatherization Assistance Program in Single-Family and Small Multifamily Dwellings* by Marilyn A. Brown, Linda G. Berry, Richard A. Balzer, and Ellen Faby, May 1993.

ORNL/CON-327, *Impacts of the Weatherization Assistance Program in Fuel-Oil Heated Houses* by William P. Levins and Mark P. Ternes, October 1994.

ORNL/CON-329, *Description of the Weatherization Assistance Program in Larger Multifamily Buildings for Program Year 1989* by J. M. MacDonald, April 1993.

ORNL/CON-379, *Utility Investments in Low-Income Energy-Efficiency Programs* by Marilyn A. Brown, Mark A. Beyer, Joel Eisenberg, Edward J. Lapsa, and Meg Power, September 1994.

ORNL/CON-434, *Five Case Studies of Multifamily Weatherization Programs* by L. F. Kinney, T. Wilson, G. Lewis, and J. M. MacDonald, May 1997.

The five reports without an abstract are as follows:

ORNL/CON-328, *Keys to Success: Ten Case Studies of Effective Weatherization Programs* by Marilyn A. Brown, Linda G. Berry, Laurence F. Kinney, James O. Kolb, Thomas C. Wilson, and Dennis L. White, November 1993.

ORNL/CON-331, *Patterns of Impact in the Weatherization Assistance Program: A Closer Look* by Linda G. Berry and Marilyn A. Brown, June 1994.

ORNL/CON-373, *Weatherization Works: An Interim Report of the National Weatherization Evaluation* by Marilyn A. Brown, Linda G. Berry, and Laurence F. Kinney, November 1993.

ORNL/CON-395, *Weatherization Works: Final Report of the National Weatherization Evaluation* by Marilyn A. Brown, Linda G. Berry, and Laurence F. Kinney, September 1994.

ORNL/SUB/92-SK904/V2, *The Scope of the Weatherization Assistance Program: Profile of the Population in Need* by Joel F. Eisenberg, Eugene Michels, David Carrol, and Nancy Berdux, March 1994.