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CASE STUDY OF THE REGIONAL MANUFACTURERS NOT PARTICIPATING IN THE MANUFACTURED HOUSING RCDP

A. D. Lee
M. C. Baechler

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SUMMARY

To develop reliable alternatives for building energy-efficient homes, the Bonneville Power Administration (Bonneville) is conducting the Residential Construction Demonstration Project (RCDP). RCDP Cycle II is the subject of this report and involves manufactured housing (commonly called mobile homes) constructed to U.S. Department of Housing and Urban Development (HUD) codes.

The primary objectives of the RCDP include:

- o develop conservation techniques and innovations
- o assess these techniques and innovations
- o introduce innovations exhibiting the potential to be cost-effective, reliable, and marketable.

Eight of the Northwest's 17 manufactured housing plants participated in the RCDP, constructing 150 homes meeting the region's Model Conservation Standards (MCS). Nine plants did not participate. Interviews of key personnel at each nonparticipating plant provide a picture of the plants, their reasons for not participating, and their attitudes toward energy-efficiency in their industry. The nonparticipating plants tend to be adopters rather than innovators.

Most of the nonparticipating plants are located in Idaho and their nonparticipation appears to have been a result of 1) a perception that the RCDP focused on the western part of the region and 2) the tighter MCS requirements for the eastern part of the region. Other specific reasons for not participating include confusion about the Project, disagreements with the technical and economic assumptions, and the (initial) lack of an allowance for a dealer inventory of project model homes.

All of these plants, however, are likely to participate in the Super GOOD CENTS Program (SGCP) which has essentially the same technical specifications as the RCDP. Customer and dealer demand appears to be spearheading participation in the SGCP. Newly instituted utility hookup requirements also are playing a key role in the decision to participate in the SGCP. In addition, it appears that the RCDP succeeded as a demonstration

project by showing that the industry could meet the MCS, that dealers could sell MCS manufactured homes, and that consumers would buy them.

The lessons learned from the experiences of the RCDP participants (reported in a previous report) and nonparticipants should be valuable in guiding future programs involving the manufactured housing industry. Additional insights could be gained by integrating the results from this study and the previous study of the RCDP manufacturers. Communicating information about Bonneville's findings and experiences to other parts of the country would also be useful. Utilities, agencies, and industry groups in other regions may want to use this information to increase manufactured housing energy-efficiency.

ACKNOWLEDGMENTS

The authors would like to thank the representatives from each of the manufacturing plants contacted for their cooperation throughout this study. They were forthcoming in their responses and willing to devote the time required to provide us with the information summarized in this report.

We would like to thank Sheila Riewer, Bonneville project manager, for her assistance and continuing support during the course of this study.

CONTENTS

1.0 INTRODUCTION

Bonneville Power Administration (Bonneville) recently conducted Cycle II of the Residential Construction Demonstration Project (RCDP), which included HUD-code manufactured housing (commonly called mobile homes). The purpose of the RCDP was to encourage manufacturers to build energy-efficient homes, determine the costs of building the homes, and assess the response of the market to energy-efficient manufactured homes. Through manufacturer, dealer, and occupant incentives, the RCDP for manufactured housing encouraged participating manufacturing plants in the Northwest to build homes meeting strict energy-efficiency requirements. For the Project, 150 manufactured homes were built to Bonneville's Super GOOD CENTS Program (SGCP) specifications to meet the Model Conservation Standards (MCS).

Eight of the 17 manufactured housing plants in the region participated in the RCDP. The experiences of the participating manufacturers are reported in Lee and Harkreader (1989). Information about the plants that chose not to participate is reported here. No attempt has been made to compare the participant and nonparticipant plants. We treated the information collected from these plants confidentially in this report, so data and information presented are not connected with specific plants or individuals.

The characteristics, attitudes, and observations of plant representatives not participating in the RCDP are important to Bonneville and others trying to increase energy-efficiency in manufactured homes. Energy-efficiency programs, regulations, and policies aimed at this housing sector must acknowledge and accommodate the entire industry, not just producers inclined to participate in innovative demonstration projects.

The characteristics of the nonparticipating plants and attitudes of their personnel were gathered from the nonparticipant plants through a series of telephone interviews conducted by the Pacific Northwest Laboratory (PNL).[(a)] The appendix presents the interview instrument used.

(a) Pacific Northwest Laboratory is operated by Battelle Memorial Institute for the U.S. Department of Energy under Contract DE-AC06-76RLO 1830.

2.0 DESCRIPTION OF MANUFACTURING PLANTS

One or more key personnel from eight Northwest manufacturing plants were interviewed between November, 1989, and January, 1990. A representative from one other plant provided a limited amount of information, but he refused to participate in a full interview. In all but one case, the primary respondent was the plant general manager; in the one exception, we interviewed the plant engineering manager.

We interviewed personnel at five plants in Idaho and three in Oregon. We conducted full interviews with personnel from the following eight plants:

- Guerdon Industries, Idaho
- Kit Manufacturing, Idaho
- Nashua Homes, Idaho
- Fleetwood Homes, Idaho
- Champion--Tamarack Homes Division, Idaho
- Marlette Homes, Oregon
- Liberty Homes, Oregon
- Redman Homes, Oregon

Seven of the eight plants are members of a national corporate structure. The number of plants in the corporations range from 2 to about 27; half of them have between 8 and 17 plants. In most cases, the headquarters are outside the Northwest.

The nonparticipating plants tend to be the plants in the region with larger production volumes. One plant has three production lines, but all the rest have a single line. Maximum monthly production capacities range from 80 to 220 floors.(a) Of the production in these plants, 60% to 94% are double-wide homes; the remainder are single-wide homes. Annual production in 1987

(a) A single-wide manufactured home consists of one floor, while a double-wide consists of two floors.

ranged from about 600 to 1,750 floors and gross sales ranged from $9 to $21 million.

Although each plant typically aims at a particular market segment, the group of plants, as a whole, covers the entire market spectrum. Most plants identify their target market in terms of price and most serve the mid-price range. One plant aims at the low- to mid-price range, as does the parent corporation. One plant manager indicates that his plant typically sells low-priced homes: "Some homes sell for as little as $12,000. The other day though we built a double-wide for $40,000 and it was the most expensive home we have built." Two plants serve the mid- to high-price range, characterized by one general manager as "the Chevy to Cadillac buyers." One plant aims almost strictly at the high-price range.

Some plants consider their customers in terms of demographics. Two primary customer types emerge. One plant selling primarily mid- to high-priced homes aims at families and second-time buyers. Three of the plants sell many of their homes to the retired or "empty-nesters." Although most Northwest manufactured home buyers are located in western Oregon and Washington, the Idaho plants we interviewed also sell their homes in Nevada, Utah, Arizona, Montana, Idaho, and Wyoming. Most of these states are outside the Bonneville territory.

3.0 RESIDENTIAL CONSERVATION PROGRAMS: PERCEPTIONS AND PARTICIPATION

Most of the information we collected from the nonparticipating plants was related to energy-efficiency in manufactured housing. We specifically asked about attitudes toward energy-efficiency, factors anticipated to influence manufacturers to build energy-efficient homes, and perceptions and attitudes toward the Bonneville programs and projects. This section discusses the information collected from the plant representatives.

3.1 FACTORS AFFECTING ENERGY-EFFICIENCY DECISIONS

Two types of decisions are of interest in this study: decisions to manufacture energy-efficient homes and decisions to participate in the Bonneville energy-efficiency programs and projects. Our data collection focused on two primary categories of factors influencing these decisions: the market and the culture of the plant and corporation.

3.1.1 Market Influences

Unlike builders of conventional housing, manufactured housing producers sell their homes through dealers. Consequently, they rely on the ability of dealers to 1) determine what types of homes are most desirable, 2) influence buyers, and 3) communicate market signals to the plant. Ultimately, however, buyer demand and the ability of the plant to produce marketable products determine what homes are sold and at what prices.

Our data collection elicited information about buyer preferences related to energy-efficiency. When asked about customer demand for higher efficiency homes, all but one plant representative thought there was such a demand. Similarly, most feel that manufactured home buyers in general are demanding energy-efficiency. One made a telling comment, however, stating, "Yes, they want energy-efficiency but they do not want to pay for it." Most representatives portray their customers as astute judges of value, stating, for example:

> If the price is right and there is something in it for the buyer, they will want energy-efficiency. Buyers really look for value.

Buyers look at costs per month rather than R-values.

> Most buyers are looking for good economy; no one wants to pay high utility bills and be uncomfortable, so energy-efficiency is important. Buyers do understand that energy-efficiency will save money later even though it costs more now. The initial investment has to have a good enough return, however, and high first costs will reduce the number of buyers who qualify. Our homes are typically sold with high insulation levels (R-19, 2x6 walls and R-33 ceilings) because our buyers want it.

As noted earlier, one market segment for some manufacturers is retired home buyers. A few manufacturers observe that retired buyers are particularly value and quality conscious:

> In fact, older customers tend to come in and request Super GOOD CENTS homes after seeing the ads and dealers don't know about it.

> Our buyers are typically retired. Our homes are considered [by retired buyers] to be a quality product.

The plant representatives have a fairly consistent view of how important energy efficiency is to buyers. In general, the interviewees feel that energy efficiency is among the top concerns of buyers, but buyers are not usually willing to sacrifice looks and aesthetics. One plant manager states:

> There is an increasing demand for energy-efficiency. A few years ago [our plant] used to market at the Portland mobile home show and our homes had fairly small window areas and they didn't sell well. Energy-efficiency is probably important enough today that people are willing to sacrifice some window area to have a more efficient home. Still, people typically prefer aesthetic features, such as a view, over energy-efficiency.

One plant representative feels that "right now both looks and energy-efficiency can be built into our homes," so the buyer is not forced to choose.

The interviewees feel that buyers are becoming more conscious of energy-efficiency. The trend is more evident in colder climates, such as the areas where the Idaho plants sell their homes. One Idaho manufacturer notes that "where our homes are sold in colder climates we have to offer R-19 and 2x6 walls or we would be out of business; this wasn't true 10 years ago." Two plant representatives from Idaho note another trend: buyer demand for more

window area. One feels that this is a trend that has migrated from western Oregon and Washington.

The interviewees see consumer demand largely shaping the market and view buyers as often being more knowledgeable than dealers about energy-efficiency. Nevertheless, the role of the dealer is critical.

Most manufacturers feel that dealers make little effort to sell energy-efficiency to potential buyers. There are a few exceptions, however, and a couple of manufacturers feel that the added dealer profit motivates dealers to push energy-efficiency. One plant representative notes that "the industry has suffered from using 'price selling' to attract buyers. The low prices force dealers to sell based on price. The industry is now turning the corner with a joint effort by manufacturers to not do so much price selling . . . but price selling has forced dealers to cut back on extras."

3.1.2 Plant Characteristics

The organizational structure and culture within a plant and company also are likely to affect whether the plant will emphasize energy-efficiency and participate in programs such as those run by Bonneville. We consider four plant and company characteristics related to structure and culture.

Three of the characteristics relate to the degree of autonomy afforded different groups and individuals in the decisionmaking process. Table 3.1 summarizes information on three levels of autonomy: for the plant as a whole, for departments within the plant, and for individuals at the plant. Lee and Harkreader (1989) discuss several reasons why such types of autonomy may affect whether a plant participates in projects and programs such as the RCDP and SGCP. For example, relative independence to make decisions without corporate control may make it easier for a plant to assess the costs, benefits, and risks and to decide whether to participate in the RCDP. High levels of individual decisionmaking responsibility may make it more likely that a plant would participate in similar programs if key staff tend to be innovators.

TABLE 3.1. Measures of Autonomy

Plant ID	Autonomy		
	Plant	Department	Individuals
A	13.00	4.00	19.00
B	11.00	2.75	16.00
C	15.00	4.00	18.00
D	16.00	3.67	20.00
E	12.00	2.33	10.00
F	5.00	2.20	19.00
G	14.00	3.00	8.00
H	9.00	2.25	16.00
Mean	11.88	3.03	15.75
Possible Range	0 - 16	1 - 4	7 - 28

The metrics in Table 3.1 are generated by summing up the ordinal or categorical measures for information gathered during the interviews. For example, plant autonomy is measured by the number of types of decisions that can be made completely within the plant. For each category, higher values indicate more autonomy.

Two of the eight plants have low levels of autonomy. Only 30% to 60% of the key decisions are made by these plants[(a)]; corporate headquarters is responsible for the other decisions. Half the plants, however, make 80% or more of the key decisions. Five of the plants have departments receiving an average score of 3.0 or more (on a scale from 1 through 4), indicating that they make most of the decisions concerning their area with no, or only a small amount of, input from elsewhere.[(b)] There is a reasonable correlation (corre-

(a) Plant autonomy was determined based on the responses to Question 2 in the questionnaire presented in the appendix.

(b) Department autonomy was determined based on responses to Question 8 in the questionnaire presented in the appendix.

lation coefficient, r = 0.77) between plant and department autonomy levels. We measure individual autonomy by the scores on 7 questions about how much employees are required to follow set procedures and allowed to make their own decisions.[a] Individual autonomy is uncorrelated (r = -.011 and 0.39) with the other autonomy measures. The extent to which a plant delegates responsibility and decisionmaking within the plant is more a function of plant management and style than autonomy of the plant itself.

The fourth characteristic we examine is the degree of innovativeness of the plant or corporation. By participating in the RCDP, some regional plants exhibited a willingness to innovate. By not participating, however, the nonparticipants appear to be less innovative; our interviews support this observation. When asked to identify innovations in the industry, corporation, or plant, most interviewees mention recent trends toward construction features that are more like site-built housing, e.g., tape and texture wall finishes. Most interviewees acknowledge that these are more evolutionary product improvements than they are innovations.

Three plants, however, appear either to be innovative or have innovative individuals in key positions. The representative from plant A (in Table 3.1) believes that the computerized design system used by his company is the most advanced in the industry. The interviewee from Plant C has been involved in two innovative energy-efficiency programs other than the RCDP. And the interviewee at Plant E feels that his company has demonstrated that it is a leader in innovation. Noting that two of these three plants are among the group with the highest values in the last column of Table 3.1, there appears to be some correlation between innovativeness and the degree of autonomy afforded to individuals within the plant.

3.2 NONPARTICIPATION IN RCDP

Why and how the plants chose not to participate in the RCDP is the primary information of interest in this study. We specifically asked each plant representative what he knew about the RCDP and why the plant chose not to participate.

(a) See Questions 10 through 16 in the appendix.

The representatives from every plant had heard about the RCDP. Most recalled a visit by Bonneville staff explaining the Project within the last 3 years. Two indicated also that they had attended meetings on the RCDP either at Bonneville or in Idaho. It appears that the industry associations also played a role in communicating information to the plants about the RCDP. Two representatives mentioned the associations or industry newsletters as sources of information about the RCDP.

The role of dealers in informing the plants about the RCDP or encouraging them to participate was fairly limited. Only two of the plants indicated that their dealers contacted them about the Project. One representative stated that "a couple of dealers did come to us to request RCDP homes . . . They had customers come in who had found out about the RCDP homes of other manufacturers and ask if [this plant] produced them." One factor that appeared to contribute to the limited dealer interest was that most of these plants were located in Idaho or eastern Oregon, and the RCDP was perceived to be far more active and actively pushed in western Oregon and Washington.

The interviewees gave several reasons for not participating in the Project. The most common reason was the perception about the emphasis of the Project on the western part of the region, where these plants typically sell few homes. This reason is related to the perception that the RCDP was pushed in the western part of the region and demand would not be significant for RCDP homes where most of these plants sold their homes.

One representative said he "heard about RCDP and heard that it was only experimental and only a few units were built under it." This interviewee also noted that the company was too busy at the time.

Another interviewee indicated that, in addition to a feeling that the Project was emphasized outside their market area, 1) the requirements to meet the specification were prohibitive in price, 2) the company was in the process of purchasing another plant that was participating, and 3) the corporate headquarters was out of the region and the company felt it was too risky to get involved in a project so far away. One plant representative said that his company felt the incentive was not enough. And one general manager stated

that "it sounded too complicated, '8,000 pages of paperwork were required,' and business was real good so we didn't want to be bothered with it."

One general manager gave four entirely different reasons for not participating:

1. There was no allowance for houses to be built for dealer stock under the payment plan and they felt the dealers needed the homes on their lots to sell them.

2. He thought that Idaho had all 3 MCS climate zones and it was too complicated to meet the different requirements.

3. The BPA analysis was based on a 20-year life and he felt that buyers only looked at a 5-year horizon.

4. Most of their homes sold in Nevada and Idaho use natural gas for heating so weren't included under RCDP.

One general manager gave a purely technical reason: his company's roof heel height was too low to accommodate higher insulation levels without excessive compression.

Although a couple of plants did not participate because their corporate offices decided they would not, most of the plant personnel we spoke with indicated that the decision was made at the plant.

3.3 SUPER GOOD CENTS PROGRAM

Every plant representative we contacted has heard of the Super GOOD CENTS Program (SGCP). Information has come from different sources including utilities, state representatives, dealers, and industry associations.

Each plant has considered building homes under the Program and is likely to participate. Most plants have qualified homes and a few had already built one or more SGCP homes. The plant that did not participate in the RCDP because of roof truss limitations found a supplier of roof trusses that raise the heel height. The plant started using these trusses across all its homes about one year ago so it could put more insulation in the homes in general, enabling the plant to qualify for the SGCP.

In terms of procedures, the interviews indicate that the plants typically are making their own decisions about entering the SGCP but going

through corporate headquarters for final approval. Plants that have their own engineering staff usually are responsible for doing the analysis required to determine how to meet the Program requirements.

Although all the plants are either in the Program or are likely to enter it, the plant representatives seem to have followed a fairly cautious approach in deciding whether to enter the SGCP. At one plant, the general manager says "Whatever we do, it must not require lots of inventory of things we do not use very often. We want to rely on materials we already use." Some plants have reservations about how many of their product lines can meet the requirements and for which climate zones they will be able to qualify:

> Climate zone 1 [the least restrictive zone] is the only zone where we feel we can build to the requirements. The main problem now is getting the required windows. We expect to use vinyl windows and we are trying to get information from window manufacturers now, but the window products are changing too fast to keep up with. The plant will not stock the windows for the Program but will order them as needed. The window manufacturers will provide us windows with 3-4 weeks notice.
>
> In climate zone 2 we can probably meet MCS with components we already offer plus a heat pump and different ventilation equipment. I personally do not like heat pumps and am afraid customers will not like the cool air that comes out. I think customers may also have problems with air-to-air heat exchangers, though I personally approve of them.

The plants are deciding to enter the Program for a variety of reasons. One general manager feels that "in the last 6 months the market has changed . . . [and] there has been a lot more talk about the Program at the plant." A few of the interviewees indicate that a couple of counties are now requiring that homes be built to the MCS, apparently in reference to recent electrical hookup fee requirements imposed by one or more public utilities, and that it is essential to their market share to produce MCS homes.

Contrary to experiences with the RCDP, the dealers are pushing the plants to produce Program homes. One interviewee indicates "there is some pressure from our dealers. The dealers see other manufacturers providing SGC homes and request them from us." Most of the pressure seems to have come from western Oregon and Washington. Plants that market to these areas note dealer

interest especially in the Seattle, Everett, and Olympia, Washington areas. Dealers marketing to the counties where hookup requirements have gone into effect also have been pressuring the plants to produce SGC homes. One plant representative mentioned that a dealer came to them for an SGC home for Butte, Montana, but the plant feels it can't meet the design requirements for Butte (MCS climate zone 3).

3.4 MANUFACTURER PERCEPTIONS OF BONNEVILLE'S PERFORMANCE

In general, the interviewees feel that Bonneville has done a good job working with the industry to improve energy-efficiency. Most comments about Bonneville's role and its Programs are favorable, and some plants see the Bonneville Programs as contributing to a positive image for the industry:

> BPA has done a good job and it is a damn good Project. Once my name was on the mailing list, I started receiving all the information.

> BPA's role has been very positive. BPA has spent good quality time with us. BPA has stepped in and done a good job.

> The advertising program has been good. We especially like the flyers and the exploded view of manufactured homes showing the additional insulation and so on.

> I believe in the Project. BPA's participation is great. The industry feels that manufactured housing is a sleeping giant as affordable, good housing. However, people are still living in the trailer house days. Company names do not ring bells in the same way as General Motors, Buick, or other well recognized corporate names do. The recognition from being associated with BPA is great and what is being done is fantastic. BPA has been very good at having meetings and sending out information.

Not all responses are as positive, however. Some of the plants in Idaho feel that Bonneville has concentrated its efforts in western Oregon and Washington and have not kept them as well informed.

> BPA has worked well with industry in western Oregon and Washington. BPA hasn't stayed in touch with my plant very well.

> I am confused about the Project. It has been a poor Project because a lot of people are running around working on it, but I can't get the basic information I need.
>
> We haven't been too satisfied. The main problem has been BPA holding meetings and not having dealers involved.

In addition, a couple of Idaho plant representatives simply are not well enough informed about what Bonneville has been doing to comment on Bonneville's performance.

4.0 OBSERVATIONS AND PROGRAM IMPROVEMENT OPPORTUNITIES

This section discusses overall findings, based on the interviews, about the plants not participating in the RCDP. It presents some observations about the plants and possible links among plant characteristics, attitudes, and behavior. It then presents suggestions that Bonneville and others should consider when conducting future Programs with this industry.

4.1 OBSERVATIONS

As Lee and Harkreader (1989, p. 17) observe, the "manufactured housing industry is highly fragmented and most companies are considered to be quite conservative." The industry has a few leaders who try innovations or new products, and the other plants follow if the innovation is successful and market demand requires them to produce the product to maintain market share. One interviewee states, "my plant can't afford to do experimental things; it is a follower. When dealers demand it, we will change." Dividing the plants into those participating and those not participating in the RCDP has provided an initial identification of which plants tend to be innovators and which tend to be adopters.

Many of the reasons given by the plants for not participating in the RCDP reflect concerns about the risks and uncertainties of the Project. Most of the same risks and uncertainties, however, were faced by the participating plants, indicating that the nonparticipants were more risk averse and conservative in their business practices.

Risk aversion and innovativeness do not appear to be driven by the level of plant autonomy, although a direct comparison between the participating and nonparticipating plants has not been made. The data here suggest, however, that innovativeness tends to be related to the level of autonomy afforded individuals within the plant. Again, a comparison with the participating plants has not been made.

There is no strong connection between the targeted market segment and the level of innovation in the nonparticipating plants. However, the more

innovative plants tend to cover one or more price ranges, rather than target a narrow price range.

Perceptions about the RCDP appear to have reduced the participation of Idaho plants. Many interviewees feel that the Project was emphasized in western Oregon and Washington; consequently, the Idaho plants were less motivated to participate since their market area did not typically include this region. In addition to the perceived focus of the Project on the western region, we note that the MCS design specifications are stricter in the eastern part of the region (climate zones 2 and 3), therefore making it harder to produce a unit meeting the standards without major design changes. Thus, it is not possible to categorize all the plants in the nonparticipant group as non-innovators, since many faced greater risks, uncertainties, and difficulties in meeting the Project requirements than did the RCDP participants.

The nonparticipant plants tend to have annual production volumes that are near the high end of the spectrum. All the nonparticipants produced 600 or more floors in 1987, compared with the RCDP participants who produced as few as 250 floors in the same period. Five of the eight nonparticipants we interviewed produced over 1,000 floors in 1987, while only one of the participating plants did. We have no additional information to indicate why higher volume plants might have been less likely to participate in the RCDP, but this apparent tendency is worth investigating further.

While the nonparticipants chose not to be in the RCDP, all anticipate participating in the SGCP. The design specifications for this Program are the same as those for the RCDP, so the technical hurdles should be essentially the same. The main reasons for entering the SGCP appear to be related to market forces and the influence that the RCDP has had on the market.

Dealer pressure, which undoubtedly reflects buyer interest, has been the main motivator for plants to participate in the SGCP. Dealers find that certain manufacturers are producing SGC homes and customers are buying them; the dealers then ask the other plants to produce them.

The actions of county utilities to impose hookup fees on non-SGC homes have also pushed plants to gear up to produce SGC units. A few plants seem

very concerned that their sales will suffer if they do not offer SGC homes in such areas.

Another reason for participating in the SGCP that was not articulated directly by any interviewee, but seems evident, is the effect that the RCDP had. The RCDP was a demonstration Project to show whether the industry could produce homes meeting the MCS. The Project was, in fact, very successful: all 150 homes were built; only minor problems were encountered; and the homes were quite marketable. One nonparticipating plant representative characterizes the RCDP as an experimental Project and argues that this is one of the reasons they chose not to participate. With the success of the RCDP and the initiation of the SGCP, it is apparent that the production and marketing of manufactured homes built to the MCS have moved from the demonstration/ experimental stage to nearly the mature product stage. This progression has clearly encouraged the participation of plants in the SGCP, even those not participating in the RCDP.

In addition to setting the stage for the SGCP, the RCDP also may have improved the overall energy efficiency and quality of homes offered by the industry in the Northwest. One plant spokesperson notes that his plant did not participate in the RCDP because of roof truss limitations; they were encouraged, however, to find a supplier of different roof trusses that allowed them to meet the MCS requirements and they started using these trusses across all their homes, allowing them to put more insulation in their homes in general. Another plant manager indicates that, partly as a result of the Bonneville Programs, they might develop a "cold weather" package that would be available for both electrically and gas-heated homes. A few plant managers remarked that Bonneville's work with the industry had helped increase public awareness of the improving quality of their product. This perception will certainly continue to benefit from plant participation in the SGCP.

4.2 PROGRAM IMPROVEMENT OPPORTUNITIES

Several types of opportunities for improving future programs emerge from this study. First, the nonparticipants have their own views of what might be done to promote energy-efficiency improvements in their products. Second, they have recommendations on how Bonneville can improve its programs involving

the industry. Third, questions and issues raised by this limited study could be resolved through additional research.

We asked the interviewees about additional steps that could be taken to improve energy-efficiency of their products. Their comments relate primarily to better information transfer, upgraded quality in the industry as a whole, and transferability of results from the Northwest to other parts of the country. The following suggestions summarize the interviewees' remarks and the implications about improving energy-efficiency of manufactured homes that we draw from their remarks:

1. Manufacturers and dealers should demonstrate energy-efficient homes at home shows and on the dealer lots.

2. Industry requirements should be tighter in areas where home quality has suffered, such as roof heel heights and heating distribution systems.

3. Information on the Bonneville programs and experiences in the Northwest should be transferred throughout the country and similar Projects should be instituted elsewhere.

4. Improved brochures and manuals explaining energy-efficiency in manufactured homes and its benefits should be developed for consumers.

We also asked the interviewees specifically for their suggestions on how Bonneville could improve how it works with the industry. A few interviewees feel that Bonneville has done such a good job working with the industry that there is nothing they would change. Others have specific suggestions that relate to the value of Bonneville's stamp of approval on energy-efficient homes. The Idaho plants feel that improvements could be made in how they are involved in Bonneville programs. Based on the interviewee comments, we make the suggestions below for improving future programs with the industry:

5. Continue to provide the SGCP marketing and labeling services or similar services.

6. Contact the Idaho plants to determine if a special meeting with them on the SGCP would be useful and conduct such a meeting in Idaho if interest warrants.

7. Determine and take into account the special needs of plants in geographic areas, such as Idaho, that may

face added problems participating in future programs and projects.

8. Ensure that adequate dealer training occurs and suitable information is provided to dealers.

Finally, it became apparent during this study that selected additional research would provide useful information for Bonneville in their programs with the industry. In addition, programs initiated in other parts of the country could benefit from information about the industry and Bonneville's programs in the Northwest and from information, similar to that presented here, for plants in other regions. The last three suggestions we offer deal with useful future research and analysis by both Bonneville and groups that affect the industry in other regions and nationally:

9. Integrate the currently separate analyses of the RCDP participating and nonparticipating plants to address the differences between the two groups of plants and issues such as: 1) why higher volume plants might have been less likely to participate in the RCDP and 2) what factors determine innovativeness.

10. Extend similar programs and demonstration projects to other parts of the country; use the results from Bonneville's studies of the industry to collect and analyze information about the industry that will improve the chances of program success.

11. Consider the results of Bonneville's Programs in any future programs, projects, or regulations directed at the industry in the Northwest and other parts of the country.

5.0 REFERENCES

Lee, A. D. and S. A. Harkreader. 1989. *Case Study of the Regional Manufacturers' Participation in the Manufactured Housing RCDP.* PNL-7176, Pacific Northwest Laboratory, Richland, Washington.

APPENDIX

INTERVIEW INSTRUMENT

APPENDIX

Non-Participants Interview Protocol

Manufacturer: _____

Person being interviewed: _____

Title:

Date: _____ Time: _____

Interviewer: _____

INTRODUCTION

My purpose in asking the following questions is to collect information for the Bonneville Power Administration that can be helpful in designing and conducting future programs to promote energy efficient manufactured homes in the Northwest. We have interviewed all the manufacturers that participated in the Residential Construction Demonstration Project for manufactured homes (RCDP) and collected information similar to the information that we will be requesting from you today. I will be asking you questions about the size of your operations, how decisions are made, and how the plant is organized. I will also be asking you your opinions about energy efficiency in manufactured homes, the RCDP, the Bonneville Power Administration, and your decision to not participate in the RCDP. I'll start off with some questions about your plant operations.

Don't read categories. Mention some categories as examples if they do not fully understand the question.

1. HOW ARE YOUR COMPANY'S FACILITIES DISTRIBUTED GEOGRAPHICALLY?

_____ One location within a city or county
_____ Basically in one location, but other plants within state
_____ Basically in one location, but other plants around the nation
_____ Basically in one location, other plants internationally
_____ Mostly dispersed within state
_____ Mostly dispersed within nation
_____ Mostly dispersed internationally
_____ Other. Specify _____

How many production plants does the company have? _____

In order to get an idea of how autonomous your plant is from outside influences, I'm going to read to you a list of actions. I want you to tell me if the decision to carry out the action rests within your plant or if the decision has to be made elsewhere.

Explain definition for decision authority.

Authority - action can be taken on the decision without waiting for confirmation from above, even if the decision is later ratified at a higher level.

2. IS THE AUTHORITY TO DECIDE THE FOLLOWING COMPLETELY WITHIN THIS PLANT:

			Where Decision Is Made
Establishment of supervisory positions	Yes	No	_____
Appointment of supervisory staff from outside the organization (external recruitment)	Yes	No	_____
Promotion of supervisory staff	Yes	No	_____
Salaries of supervisory staff	Yes	No	_____
To dismiss a supervisor	Yes	No	_____
To determine a new product	Yes	No	_____
To determine marketing territories covered	Yes	No	_____
The extent and type of market to be aimed for	Yes	No	_____
The price of the product	Yes	No	_____
What type or what brand of new equipment is to be used	Yes	No	_____
Which suppliers of materials are to be used	Yes	No	_____
To spend unbudgeted or unallocated money on capital items	Yes	No	_____
To alter responsibilities/areas of work of specialist departments	Yes	No	_____
To alter responsibilities/areas of work of line departments	Yes	No	_____
To create a new department	Yes	No	_____
To create a new job	Yes	No	_____

The following apply to this plant alone, rather than the corporation.

3. HOW MANY PRODUCTION LINES OO YOU HAVE IN THE PLANT? _____

4. WHAT IS THE MAXIMUM NUMBER OF UNITS YOU CAN PRODUCE IN A MONTH? _____

5. HOW MANY UNITS DID YOU PRDDUCE IN 1987? _____
   GROSS SALES IN $? _____

6. HOW MANY EMPLOYEES DO YOU EMPLOY WHO ARE DIRECTLY INVOLVED IN THE DESIGNING AND BUILDING OF HOMES (INCLUDING SUPERVISORS)?_____

7. HOW MANY PEOPLE DO YOU EMPLOY IN TOTAL (PRODUCTION AND NON-PRODUCTION)? _____

This next section of questions asks about how plant operations are organized. We would like to get an idea of what your organizational chart looks like. Specifically, we would like to find out who has the authority to make decisions and in what areas their authority lies. To begin with:

We are mostly interested here in the specific plant, but if the plant is tightly tied to a headquarters the components of the headquarters that directly affect the plant are also of interest.

8. HOW MANY SEPARATE DEPARTMENTS OR DIVISIONS DOES THE COMPANY HAVE? WHAT ARE THEY? _____ (For example, sales, production, payroll)

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

9. HOW MUCH DECISION MAKING AUTHORITY DOES EACH ONE OF THE DEPARTMENTS HAVE? (Real authority or authority by guidelines from the top.) WHO DO THEY REPORT TO? (We're after a position, not a person.)

DO THEY MAKE:

1 ALL OF THE DECISIONS CONCERNING THEIR AREA WITHOUT INPUT FROM ELSEWHERE
2 MOST OF THE DECISIONS CONCERNING THEIR AREA WITH SOME INPUT FROM ELSEWHERE
3 SOME OF THE DECISIONS CONCERNING THEIR AREA WITH MOSTLY INPUT FROM ELSEWHERE
4 NONE OF THE OECISIONS CONCERNING THEIR AREA ARE MAOE WITHOUT INPUT FROM ELSEWHERE

SCORE	DEPARTMENT	REPORT DIRECTLY TO
____	_____	_____
____	_____	_____
____	_____	_____
____	_____	_____
____	_____	_____
____	_____	_____
____	_____	_____
____	_____	_____

Now, the next questions I'm going to ask are in reference to the style of management that is used around the plant in general. By style of management, I mean who participates in major decisions, the amount of responsibility delegated to lower levels, whether the employees have set procedures they must follow, etc. I'm going to read a list of statements that may apply to the operating procedures at your plant. Please respond with the following categories: DEFINITELY TRUE, MORE TRUE THAN FALSE, MORE FALSE THAN TRUE, OR DEFINITELY FALSE.

10. Whatever situation arises, we have procedures to follow in dealing with it.

    _____ Definitely true
    _____ More true than false
    _____ More false than true
    _____ Definitely false

11. Everyone has a specific job to do.

    _____ Definitely true
    _____ More true than false
    _____ More false than true
    _____ Definitely false

12. Going through the proper channels is constantly stressed.

    _____ Definitely true
    _____ More true than false
    _____ More false than true
    _____ Definitely false

13. We are to follow strict operating procedures at all times.

_____ Definitely true
_____ More true than false
_____ More false than true
_____ Definitely false

14. There can be little action taken here until the decision is approved.

_____ Definitely true
_____ More true than false
_____ More false than true
_____ Definitely false

15. Even small matters have to be referred to someone higher up for a final decision.

_____ Definitely true
_____ More true than false
_____ More false than true
_____ Definitely false

16. Any decision made by an employee has to have their boss' approval.

_____ Definitely true
_____ More true than false
_____ More false than true
_____ Definitely false

Finally, I would like to ask your thoughts on a number of issues that may have affected your decision to not participate in the RCDP or might affect the success of future Bonneville programs.

17. WHAT TYPES OF BUYERS DO YOU CONSIDER TO BE YOUR PRIMARY CUSTOMERS? DO YOU FEEL THERE IS A DEMAND AMONG YOUR CUSTOMERS FOR HIGHER EFFICIENCY MANUFACTURED HOMES? Yes No WHAT ABOUT AMONG ALL BUYERS OF MANUFACTURED HOMES? Yes No

HOW IMPORTANT IS ENERGY EFFICIENCY COMPARED TO OTHER FEATURES OF THE HOME?

18. WHAT DO YOUR DEALERS DO TO SELL ENERGY EFFICIENCY TO BUYERS OF YOUR HOMES?

WHAT WOULD HELP YOUR DEALERS SELL CUSTOMERS ON MORE EFFICIENT MANUFACTURED HOMES?

19. ARE YOU AWARE OF ANY RECENT INNOVATIONS IN HOME DESIGNS, BUILDING MATERIALS, OR MANUFACTURING EQUIPMENT THAT WOULD AFFECT YOUR INDUSTRY? Yes No

    WHAT ARE THEY?

20. IN THE PAST 5 YEARS HAVE YOU MADE ANY IMPORTANT CHANGES IN DESIGN, MATERIALS, OR EQUIPMENT? WHAT ARE THEY? HOW INNOVATIVE DO YOU THINK YOUR COMPANY IS?

21. WHAT HAVE YOU HEARD ABOUT THE RESIDENTIAL CONSTRUCTION DEMONSTRATION PROJECT FOR MANUFACTURED HOMES? WHERE DID YOU HEAR ABOUT THE PROJECT?

22. WHY DID YOUR PLANT CHOOSE TO NOT PARTICIPATE IN THE RCDP? HOW WAS THIS DECISION REACHED AND WHO MADE IT?

    WHAT ROLE IF ANY DID YOUR DEALERS PLAY IN YOUR DECISION?

    DO YOU THINK YOU WOULD HAVE CHOSEN TO BE IN THE PROGRAM IF YOU KNEW THEN WHAT YOU NOW KNOW ABOUT IT?

23. WHAT ARE YOUR THOUGHTS AND IMPRESSIONS ABOUT BONNEVILLE AND ITS WORK WITH THE MANUFACTURED HOUSING INDUSTRY? HOW COULD BONNEVILLE IMPROVE HOW IT WORKS WITH THE INDUSTRY?

24. ARE YOU AWARE OF THE SUPER GOOD CENTS PROGRAM FOR MANUFACTURED HOMES? IF SO, WILL YOUR PLANT OR COMPANY PARTICIPATE IN IT?

    HAVE YOUR DEALERS PLAYED ANY ROLE IN YOUR DECISION? IF SO, WHERE ARE THESE DEALERS LOCATED?

25. WHAT OTHER APPROACHES DO YOU THINK MIGHT BE USED TO IMPROVE THE ENERGY EFFICIENCY OF MANUFACTURED HOUSING?

26. WHAT OTHER COMMENTS OR SUGGESTIONS DO YOU HAVE?