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INDUSTRIALIZED HOUSING

HEARINGS
BEFORE THE
SUBCOMMITTEE ON URBAN AFFAIRS
OF THE
JOINT ECONOMIC COMMITTEE
CONGRESS OF THE UNITED STATES
NINETY-FIRST CONGRESS
FIRST SESSION

Part 1: July 9, 1969

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CONGRESS OF THE UNITED STATES, JOINT ECONOMIC COMMITTEE

Chairman Bolling Announces Hearings on Industrialized Housing by
the Subcommittee on Urban Affairs

Representative Richard Bolling (D., Mo.), Chairman of the Subcommittee on Urban Affairs of the Joint Economic Committee, today announced that the subcommittee will hold public hearings on industrialized housing, July 9, 23, and 24. In announcing the hearings, Chairman Bolling said:

"These hearings will supplement the compendium of papers by experts on the subjects of 'Industrialized Housing,' which the subcommittee released on April 28 of this year. We have planned to receive testimony from the Department of Housing and Urban Development as well as from those in the industry actually working to put housing production on an industrialized basis. The hearings should develop valuable background for the subcommittee's further studies of long-range urban planning both here and abroad."

A list of witnesses, together with the time and place of the hearings, is given below. Additional witnesses may be announced later.

SCHEDULE OF HEARINGS

Wednesday, July 9, 10:00 a.m., Room 6226 New Senate Office Building

Harold B. Finger

Assistant Secretary for Research and Technology, Department of Housing and Urban Development

Charles L. Biederman

Vice President, Technical Services, Levitt & Sons Corp., New York

Wednesday, July 23, 10:00 a.m., Auditorium, New Senate Office Building (G-308)

Ezra Ehrenkrantz

President, Building Systems Development Inc., and Associate Professor of Architecture, University of California, Berkeley

Peter Terzick

General Treasurer, United Brotherhood of Carpenters, AFL-CIO

Thursday, July 24, 10:00 a.m., Auditorium, New Senate Office Building (G-308)

James R. Price

Chairman of Board, and

George E. Price

President, National Homes Corporation, Lafayette, Ind.

Richard Rosen

President, Urban Systems, Inc., Boston, Mass.

INDUSTRIALIZED HOUSING

WEDNESDAY, JULY 9, 1969

CONGRESS OF THE UNITED STATES,
SUBCOMMITTEE ON URBAN AFFAIRS
OF THE JOINT ECONOMIC COMMITTEE,
Washington, D.C.

The Subcommittee on Urban Affairs met, pursuant to call, at 10 a.m., in room 6226, New Senate Office Building, Hon. Richard Bolling (chairman of the subcommittee) presiding.

Present: Representatives Bolling, Moorhead, Widnall, and Brown; and Senator Percy.

Also present: James W. Knowles, director of research; George D. Krumbhaar, Jr., senior minority economist.

Chairman BOLLING. The subcommittee will be in order.

Today, the Subcommittee on Urban Affairs of the Joint Economic Committee begins public hearings on industrialized housing to provide information supplementing that contained in the compendium of expert papers on this subject which the subcommittee released on April 28 of this year. During these hearings we will receive testimony from the Department of Housing and Urban Development as well as from a number of those actually working in the industry to put housing production on an industrialized basis.

At the outset, I wish to express complete confidence that the architects, engineers, management experts, and other experts of this country are fully capable of solving the technical problems involved in industrializing housing production. Indeed, I suspect most people would think it rather silly to express any doubts on this subject in a nation whose skills are sufficient to transport astronauts to the moon and return. We, therefore, assume that there will be technical problems to solve but that they can be solved if we have the will and devote the needed organization and resources to the effort.

There will be some problems, of course, connected with institutional and organizational barriers for success. Among other areas, these probably will concern building codes, zoning legislation, financial arrangements, and tax structures. In this general line of thought we will be interested especially in the kind of organizational or institutional innovations which might be suggested to produce improved results in the long run. For example, will success depend upon evolving new communitywide development corporations to take on the problems of organizing and financing a complete program for the entire area, including the necessary housing?

Most of the attention in the past seems to have been given to the technical and institutional or organization problems, but this subcommittee's emphasis on the longer-run and on a more rounded view

of the urban complex of problems suggests the importance of taking a close look at the sociological, psychological, and esthetic or cultural aspects of community development on a large scale. We must ask ourselves what kind of community will be created, not merely how many houses we can or should build.

Finally, on a more mundane level, there are some practical questions about costs: How much does it cost by present techniques to make available a modern, clean, appropriately equipped dwelling unit for a typical family? What does this require by way of a monthly charge on the budget of the occupant family, whether they are owners or renters? How much can this charge be reduced by industrializing the process of producing houses? How much of the monthly cost for housing services goes to provide the site on which the structure is to be erected? How much for financing, for taxes, for insurance, for labor and materials that go into the structure, and for the capital employed in the construction cycle? How would each of these be affected by a different system of housing production? What are the barriers to achieving reductions in each of these categories of cost? How would the whole process be affected by taking a longer perspective and a communitywide view of the home production process?

Our first witness this morning is Mr. Harold B. Finger, Assistant Secretary for Research and Technology, Department of Housing and Urban Development; he will be followed by the vice president for technical services of Levitt & Sons Corp., Mr. Charles L. Biederman.

We are grateful to both of you for taking the time to appear as our first witnesses in these hearings.

Mr. Finger, we will hear from you first. You may proceed in your own way.

STATEMENT OF HAROLD B. FINGER, ASSISTANT SECRETARY FOR RESEARCH AND TECHNOLOGY, DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

MR. FINGER. Thank you very much, Mr. Chairman. We sent to the committee this morning copies of the statement I will present. I understand that they are being brought up now.

I am pleased to appear before you today to discuss industrialized housing. This is a subject that I find generates very clear reactions—pro and con—in industry, in labor, in user groups, in communities, among governmental officials. Over the years, there has been movement toward increased reliance on industrialization, even in what we still refer to as our conventional home building systems. By industrialization here, I mean factory-built components and subsystems. Roof trusses, preassembled window systems, kitchen cabinets, prefitted and preassembled doors are examples. Precast concrete wall sections such as those used to form the outside skin of the building in which the Department of Housing and Urban Development, for example, is located are also seeing increased use. Mobile homes and sectionalized modules made of either wood or of concrete are receiving increased attention in the marketplace. Numerous examples exist in the FHA files of Structural Engineering Bulletins on systems developed through the mobile home industry concepts, of panelized systems, and of sectionalized housing.

If this is a trend—and I believe it is—why doesn't it develop faster, particularly in view of the deficit in housing that we now face and the urgent housing needs that are apparent for the future? The Housing Act of 1968 defines the need for 26 million housing units over the next decade, with 6 million of those needed for our low- and moderate-income families. Some estimates that I have seen indicate that the need may be even greater than this. This statement of need also does not reflect the volume of housing that will be necessary to properly shelter the 300 million people that are anticipated in this country by the year 2000. Estimates have been made to indicate that over the next 30 years we will have to build again about as many housing units as now exists, and we have something like 66 million housing units today.

Our total system of providing housing must be made more effective to assure that we satisfy these needs. We must be able to produce and deliver housing in larger volumes than we have ever done before.

One of the major limitations to satisfying these needs is generally associated with the fragmentation of our housing market. Orders for housing are placed in small quantities and the response to those fragmented orders is a fragmented industry. Fragmentation of the market is associated with local variations in building codes, with codes that do not encourage and in some cases do not allow for improvements in the homebuilding system, with difficulty in procurement of land in sufficient quantity and at reasonable cost and far enough in advance of the actual project development to be effective; with local zoning that inhibits effective use of land and frequently relies on very low density zoning as a means of restricting the introduction of a mix of housing types and economic levels, and income levels of the families to use those housing units; it is frequently associated with the scarcity of skilled labor needed for our present building systems, and, of course, with the problems that the industry has faced in obtaining regular access to the financial markets. All of these have contributed to the fragmentation of the housing industry.

The financing problem is seriously aggravated in today's market by the inflationary pressures that exist. These pressures must be brought under control in order to assure the flow of funds necessary to the mortgage market.

It is in recognition of the need for developing an improved housing system process and improved housing system concepts that will help to meet our needs that suggested the initiation of Operation Breakthrough by Secretary Romney. Operation Breakthrough is a multi-faceted program aimed at:

1. Encouraging industry to propose the ideas available for volume production methods, including those that they have had difficulty applying in the past;
2. Encouraging continual housing system advancement through support of applied research and development;
3. Pooling or aggregating the market for housing, including both the demand for housing and the available land for such housing;
4. Encouraging State and local adjustments in building codes and zoning codes that now contribute to fragmentation, high cost, and the difficulty of producing for a broad market;
5. Improving methods of financing, including the processing of FHA insurance applications;

6. Making more effective use of our total work force;

7. Conducting tests and evaluations with authoritative test validation that will serve as a basis for approval of advanced housing concepts and for development of performance standards for housing systems.

Operation Breakthrough is, therefore, not only directed at technological advancement of housing, but also at breaking through the various nonhardware constraints to more efficient production of housing. As you pointed out, Mr. Chairman, we agree that the technology requirements can be met. There are many other blocks in the way of providing housing in the volume that we need and at reasonable costs.

Operation Breakthrough is aimed at more effective and timely delivery of housing to those who need it. It seeks to establish an improved process that develops and brings together volume production and a volume market (including pooled housing orders and identified land) in a total environment that encourages industrial investment and the best of our commercial marketing methods and management techniques.

A copy of a writeup on Operation Breakthrough that was prepared as a basis for meetings held early in May with industry, labor, Governors, mayors, and county officials is attached to this statement for the subcommittee's information. (See p. 53.) Also attached is a copy of the Request for Proposals that we have sent to industry and other private organizations involved with housing. (See p. 82.) These requests for proposals were sent out starting late in June. We have had continued and very high interest expressed on that Request for Proposals which invites ideas, new ideas, for improved high-volume production of housing, and the number that we have now sent out is something over 2,000. We are having a meeting on Friday to discuss this Request for Proposals with the industry people, and I expect we will have over a thousand representatives of the industry present at that meeting.

This Request for Proposals offers to the industry an opportunity to submit to us their ideas for improved, high volume production systems so that we may encourage and support the application of the most promising of the concepts submitted.

Of the various factors defined in Operation Breakthrough, I believe that the lack of an aggregated, large, continuous, deliverable market is the greatest obstacle to significant change in our housing systems methods and to accelerating the application of industrialized housing and of improvements in our traditional building methods. Therefore, an essential ingredient of Operation Breakthrough is the effort to pool the various parts of the housing market to provide the large volume which will encourage improved production methods for all building types. In this regard, we have asked State and local officials to work with local housing authorities, private developers, nonprofit and limited dividend sponsors, and others, to pool the market, to pool their needs for housing, and to pool the land available to them so that orders can be placed in larger volume. We are prepared in HUD to provide assistance through the various planning and other grant programs that we have, as well as staff support that may be needed by these State and local officials in aggregating such a large-volume market.

We should not, in considering industrialized housing, however, eliminate from consideration the benefits that can be provided to our tradi-

tional building systems by increased and continuous market demands and the resulting possibilities of significant increases in efficiency and improved management of those operations. In fact, I understand that the competition of industrialized building has led traditional builders in Europe to adopt some of the cost and time-saving and management techniques pioneered by the industrialized building community so that the competition between the two systems continues to be strong.

The prerequisite for industrialized housing of a massed or concentrated market of continuing duration was available in Europe after World War II. That war served as a grim determinant of the housing needs of many European areas and provided a large, aggregated market. This, combined with the labor shortage created by men working to rebuild industry, encouraged Europe to develop industrialized building. Many systems arose in Europe, but the majority of the industrially produced housing contracts went to a relatively few companies that have prospered. Some of these companies are now seeking acceptance in the United States under the FHA special construction methods bulletins. To date, two systems have qualified and four more are under consideration. All of these are concrete systems.

To be somewhat more specific on the status of European housing progress, as an assist in considering our own approaches, it should be recognized that only the U.S.S.R. builds more actual housing units per year than the United States. West Germany, the most productive country in Europe, is building 40 percent as many houses as we are and Sweden is building 7 percent as many. However, in terms of the number of dwellings completed per thousand inhabitants, which is a more significant figure, the countries of Western Europe, as well as the U.S.S.R., are outbuilding the United States.¹

For example, West Germany over the last 5 years has built at the rate of 10.1 dwellings per 1,000 inhabitants, while the rate in the United States has been 7.4. The United Kingdom is the only country in Western Europe where this rate (7.1) is less than in the United States. The rates in other countries are: Sweden, 11.8; The Netherlands, 8.9; Denmark, 8.3; and France, 8.0. In the Soviet satellite countries, this rate ranges from 6.3 in Czechoslovakia to 4.3 in East Germany. However, the U.S.S.R. builds at the rate of 9.8 housing units per 1,000 inhabitants and produces more housing units at a higher rate (though generally of a lower level of quality and smaller size, that quality has improved in recent years) than does the United States.

Eastern Europe has concentrated on multiple-family structures, both low-rise (three to five stories) and high-rise (eight stories and above). Western Europe presents a mixed picture with the United Kingdom, Denmark, and Norway building well over 50 percent of their housing as one- and two-family buildings, and France, Sweden, and Finland concentrating on multifamily production. West Germany and The Netherlands roughly split their housing production between these two types. In the United States construction is typically and predominantly one- and two-family dwellings (61.7 percent in 1968).

It is difficult to obtain figures expressing specifically the production of industrialized housing in any one country. I understand that the

¹ All figures quoted from tables 2, 5, 6, and 7 of the *United Nations ECE Annual Bulletin of Housing and Building Statistics for Europe 1967* (latest edition). U.S. data are from the Bureau of Census.

only unequivocal statistic is for the United Kingdom where industrialized housing accounts for 35.9 percent of the dwellings in the high-rise building and 29.6 percent of the low-rise buildings. France, in Western Europe, one of the pioneers in industrialized housing, appears to be obtaining under 20 percent of its multidwelling production through industrialized production and about 24.5 percent of its single and two-family dwelling construction by this means. It appears that housing production in Eastern Europe is mostly industrialized. Figures range from 60 to 97 percent for the satellite countries and from 80 to 85 percent for the U.S.S.R.²

Who pays for housing varies from country to country, and it does have an affect on the type of housing that is introduced? Government financing predominates in Eastern Europe and private investment predominates in Western Europe. Statistics do not provide definitive evidence since subsidy or other aid from government is often hidden. For example, United Nations statistics show U.S. housing as being 97.7 percent financed by private investment, counting only our public housing programs as government financed. Obviously, no account is taken of the FHA-VA programs which make possible, through the private sector, almost 20 percent of our housing. That does also include the Farmers Home Administration funding and both normal insurance coverage on mortgages as well as the subsidy and supplemental support given by our housing programs. This kind of aid, and that provided by U.S. Federal Income Tax provisions for owning a home, have their equivalents in other countries.

One of the problems in developing an industrialized homebuilding sector in Europe has been integrating it with the existing building industry structure. The homebuilding industries in Europe appear to be similar in many aspects to the U.S. homebuilding industry and they share similar or equivalent problems.³

Industrialized building has received strong government support in both France and the United Kingdom. In France, a "Reserve Sector" of government-sponsored housing must be obtained by means of industrialized or systems building. In the United Kingdom, the local governments, for example, The Greater London County Council, provides an aggregated market. It has a preference for industrialized building systems. In Sweden, the market is organized around two large housing cooperatives which provide the market aggregation necessary for industrialized housing production.⁴

The fact that Sweden builds mostly multidwelling housing, and in concentrated areas, further aids the establishment of industrialized housing firms.

Obviously, an industrialized housing industry would be capital-intensive, whereas the homebuilding industry in the United States today tends to be basically labor-intensive. The shortage of skilled labor in our traditional building process emphasizes the need for supplementing present methods with systems that make better use of our total work force, but that will require greater capital investment. In Europe the building industry in general and the homebuilding industry in particular has borne the brunt of recessions. This, combined

² Carl Koch, *Russia's Housing Industry*, Douglas Commission testimony.

³ ECE report, *Structure of the Building Industry in Europe*.

⁴ See *Housing in The Nordic Countries*.

with a segmented market, has caused cautious investment in capital-intensive equipment and plants, and has led to the alternative course of rationalizing traditional construction, preserving the existing industry structure while making use of cost and time-saving techniques. Interestingly enough, in many instances, traditional builders adopted these economical techniques only after they were faced with competition from industrialized building.

To summarize this brief statement of European experience, it appears that in Eastern Europe, where public investment is consistently the strongest, with heavy emphasis on subsidies and supplements, the trend has been to industrialized housing. Most of the production has been in multifamily structures. In Western Europe, industrialized building methods have been used for single as well as multifamily housing, financed both privately and publicly. However, it appears that industrialized production has not yet provided the full solution to the housing problems of Western Europe, although it has provided an important supplement to and influence on the existing building systems.

I should mention at this point that I have purposely kept these comments on the European systems brief. The subcommittee document entitled "Industrialized Housing" which was compiled by the staff of the Subcommittee on Urban Affairs serves as an excellent and complete review of the types of systems in use, their status and the factors considered in their application for Europe and also here in the United States. I do not believe it is necessary for me to repeat that material which has already been so effectively presented.

There are, however, a few additional comments I would like to make concerning improvements in our housing system that relate to increased use of standardized or prefabricated components, subsystems, and full systems.

The levels of production required to achieve the maximum benefit in cost, systems management, quality, flexibility in design, marketability within large areas of the United States, are not clearly definable at this time. Obviously, different parts of a housing system will require different production levels. For example, the optimum with the housing shell itself might be 5,000 units, but the optimum with regard to mechanical equipment and fixtures within that housing unit that require changing the interface, might be 15,000 units. I present these estimates to indicate some of the variations, although we do not exactly know what those optimum levels are.

I frankly doubt that enough continuous industrialized production has been done anywhere, with the possible exception of the U.S.S.R., to assure that levels approaching those that can provide the maximum benefits have indeed been achieved. As a result, the full benefits of improved methods are probably not yet factually demonstrated. Until such factual data are available, the various analyses that have been performed and the extrapolations of production experience must serve as the basis for our estimates of the benefits that are potentially available. Very frankly, I look forward to Mr. Biederman's comments along these lines, because I think Levitt probably has some of the most factual data available on large-scale operations, since they are a major building organization.

The request for proposals for Operation Breakthrough requests cost estimates from industry for various levels of prototype construction, for the minimum volume of an economic production run, really meaning the production run that would result in amortization of capital investment, the cost for a thousand units per year which is the minimum specified in section 108 of the Housing Act of 1968, and for the most economic production rate. Analysis and evaluation of these estimates will be factors in our selection process. They should add to our understanding of the benefits of high production scale. But I must caution that they will still be estimates, not actual accomplishments.

It is however, clear that the cost benefits and, I believe, the quality benefits that could be achieved require high-level production and continuous orders in the market. Dips in the requirement or demand for housing, delays in procuring land or in obtaining necessary approvals at the various government levels, delays in shipping or in availability of equipment and labor for erection, or anything that delays the required schedule, could reduce the advantages that could be expected and could eliminate many of these anticipated benefits. We just can't have a situation that provides for a buildup of housing through the production process in the warehouse or a storeyard but does not provide for actual erection of housing units on-site and delivery to the users in a timely way. Otherwise, the company is maintaining a large work force and large erection forces and costs mount beyond the optimum level. Therefore, introduction of large-scale industrialization requires strong, modern, and systematic management and cooperation of all of the involved groups.

Another point frequently raised in discussions of industrialization, prefabrication, or increased dimensional and interface standardization is the assumption that a lack of variety will result that will preclude marketability and pleasing site design. I do not accept this assumption. Even dimensional similarity can still allow design versatility. Further, we should distinguish between lack of variety or repetition and monotony or poor design. One brownstone obviously looks like the next. The problem basically is good design and good appearance and it applies equally to site-produced as well as to industrially-produced housing. For example, when we view some of our suburban housing developments, we find that they sell well, though they are not noted for variety in design. Their use of land also does not usually impart any basic variety in approach. Indeed, variation and innovation in land planning and land use may be even more effective than arbitrary variety in housing design to the development of appealing and attractive site arrangements and reduced costs.

This was certainly my impression in a recent visit to the FHA-CHOICE program in Seattle. This is the program entitled "Cost-effective Home Owners in an Improved Contemporary Environment." The CHOICE program has already demonstrated the effectiveness of close cooperation between Federal and local governments with innovative developers in Seattle. Here, moderate-cost, conventionally constructed homes, averaging about \$16,000, were provided. I should mention that previous to the CHOICE project, the average moderate-cost house was about \$22,000. That cost was reduced. The minimum cost of housing in the area was reduced from \$17,000 to \$13,600 by the combination of improved housing design and better use of land. The inter-

esting and effective use of the available land created variety, good appearance, open areas, and helped to reduce the cost per housing unit. This program is now being extended into Houston, Tex., and Montgomery County, Md.

Further, the development of an aggregated market with pooled orders for housing can permit even small elements of that pooled order to get the full variety of concepts that are developed. Good design and appearance, effective land use, and pooling of orders in an aggregated market are integral parts of Operation Breakthrough.

The approaches we are defining will require the collaboration and support of the industry, labor, government officials at all levels, and the consumer groups including sponsors and private developers. All will have much to gain if we are successful from the economic and social benefits that develop, but all may have to yield some prerogatives in this process. The discussions that we have been holding with various groups involved in the housing business indicate the interest of these groups and their desire to participate. The recent agreements made by the United Brotherhood of Carpenters and Joiners with the Stirling-Homex Co. and the triparte agreement of the union, Stirling-Homex, and the Urban League in regard to training of local labor are clear indications of the readiness of the various groups involved in housing to contribute to the improvements that are needed if we are to meet the needs that are evident. We will certainly keep the committee informed of progress—I should add as well as the problems—made in these areas, and in our various programs.

Thank you very much, Mr. Chairman.

Chairman BOLLING. Thank you very much, Mr. Secretary.

Next, we will hear from Mr. Charles L. Biederman, vice president, Technical Services, Levitt & Sons Corp.

**STATEMENT OF CHARLES L. BIEDERMAN, VICE PRESIDENT,
TECHNICAL SERVICES, LEVITT & SONS CORP.**

Mr. BIEDERMAN. Thank you, Mr. Chairman.

Earlier this week, I had submitted a formal statement to the subcommittee and I would like to take this opportunity merely to summarize in outline format the essence of that statement.

In our industry, we have thrown around the term "industrialized housing" quite a bit in recent months and the last 2 years. I have noted then even among the *experts*, and that is double underlined and quoted, there is some confusion as to what we mean by industrialized housing. I thought for purposes of clearing the air a little bit, perhaps we can define for the purposes of this conversation what we do mean, how we define industrialized housing.

We believe it can include prefabricated housing, mobile homes, and sectionalized houses. Prefabricated houses, as we understand it, are composed of two-dimensional wall components or roof trusses or floor sections. But the essence of them is that they are two dimensional. They are 2 by 4 wood studs, generally, and those wall panels, those two dimensional wall panels may come sheathed—that is, with the outer or the inner skin attached to them—with or without windows attached to them, acoustical or thermal insulation, wiring, gypsum wall-board. These two dimensional panels are generally made in a factory

either off site or on site, then delivered to the building lot and erected by skilled crews on the job.

Mobile homes, on the other hand, are complete movable dwellings, as the name implies, fabricated in a factory on an assembly line basis. I would like to inject at this point, however, that while it is on an assembly line basis, the mobile home industry as we know it in the industry, is far from an automated or mechanized high-speed industry.

The mobile home does not have generally permanent foundations on the building site. It is usually wheeled or trucked to a concrete pad and rests on the concrete pad. Interestingly enough, the current statistics relative to mobile homes are that the mobile home is not mobile. The average mobile home travels an average of 300 miles in a 5- to 7-year lifespan. They are now being produced in either single or telescoping or bolted-on-the-site multiple units. The term in the industry is known as a double-wide, which can achieve a width of up to 24 feet.

Very importantly, the mobile home is not judged as real property. It is considered personal property and taxed as such.

Sectionalized houses are three-dimensional movable building modules that are fabricated in a factory, delivered to the site, and placed on permanent foundations as opposed to the temporary foundation of a mobile home. They do generally comply with local building codes, or at least can be made to comply with local building codes. They meet zoning requirements and are quite comparable to site-built dwellings. As a matter of fact, a quality sectionalized house should be indistinguishable and can be indistinguishable from a site-built, stick-built house. Importantly, they are judged as real property as opposed to personal property, and again are taxed as real property.

In our opinion, we believe that industrialized housing, except for high-rise buildings, will involve increasingly sectionalized housing. I cannot present myself as an expert on high-rise buildings, because our firm and our activities have been primarily in single-family housing, low-rise.

Now, we come to the question, why should we even be bothering about discussing industrialized housing? After all, we have been able to house the people of this country since the birth of the Nation. Why, suddenly, do we have the problem? Why, suddenly, should we be considering industrialized housing? We have prepared some charts which I think can explain this quite graphically.

Last year, a goal was set for the country by President Johnson of 26 million housing units over the next 10 years. I think everybody here has seen "pros and cons" as to whether we are going to achieve that goal.

We sat down at one point in our company and tried to figure, can we really achieve as a nation 26 million housing units in the next 10 years if we build as we are currently building? Quite frankly, we came to the conclusion that it is impossible, for two reasons.

First, as Mr. Finger pointed out, there is a critical labor shortage. Now, in 1968, the U.S. housing industry produced 1,535,000 housing units. We took one trade, which we assumed to be a typical trade required in the housing industry. In this case, it happened to be plumbers, but we believe the analysis I am about to show you would be applicable to electricians, carpenters, masons—any trade.

In the United States, operating in general construction last year, there were 386,000 plumbers. Now, we got that from the Department

of Commerce Construction Review. We assumed, because we could not find the statistic anywhere, that half of these plumbers were involved in residential construction and we feel that that is a reasonably fair assumption. As a matter of fact, if it were more than half, what we will achieve at the end of this chart would be even more disastrous. So let's assume half. That gives us 193,000 plumbers required, working on the 1,535,000 houses built last year.

Now, at least in our case, and we are among the major builders in this country, the only reason we built 1,535,000 housing units was not a result of demand, we just could not build any more. We were in the happy position last year and the year before that of being able to sell as many houses as we built. Therefore, if we accept the goal of 26 million housing units in 10 years and if we built 1.5 million last year, then on a straight-line increase to achieve that 26 million, in the 10th year, we are going to have to be producing 3,665,000 housing units.

To do that, and assuming that the efficiency of plumbers is as good as it is going to be, with perhaps moderate increases, we are going to need 464,000 plumbers in that 10th year. However, based on the 1.7-percent annual increase in the U.S. work force, we are going to have 452,000 total plumbers in 10 years, and again, assuming even more than half being involved in residential, we are going to find ourselves with 259,000 plumbers available for residential construction.

The point here is that between what's needed and what will be available will provide a discrepancy of 205,000 plumbers short of the numbers of housing units we are going to want to build in that 10th year to achieve the 26,000,000 over 10 years.

In addition to that, we are pricing ourselves out of the market. You all recall the Levittowns of 1946, when we were building houses and selling them at \$7,990. Our average-priced house today is \$29,000. We still represent one of the largest builders in the country. So cost becomes a very critical factor.

We considered a typical low-priced unit and we considered the direct cost of the unit, excluding land, excluding financing charges, excluding our own overhead. The direct construction cost today of one of our units, labor and materials amounts to roughly \$11,000.

Now, we assumed—no, we did not assume, we know that in that \$11,000 figure, we have \$4,400 for field labor. If we took that \$4,400, and historically, we know we have been hit with roughly 10-percent wage increases on labor over the past 10 years and we can only assume that the same will be true in the next 10, that \$11,000 figure, using site-built, skilled labor, is going to go up to \$15,175 by 1975. However, if we take that same \$11,000 direct cost for the same constructed unit and build it in a factory, with semiskilled and unskilled labor, which is all that is required for the factory-built house, and provides, incidentally, a far greater labor force availability, we have \$1,200 for field labor in 1968 and \$1,400 for shop labor.

Now, again, historically, the field labor is going to increase at 10 percent and the shop labor is going to increase at 5 percent. By 1975, that factory-built house is going to cost us \$12,709, or a difference of over \$2,000. That is a significant number. So we are not saying that industrialized housing today or tomorrow is going to be less expensive, but it certainly is going to contain costs a lot more effectively than the site-built house. There, then, is the reason why we have to do something

if we expect to achieve any sort of goal that we have established for ourselves.

Now, so that my visit here today, aside from doing wonders for my ego, can be of some benefit, we have given some serious thought as to what we think really is necessary to create the climate, to create the environment that would be conducive to bringing about industrialized housing in this country. To that end, in a very humble kind of approach, we call upon Congress to take certain actions to set the groundwork to enable us, the industry, to respond to the Operation Breakthrough's, to respond to the national goals set by former President Johnson, and the country.

First, we believe that something should be done to reduce the confusion, the complexities, the contradictions of local building companies. To that end, we support and highly endorse the concept of a National Institute of Building Sciences.

We suggest legislation establishing a National Institute of Building Sciences, the effect of which would be to encourage a municipality to evaluate new production techniques on a rational basis. In other words, a wall should not have to be 2 by 4's, 16 inches on center. A wall should have to be able to support x number of pounds under a certain wind load; performance rather than materials, catering to no industry or no interests but the American people.

Secondly, we request that Congress exert the same influence as it would on building codes by establishing a National Institute for Building Sciences, by establishing an Institute of Environment Sciences that would develop the same kind of standards for zoning concepts, for environment, for the situation in which the dwelling unit is placed, as it would on the construction of the dwelling unit itself.

Third—and I hope I am not putting Mr. Finger in a compromising position, because we intend to be one of the bidders of Operation Breakthrough—we urge Congress to thoroughly support and encourage Operation Breakthrough, because we think it is going to be terribly effective in developing innovative building techniques, and a response to the need for industrialized housing.

We also suggest increased funding for sections 235 and 236 of the National Housing Act and raising the limits of the eligibility of the housing units under those sections of the act. Right now, the act has finite dollar limits as to the cost of the unit, and it is not tied in with any inflationary or cost-of-living index. As such, if we maintain it at its present course, it will be avoided or unacceptable or unavailable to the mass housing market in a very short time.

Fifth, we urge authorization for variable rate mortgages so that housing can attract its fair share of available financing. What we mean by variable rate mortgages is that when a homebuyer takes out a mortgage, he would take it out at a price that was competitive with the commercial lending market. And if the commercial interest rate increases, so would the mortgage rate, of that particular mortgage. However, the home buyer would not pay any more on his monthly payments.

Representative MOORHEAD. The monthly payments remain constant?

Mr. BIEDERMAN. The monthly payments would stay the same. The duration of his mortgage would increase. For example, he starts out with, today, a 9-percent mortgage, 25-year payout. The commercial lending rate increases, say, to 10 percent. His mortgage interest rate

increases to 10 percent. He still pays his \$185 per month or whatever, but the length of the mortgage increases to, conceivably, 30 years. When the mortgage market decreases, his interest rate decreases and the length of his payout decreases as well. But his monthly payment maintains at a constant level.

In addition to that, we think that an inclining rate of mortgage makes a good deal of sense. The young home buyer in America can look forward to increased earnings during his business career. It would make good sense, we believe, for his mortgage to parallel the rate of his potential earnings so that a young couple could buy housing at a low mortgage rate and as their earnings increase, the rate of their mortgage would increase, which would make the mortgage a very attractive investment for lending institutions. He might start out at a low interest rate of 5 percent, but as his earnings increased, both his carrying charges and his interest rate would increase at the same rate.

Seventh, we believe that pension funds and insurance companies as well as all other financial institutions should be required to invest a minimum percentage of their funds in residential mortgages. If we indicated to pension funds and required of pension funds, for example, that 10 percent of their investments be placed in real estate mortgages, a vast well would be opened for funding for residential construction.

Eighth, we advocate that Congress allocate substantial funds solely for the research efforts required to develop satisfactory and equal techniques for industrialized housing. Gentlemen, there is no member of the building industry that I know of, be he manufacturer or builder, that is capable of taking on singlehanded the research that is required in building. We have subsidized aerospace, we have subsidized our transportation segments of society, we have even subsidized shipbuilding. But we have done very little in the areas of research and development for the building industry for housing of American people.

We suggest strongly that conceivably tied in with this proposed Institute of Building Sciences or Institute of Environmental Sciences, a research branch be set up, funded by the Federal Government, for the research of developmental techniques and new innovative construction methods. We believe that with Government help along the lines we have outlined here and with effective action by the building industry and other elements of American industry, industrialized housing truly could provide a decent home for every American.

Thank you very much.

(Mr. Biederman's prepared statement follows:)

PREPARED STATEMENT OF CHARLES L. BIEDERMAN

I am proud to have the opportunity to share with this Subcommittee our thoughts concerning industrialized housing.

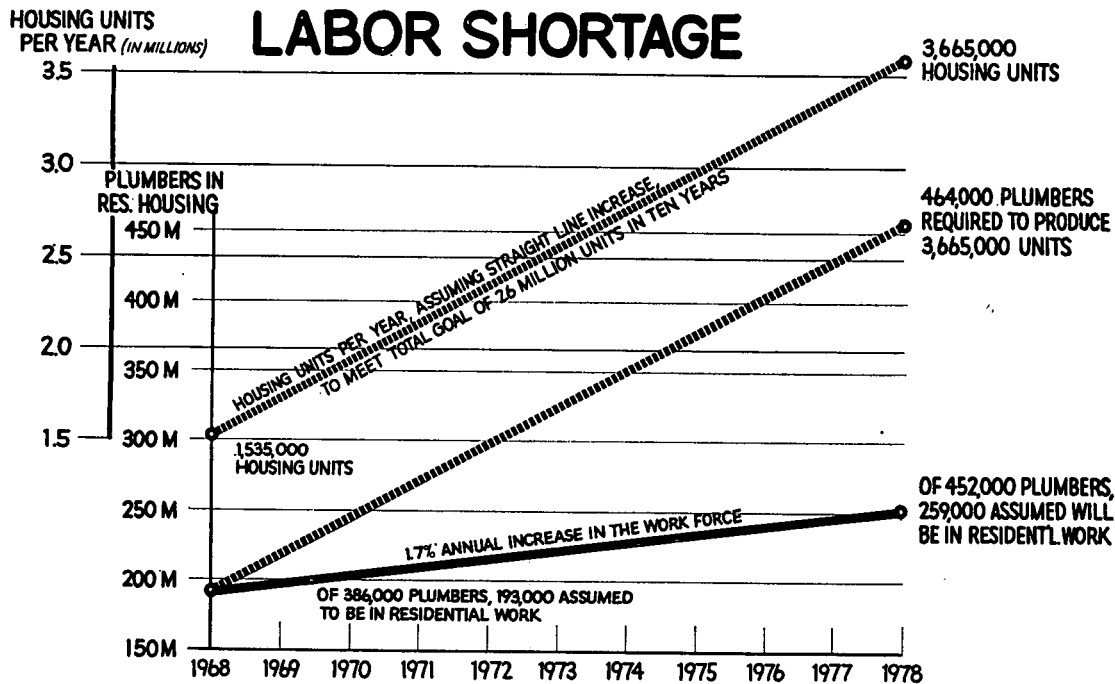
If we define industrialized housing as a systems approach to residential building which employs assembly line techniques, manufactured components and some degree of mechanization, then we have been producing industrialized housing for many, many years. However, because of a number of constraints, some originated by builders themselves, some by local authorities, some by special interests, some by market place inertia, others by the peculiar nature and unique character of our building industry in this country today, we as a group have fallen far short of the degree of industrialization achieved by other American producers.

Let's consider that industrialized housing, at least for the purposes of our present discussion, excludes the small degree of industrialization we have accomplished with our primitive site-built assembly and installation methods.

Rather, let's consider it as a mechanized, factory--built method of producing housing modules and panels in a controlled environment.

What, then, do we think of industrialized housing?

We believe that the housing goals of this nation cannot and surely *will not* be met if we do not vastly improve the productive capacity of the housing industry. We at Levitt are actively investigating the feasibility of industrialized housing, or manufactured housing or whatever you choose to call it at this very moment. Even though we feel that our present methods of construction are more economical, we foresee a housing need which cannot be satisfied with our present site-built techniques. That's so because current methods require a great amount of skilled field labor working under variable and unpredictable weather conditions. We must find ways to reduce the total amount of field labor and the work skills required in housing. At the low rate of 1½ million starts predicted for this year, *there are simply not enough* carpenters and electricians and plumbers. Their number—absolute number, not percentage—is decreasing every week. How could we build 2 million houses this year? *We can't! We lack the capability!* We don't have the capacity to construct the houses required to satisfy our current needs. The only answer we see to former President Johnson's request for 26 million housing units by 1978 is in factory production by semi-skilled workers in place of field production by skilled workers.



386,000 Plumbers in December, 1968 (MONTHLY LABOR REVIEW MARCH 1969, PAGE 90). Assume that 1/2 are engaged in Residential Plumbing, Heating and Air Conditioning work. Assume that the anticipated annual increase in the work force applies to Plumbers, and that this entire increment becomes engaged in housing ---

SHORTAGE IN 1978 -- 205,000 PLUMBERS

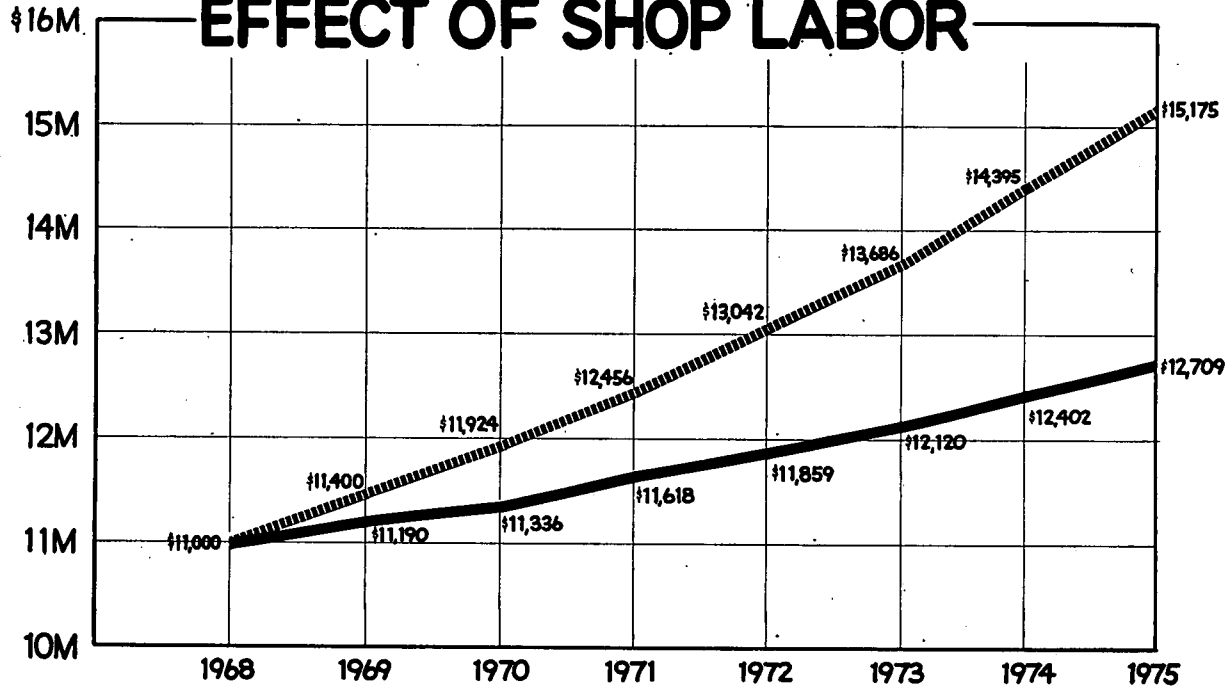
Let's consider this chart, which is concerned with plumbers but which would be similar for any of the building trades. Let's assume that (1) Half of our plumbers are engaged in residential work; (2) The anticipated annual 1.7% increase in our work force will apply to plumbers; (3) All these additional plumbers will become occupied in residential work; and (4) We will expand housing production on a straight line basis to meet our housing goals by 1978. Then we will suffer a shortage of 205,000 plumbers nine years from now!

Factory built housing permits semi-skilled workers, with the use of wall framing machines, pre-fabricated plumbing systems, pre-assembled utility cores, and other structural and technical components, to build and complete housing units in a controlled environment under optimum conditions. Consequently, the labor time in a factory-built dwelling unit is only a fraction of what is required to construct a similar unit on-site.

That's why we must look at factory-built housing. That's why factory-built housing must succeed, or we will never be able to produce the homes and apartments needed to house our expanding population and our underprivileged citizens in a comfortable, dignified, decent way.

It is not clear today whether factory housing and industrialized processes are less costly than our present methods, but it is certain that we must work at it today, and begin to develop it today, so that tomorrow we will have a different production method that *will* result in economies over our anticipated site-built costs of tomorrow.

EFFECT OF SHOP LABOR



..... Indicates \$11,000 Direct Cost including \$4,400 for Field Labor, Compounded at 10% Annually.

———— Indicates \$11,000 Direct Cost including \$1,200 for Field Labor, Compounded at 10% Annually and \$1,400 for Shop Labor Compounded at 5% Annually.

Let's look at what we anticipate may happen to costs as we transfer labor from the field to the factory. Let's assume *direct* construction costs of \$11,000 for both site-built and factory-built houses. The lower labor input in total man-hours required by manufactured housing, the lower hourly wages for factory labor, and the smaller annual increase in these wages compared to anticipated increases in field labor rates, result in direct increases by 1975 of \$4,175 for site-built houses and only \$1,709 for manufactured houses.

Here, then, is our foreseeable economy in industrialized housing—a reduction of total labor time, a smaller requirement for skilled craftsmen, and a lower rate of annual adjustment.

We foresee other building costs as being constant. A bathtub, or a sheet of plywood, or a roof shingle will cost X and Y and Z dollars in 1975, regardless of whether they are installed on-site or in the factory. However, factory-installed material is less vulnerable to loss, theft, and damage than the materials which today lie around a building site for days or even weeks. While difficult to measure the total cost effect, we know it is substantial.

If we continue our present course, we may outprice our markets. As the real need for adequate housing increases, the housing market may decrease because of the inability of our people to buy higher and higher priced homes. Our prices—Levitt's prices—have risen approximately 50% in the last five years. Our potential customers, the people to whom we sell our houses, have not enjoyed anywhere near a similar appreciation in their incomes. So the base of our market has become smaller. And it will continue to shrink unless we can contain our costs. Certainly, at least in so far as the house structure is concerned, we can better contain and control and limit production costs in an industrial environment.

The present constraints and burdens—zoning restrictions, building codes, union featherbedding, increasing land costs, and tight money—also frustrate production of tasteful, safe, comfortable, yet economical housing units. These problem areas have been investigated and reviewed and discussed and considered *ad nauseum*, but they are still huge obstacles to the housing goals we want to achieve. It is time—past time—that local and state authorities and even our Federal Government acted effectively to remove these blocks! Industrialized housing is in its infancy and needs the assistance of a new sensitivity to housing production in place of the hindrances of our present archaic land planning, unrealistic building specifications, and needless yielding to special interest groups. Industrialized housing needs the commitment of research and development funds to an extent beyond the resources of any private enterprise. We need the means to discover and uncover what is acceptable to a mass market in order to justify mass production. Then—only then—can we design and produce housing to meet those standards.

We recommend that the following specific actions be taken *now*:

First, we ask that the Congress support the concept of performance standards for residential construction rather than the arbitrary and often outdated material specifications in many local building codes. We suggest legislation establishing a National Institute of Building Sciences, the effect of which will be to encourage American municipalities to evaluate new products and techniques quickly and fairly as provided for in the successful Agrément and D.I.M. systems in Europe.

Second, we request that Congress exert its influence so that sense and order replace the jumble of zoning restrictions we must now contend with and which inhibit intelligent use of our land.

Third, we believe that Operation Breakthrough, a brand new HUD program designed to encourage and facilitate development of useful innovative building techniques, should be helped by the enthusiastic and constant support of the Congress.

Fourth, we suggest increased funding for housing under Sections 235 and 236 of the National Housing Act so that private enterprise may invest in the design and development of products satisfying these special requirements without the fear that the programs may be aborted.

Fifth, we urge authorization for variable rate mortgages so that housing can attract its fair share of available financing by being able to assure lenders an equitable return regardless of prevailing interest rates.

Sixth, we ask for favorable consideration of inclining rate mortgages so that home owners may repay their loans incrementally as their personal income increases.

Seventh, we believe that pension funds and insurance companies as well as financial institutions should be required to invest specified minimum percentages of their resources in residential mortgages.

Eighth, we advocate that the Congress allocate substantial funds solely for the research efforts required to develop satisfactory and economical techniques for industrialized housing. An investment of only one-tenth of one percent of our annual budget is suggested.

We have likened our dream of future housing production to the industrialization of our automobile industry, but we have not yet created comparable conditions so that the functions of highly mechanized, extremely efficient, tremendously economical assembly lines in Detroit can be utilized to provide a clean and comfortable home for all Americans.

Hammering sticks together by hand under a factory roof instead of hammering sticks together by hand in an open field is not an answer to our problem, but only a first step towards its solution. As we develop satisfactory production techniques, we must also work towards market receptivity of industrialized housing.

Until and unless government at all levels acts to clear the way for industrialized housing, we foresee no breakthrough, we foresee no low-cost housing method, we foresee no real answer to the increasingly critical housing inadequacy of today. We can foresee and we do anticipate gradual technological development and a partial containment of rapidly escalating costs. Unfortunately, we also foresee failure to meet even a major portion of our announced housing goals during the forthcoming decade.

With government help, with the effective action required to overcome and eliminate today's housing obstacles, industrialized housing could provide a decent home for every American.

Chairman BOLLING. Thank you very much, Mr. Biederman. I would like to get unanimous consent to include the various charts and additional materials provided by both the witnesses. Without objection they will be included. The charts will appear with Mr. Biederman's prepared statement (see pp. 15, 17). The publication "Breakthrough" and "Request for Proposal No. H-55-69, supplied by Mr. Finger will be included at the end of today's proceedings (see pp. 53-202).

I would like to say that this subcommittee does not operate under the time limitation of members that our full committee and other subcommittees do. We count on the individual member restraining his length of questioning himself, rather than having a 10-minute rule.

Then I would like to welcome to the subcommittee our new member, who is the son of a very distinguished member who served here many years, and a very distinguished member himself in his own right. I am particularly glad he is on this subcommittee, because I think he will be a Member of the House who will appreciate the way the subcommittee works, which is to try to get very little publicity and try to find out some new ideas which might be helpful over the long run. So I am delighted to have Representative Clarence Brown with us.

You now have the floor, Mr. Brown.

Representative BROWN. Thank you very much. I am sorry to say that I could not get here for my first meeting on time. That is a bad precedent to set, I suppose, but not an unusual one.

I thank you, Mr. Chairman, for the words of welcome and for including in the comments recognition of my service as distinct from that of my predecessor. That is the sort of courtesy that I do not encounter frequently.

I am pleased to be on this subcommittee and I am interested in the comment that you are after solutions, not publicity. That also is somewhat unique.

I have but one question on the testimony which Mr. Biederman and Mr. Finger have given. I perhaps am asking a question that has al-

ready been answered by your testimony, and again I am sorry if that is so. Regarding the use of industrialized housing in the company operation that you represent—has this been undertaken outside this country? I know that Levitt has operations in various parts of the world.

Mr. BIEDERMAN. No, we have not been involved in industrialized methods save an assembly line technique for on-site construction as opposed to factory production of housing. We have been in competitive situations in France, for example, where we have a project, against industrialized system. We really can't compete on high-rise construction with site-built construction.

In France we are presently in the process of finishing our feasibility study for the future of our own company relative to industrialized housing and we expect in the fall of this year to be finalizing our thinking and making the firm decision one way or the other as to what approach to take relative to industrialized housing.

Representative BROWN. In your foreign experience, has there been a good deal of labor opposition or have you found that this is not as significant a factor abroad as it is here?

Mr. BIEDERMAN. We have not seen evidence of any labor opposition in other countries to industrialized housing. If anything, it opens up the construction industry to a need for more labor rather than less, because the volume increase is so dramatic.

Representative BROWN. In your French experience, have you picked up information or patterns which will benefit you in future operations elsewhere, here or abroad?

Mr. BIEDERMAN. Well, personally, I have gotten to enjoy the 2-hour lunch hour which I picked up there.

Representative BROWN. I did not have that kind of French experience in mind.

Mr. BIEDERMAN. From a company standpoint, however, we have been exposed in France to what they call the *agrément* system, which translated rather loosely into English is the "agreement" system of building code, which seriously affects, by the way, coding. What that amounts to is a quasi-governmental agency which is financed partly by the French Government and partly by the sale of publications and charges for the service they perform. It is very interesting in the way that it works.

There is a national agency called the CSTB, Centre Scientifique Technique du Batiment, which is basically a center for scientific and technical development of building. If anyone has an innovative technique that they think makes good sense, or a building product, they go to the CSTB, they pay a fee relative to the magnitude of what they are substituting. The CSTB approves—tests, approves, or rejects the process. If they approved, the process is granted an *agrément*. Now, no local community has to accept that *agrément*. No local community has to accept a builder's insistence that he wants to use that technique. However, if the community does not accept the technique, they are not eligible for federal subsidies for sewer, water or municipal advantages; they are not eligible for federal funding for schools; they are not eligible for highway access from a major road to their village.

On the other hand, the builder does not have to use processes that are accepted by CSTB. He can use whatever processes he wants. But

in France, there is a 10-year collapse liability placed on anyone who either supervises or constructs anything. No insurance company in France will give insurance to any builder who uses anything that is not approved by the CSTB. So it is a very nice, pleasant form of clubbing everybody into accepting standards. And the CSTB does seriously remain above reproach. It is composed of a constantly changing force of experts. It is composed of members of the building industry, members of the manufacturing segments that service the building industry, members of the educational community, and these boards constantly change in character and represent local elements as well. There is not just one board that sits in Paris, but there are boards all over France.

For the first time, after having been in the building industry in America all my life, and then working in France for 2 years, my first exposure to it was like a big double-barreled chocolate malted. It was a refreshing change. I think if we can develop that same technique here, and I think there is no reason why we could not—incidentally, I mention in here the proposal for the establishment of an institute of building sciences, which would perform that very, very same function. If there is one significant item I picked up in my experience in France, it is most certainly that.

Representative BROWN. Are you satisfied with the quality of the study effort made of the new methods by the French Government?

Mr. BIEDERMAN. It is indeed thorough.

Representative BROWN. Scientifically sound also?

Mr. BIEDERMAN. Yes. As a matter of fact, it is not a short process. One American heating manufacturer wanted to have his furnace approved in France so that builders like ourselves could use it. It went through a 39-stage battery of tests by 15 different segments of the CSTB, none of which, incidentally, was red tape. They were all sound testing procedures. And the process takes close to a year to 15 months. Then it only gets a partial agrément. It gets a complete agrément after the system has been used and reviewed for a period of 2 years by the CSTB. So it is a very thorough system. Obviously, from time to time, there are some politics involved, but overall, it is a very clean and very effective operation.

I might add that the builder, as well as the owner, ends up being satisfied with the system. The mayor of a small town, for example, does not have to depend on farmer Brown, who happens to be the local building inspector. They can be going to a higher authority composed of experts to certify the quality of a technique or a system.

Representative BROWN. Did you say that the expense of the user-fee basis is not a large one?

Mr. BIEDERMAN. No; it is directly proportional to the magnitude of the innovation or the process submitted. If it is a small item, it is a small fee. If it is a major undertaking, it is a major fee.

Representative BROWN. Thank you.

Thank you, Mr. Chairman.

Chairman BOLLING. Mr. Moorhead?

Representative MOORHEAD. Thank you, Mr. Chairman.

Mr. Biederman, you suggest the establishment of a national institute of building sciences in the United States. Would you recommend that it be given the same kind of authority as the French institute that you describe?

Mr. BIEDERMAN. Very definitely. If it were not, it would not be effective.

Representative MOORHEAD. You do not think it can be done by example or exhortation or the like?

Mr. BIEDERMAN. No. That is not to say—I am not proposing here for a moment a national building code. These are simply national standards that would vary from one part of the country to another, but it would take out of the hands of a local building code the determination that, and I keep on going back to the same example, 2 by 4's 16 inches on center because somebody once built a barn and had them further apart and the barn fell over. If the thing does not have the clout, if the institute does not have the clout, then you might as well not go through the effort.

I, incidentally, would have this institute list all the existing agencies that are present in this country right now—UACI, ASTM, and so forth. I would try to have the institute structured under an apolitical institute or something that did not have political overtones that would be widely respected in the country, something like the National Academy of Science.

Representative MOORHEAD. I take it, when you say you would get no FHA insurance, you would get no urban renewal, no sewer and water advantages, and so forth, unless you follow the standards set by the national institute. You mean that you would have, if not a national code, a series of codes that would be nationally enforced, do you not?

Mr. BIEDERMAN. No; a series of performance standards—and we should be very clear as to what we mean by performance standards—as opposed to material standards. If I may be repetitive for a moment, a wall should be required to do something. It should be required to support a certain load, a certain snow load, a certain wind resistance. It should not necessarily have to be made out of either papier mache or wood or steel or whatever; as long as it performs to the satisfaction of the requirements, it should be allowed. These standards would vary.

For example, in California, a wall could be required to do something far more than a wall in New York because of the earthquake problem.

Representative MOORHEAD. But would the decision be made in Washington as to how strong a wall should be in California?

Mr. BIEDERMAN. No; this national institute would have a group of experts who were, conceivably, in California, who are most familiar with the California problem. It would have a central office in Washington, but only to serve as a clearinghouse.

Representative MOORHEAD. Secretary Finger, does HUD or do you personally have any position with respect to this national institute (a) should it exist, and (b) should it have a clout of the type described by Mr. Biederman?

Mr. FINGER. Let me make a few comments on it. I am familiar with the proposal and I see some potential concerns as well as benefits in setting it up. But at the same time, I believe that some move toward performance as a measure of the ability of a house to provide what's expected of it is necessary; some move in that direction is clearly indicated.

Perhaps as an indication of it, I should describe the approach that we are including in this Operation Breakthrough program that recognizes this kind of a need. One of the major problems that we face is

the variability of building codes that specify how things are to be done as Mr. Biederman indicated, rather than what the system is to provide in terms of performance. There is a great variability throughout the country. Also, there is, in many of these codes, an inability to accept new features, new ideas and new concepts that may provide better performance and performance that is more useful in the house while reducing cost. What we are proposing to do is to go through an extensive test program on each of the new features that is proposed to us in the response to the requests for proposals that we have been sending to the industry. We will test and evaluate those features through private laboratories, through the National Bureau of Standards, through the Forest Products Test Laboratory of the Department of Agriculture. Then, we have just signed a contract for a combined group of the Academies of Science and Engineering. They are in the process now of establishing that group to validate the test results—that is, to review the test procedure, the measurements made, and the final results, and to assure that the tests do in fact provide the evaluation that is necessary.

Now, at that point, after passing the necessary tests, we in the Department of Housing and Urban Development would accept any proposal that comes in and propose to use that concept as suitable and will provide FHA insurance, will provide the necessary subsidies and supplements. So we are offering the carrot and providing an incentive for use of these tested concepts.

We will also be asking local communities, local officials and State officials, to accept that HUD approval, which is made on the basis of thorough testing and evaluation, as assuring the acceptability of that house or building system in a local community, regardless of what the codes now require. In other words, we are saying that the local community should accept that HUD approval based on test and evaluation that has been performed by capable laboratories, validated by the Academies of Science and Engineering as sufficient proof of the suitability of a concept to permit it to be installed in their areas.

Further, rather than holding a club, we are taking the approach of providing an incentive and providing carrots for participation in this program. We are saying that we will earmark HUD housing-program funds, rent supplements, homeownership subsidies, to sponsors and developers and local housing authorities who come in to propose to use these high-volume production approaches and building concepts that are selected by HUD after this competitive evaluation of proposals.

We are also saying that we will earmark or give priority consideration for the various grant programs that HUD has—sewer and water grants, community facilities grants, open spaces grants, urban renewal allocations—we will give priority to communities that participate in the program. So rather than holding the club and saying, we will not consider any that do not accept these approaches, we are providing an incentive to join with the program.

Representative MOORHEAD. I take it, Mr. Biederman, you say that is good but it is not enough.

Mr. BIEDERMAN. That is a partial fact. I would like to add that you can interpret that one of two ways. The French Government, for example, does the same thing. They say that for those builders that use CSTB-approved techniques, then the home buyers of those houses

are eligible for Federal subsidies for the purchase of those houses. Now, that is the positive way of looking at it and we get back to the old question, is the glass half empty or half full. I can take the same statement and say if you do not have CSTB approval, then your home buyers can't have the subsidies. We are saying basically the same thing.

I would like to add, incidentally, that England, France, Germany, and Holland, not to mention Denmark and Sweden, have agreement systems and have for several years. The experience these countries have had with these systems has been remarkably effective. Builders from other countries in the industry come here and meet with us—I do not know whether Mr. Finger has had the same exposure—but they are shocked by the number of codes and contradictions that we go through.

Gentlemen, I think whatever system we set up, this is a tremendous stumbling block in both the aggregation of the market and the ability for this country to industrialize. If we relate it to the automobile industry, you can imagine what would happen to the automobile industry if a windshield had to be three-quarters of an inch thick in Chicago because they have lots of hail and a quarter of an inch thick in New York and the tires had to be 17 different sizes in 24 different States. It is the same kind of thing. The automobile industry has grown because of standardization and the ability to produce lots of cars on the same line. That is what I am saying is necessary.

Representative MOORHEAD. What are the leading U.S. corporations in size? Can one of you gentlemen in industrialized housing tell me?

Mr. FINGER. I think you think primarily of sectionalized type construction and as Mr. Biederman indicated, Levitt does system building to a large extent; mass production on site. National Homes does work along those lines. The mobile home people, of course, are the prefabrication people building modules—Guerdon Homes, for example. Stirling-Homes uses volume production methods. There are many others like Kingsberry, Skyline, Redman, Boise Cascade, and others. There are concrete concepts as well that exist here in the United States.

I think, as the chairman mentioned earlier, the problem is not our ability to do it or the technology involved, because I am really convinced that we have that. It is all the other factors associated with the process of building, of providing housing to the users, that creates our difficulty.

Representative MOORHEAD. In Pittsburgh, we have just worked through what I think would be an industrialized housing concept under 221(d)(3). It is to be built by a subsidiary of United States Steel Corp. I might say that word of your interest in industrialized housing has not reached the local and regional offices, because we had a heck of a time getting it approved. We had to get final approval in Washington, and it was delayed so long. I think your interest in this approach should be distributed throughout the HUD regional and local offices.

Mr. FINGER. Mr. Moorhead, I would say that one of the obstacles in this process is our own processing; the red tape within our own departmental structure, on proposals along these lines. We are working on trying to assure that everyone is well informed on the need

to process these applications for improved systems more rapidly than has been done.

It isn't only for improved systems. It is even for conventional systems. Processing just has to be done more rapidly than it has been and we are working on that.

I might mention that in this connection, we are providing incentive through this test and evaluation procedure of Operation Breakthrough of saying that once a system has been technically evaluated, and has gotten the stamp of approval from HUD, it no longer needs further technical review. Also, since we intend to build prototypes on eight regional prototype sites throughout the country, we will to a large extent, be performing a test of marketability, so that when systems are selected from those prototypes to be put into volume production by the local communities, sponsors, developers, and so on, there should no longer be a review for marketability or for the financial risk involved. So that, too, should speed the process; it really should bypass a good bit of the review process that now takes place.

Representative MOORHEAD. Mr. Biederman, do you have a comment you want to make?

Mr. BIEDERMAN. Yes; in answer to your question: Who are the big producers, I think first of all, we should question whether there is a building industry. At last count, there were over 100,000 builders in the United States. We represent one of the largest, certainly one of the top, if not the No. 1. Certainly one of the top five. Last year, we produced 6,000 houses. Now, there were 1,500,000 produced in the country and we represent one of the largest and we produced less than half of 1 percent; 90 percent, or over 90 percent, of the builders in the United States produce less than 25 houses a year.

The only company—aside from the mobile home manufacturers, which incidentally, turned out 320,000 units last year—the only company of which I am aware is literally producing industrialized housing on an assembly line basis and delivering them in any volume is Stirling-Homex. There are other companies that are in development stages right now. There are other companies that are in the process of being formed. There are other companies that are in feasibility studies much like ours. But the fact is there is only one that is turning them out and that company is only going to be producing something around 400 this year, which is not tremendously significant.

You can argue that the way we build today is an industrialized method, and it is, because it can be compared to the assembly line. The only difference is instead of the product passing the worker, the worker passes the product. We computer program the delivery of materials, we computer program our scheduling. The construction of a house is a very carefully calculated process. But nonetheless, it requires skilled labor in an unfavorable environment, subject to the climate, subjected to weather conditions, subjected to lots of variables, and it is truly not industrialized as we would like to think of it. It is certainly not factory production. To my knowledge, and Mr. Finger may take issue with me, there are no companies in the country today that are building permanent sectionalized houses on what we would construe as a large-scale basis.

Representative MOORHEAD. There are companies producing houses on an experimental basis that I think want to get into the business.

I mentioned United States Steel. And there are other Pittsburgh corporations, Jones & Laughlin, Western Electric, and some others.

Mr. BIEDERMAN. Yes.

Representative MOORHEAD. We need to set a climate whereby these big companies which are engaged in other fields get into the production of housing.

Mr. BIEDERMAN. I think that is what Operation Breakthrough is trying to do.

Mr. FINGER. We are trying to encourage those people to come in with the concepts they have had and that they have really not had an opportunity to apply in quantity. And we will provide the support for design, testing, prototype construction of those concepts and then give them an opportunity through these prototype sites and their marketing capability to market these concepts for volume production.

Parallel with this is the other important element I was trying to emphasize in my statement, which is that there must be a deliverable market of high level, continuous demand, made available to the builder. Otherwise, there is really not an incentive to get into this. If they are going to fall back into a segmented kind of demand, for example, into a segmented market, there is no incentive for investment in this process.

And we do have to change the process by which we produce and deliver housing in this country if we are to satisfy the housing needs over the next 10 years, to satisfy the housing goals that were set in the Housing Act of 1968, or at least try to; but beyond that, to build a process that assures that the people we expect to have here for the indefinite future will have housing. The process we have does not assure and can't provide for those needs.

Representative MOORHEAD. Thank you, Mr. Chairman.

Chairman BOLLING. Senator Percy?

Senator PERCY. Mr. Finger, I am delighted to have this chance to chat with you.

As I studied your testimony concerning Operation Breakthrough, my thoughts turned to my esteemed predecessor from Illinois, Senator Paul Douglas, who was perhaps one of the most distinguished members of this committee in its entire history. Senator Douglas spent a great deal of his time heading the Presidential Commission on Urban Problems. I have spent a great deal of my time in the last 2 years in the Senate trying to follow through on the concepts and ideas that he had pioneered through his 18 years in the Senate—such as truth in lending—to be certain that the great work he created with his very fertile and imaginative mind would not be lost simply through the cruel fate of politics.

I also want to be certain that as a member of this committee and as a member of the Senate Urban Affairs and Housing Subcommittee of Banking and Currency, I try to follow through with the recommendations he has made in this Commission report, which is the size of several New York telephone directories.

Does the Department of Housing and Urban Development look upon itself as the primary agency responsible for implementing, for sorting out, listing, and evaluating the ideas brought to the Government by this Commission and for following through and putting them into practice?

Mr. FINGER. Senator Percy, we are the Housing and Urban Development Department. From that point of view, most of those recommendations are directed to the areas for which we have a responsibility. Therefore, my answer is yes, we do have a responsibility to review all of the recommendations of the report, the data gathered in it, to be sure that we understand it and are thinking ahead to how to implement those recommendations that we believe should be implemented.

Now, clearly, some of the features that came out of that report are being implemented. Some of them were included in the Housing Act of 1968. The emphasis on innovation, new approaches, and so on, for example, is included in the Housing Act of 1968 in section 108. In effect, we are trying to implement that part of it in Operation Break-through and broaden it beyond that. We think that there are many features of that report that need implementation. We are looking to that.

Senator PERCY. I am so anxious to be certain that this study to which Senator Douglas and his distinguished committee devoted so many thousands of hours does not suffer the fate of so many studies: Read by the committee's members who prepared them, the staff members, by a few people who are directly affected by them, and then filed away. I think we need action, because the problems that the Commission pointed out are tremendously difficult, complex ones involving a power form as a government, almost, and the report states what we are going to have to do to bring order out of the chaos that we now have.

Internally, within the Department of Housing and Urban Development, is there a regular reporting procedure to the Secretary or to your office now by a group of men responsible for seeing that we do follow day by day, week by week, month by month, these recommendations to be certain that we do not lose track of them?

Mr. FINGER. Senator Percy, I think it is divided at this point; however, brought together in an office responsible for broad program evaluation. This is headed by Mr. William Ross. His office is really the one responsible for evaluation of all our programs to assure that they are effective, that their objectives are clear. There are major elements of that report, for example, that relate to the responsibilities of my office in research and technology, and there are others that relate to some of the urban renewal areas and other housing subsidy and supplement programs; however, he does have a responsibility for broad program evaluation across all of these areas.

But the actual implementation of programs, evaluation of specific programs, is divided by the responsibilities assigned to the various assistant secretaries and each of them, I feel very confident, have gone through the report and does recognize the great effort that was put on it.

We just recently got the appendixes which contain the mass of data that were used to form the basis for the report—I must confess I have not gone through all of that backup data yet. I have gone through the prime summary report. It does require going through all of the backup data, too. We are doing that in the research area and I feel sure that the other people are doing it.

Senator PERCY. As I understand it, the Commission is not functioning any longer. It has completed its work.

Mr. FINGER. That is right.

Senator PERCY. Has a report been made by the Department of Housing and Urban Development to Congress on what it is doing to implement the report?

Mr. FINGER. Not that I know of, Senator.

Senator PERCY. Would it be possible for the Secretary to undertake such a report? Could you transmit to him my earnest desire as an individual to have a report made to Members of Congress as to what has been accomplished, what is now in the works, and where the Department anticipates going? I would not want to look on this as a detailed project, but instead a sharing with us of what must be available internally anyway, so we do not lose track of it. I think it would be very well indeed for the members of that committee who put in so much time and effort to also know that their work is appreciated by the fact that we are not losing sight of it.

Mr. FINGER. I will pass that request on, Senator Percy.

I thought there was someone here who might answer whether there is such work already underway. I know it has been examined carefully and it is really a continual discussion that goes on; comments on the report and data in it are used continually. But I will pass your comments on to the Secretary.

Senator PERCY. I was most interested in the section of your testimony dealing with the comparison of American housing and that of European countries, and was rather shocked to find how many of them are so far ahead of us. I could not grasp it. Automobile for automobile, we are able to move people around almost to the point of saturation. Yet when they are stationary or supposed to be situated in homes, we do not keep up with this particular need.

As you have emphasized, Eastern Europe has done more with industrialized housing. I am impressed by the housing in Moscow, and even by some of the housing in Paris and in East Berlin, with its drabness, the poor quality of its workmanship and the deterioration of the buildings which occurs so early in their life. For example, I thought buildings in Moscow were 25 years old. I was shocked to learn they were only 5 years old. I wonder if mass production diminishes quality this much?

Can you tell us what your feeling is—and perhaps Mr. Biederman could comment as an industrialist—as to what our approach will be in industrialized housing from an esthetic standpoint. Do we have to build these barracks-like buildings that the Robert Taylor Public Housing Projects in Chicago are? Is Congress wise to simply say, "Well, so long as it is for the poor or lower income people, or we have something to do with it, we are going to see that it is built just as cheaply as it possibly can be," not taking into account that cheapness of the initial investment detracts from its esthetic and continuing value? We did not build the Rayburn Building that way. I do not want to build public housing that way, either.

Why have we thought that housing has to sacrifice so much, and what are we doing now as a government to learn from the past and not move into this field of industrialized housing with the feeling that it has to be drab looking, that there can be no esthetic value, that it is

sheer function and not the other factors that I have mentioned, that are really just as important?

Mr. FINGER. I agree with your comment very much, Senator. I think we just have to be realistic enough to know that features that at one time may have been considered luxuries just are not any longer luxuries today. They really are necessities. They are necessities for decent living, and also to satisfy some of the aspirations of the people who move into these areas.

We have had major problems in some of our public housing for just the reason you have quoted. They have been minimal in appearance, in structure, in facilities, in every way. As a result, we have had security problems, vandalism problems. They are just not a help to the area in which they are set and they do not provide for the needs of those people for any length of time. Really, they tend to be destroyed almost as soon as they are built. So we do have to take a more progressive view of the fact that our investment in public housing must be protected by making it good, sound, usable, attractive housing that will satisfy the people who move into it.

Senator PERCY. How much variety can be put into industrialized housing? Look at the automobile industry—I hate to use that comparison, but I think of it when I think of Secretary Romney—they have introduced an infinite amount of variety. You can just look down on a parking lot from an airplane coming into the city and it is amazing to see the multicolor, the shapes, the forms, and everything else that are in that parking lot. Yet when we start talking about low-cost industrialized housing, we seem to think in terms of uniformity. Can we introduce variety and not add too much to the increment of cost?

Mr. FINGER. Well, I think they do in the automobile industry, even though many automobiles of different makes within the same basic organization use the same fenders, the same lines, same dimensions, same accessories in many cases.

The point I was making here in my statement was that even within dimensional similarity, you should be able to get a wide variety of design. Dimensional similarity is probably one of the key elements, I believe, of industrialization; if you go through an industrialized process, forms and jigs and so on will probably end up with some similarity in dimension.

Mr. Biederman, who has had good experience with this, made the point that there is no reason to expect that an industrialized house will be or could be differentiated by its appearance from an on-site built house. I think we have to work to that.

Also, I do not think we have made necessarily the best use we can of the available land that we have so that we add that into appropriate attractive design. There is no question, we have to consider the appearance of the housing development just as important as specifying the number of rooms used in these houses.

Mr. Biederman may want to comment further.

Mr. BIEDERMAN. Senator Percy, I have never found any evidence that would justify that good design costs more than bad design and I believe that applies to an industrialized system or any other system, the design potential is infinite.

Thamesmead, which is a new community being built just 8 miles outside of London by the London County Council, an extremely large

project, is being built by totally industrialized techniques. While it was in its early stages, I studied the design drawings at some length. The variety and the excitement they are creating there are wonderful. So it is not one of the prerequisites of industrialized housing that it have this sameness about it.

Senator PERCY. From within the industrial community, how much excitement has been created by HUD's Operation Breakthrough? Do you see a good deal of interest being developed now on the part of American companies? Maybe this is a redundant question, but how many American companies have really responded and reacted favorably to Operation Breakthrough?

Mr. BIEDERMAN. Mr. Finger can answer the question how many. I can tell you that from our standpoint, we have a great deal of interest in it and the companies that we do business with have expressed equal interest.

Mr. FINGER. Senator Percy, we have sent out something over 2,000 requests for proposals. A good number of those were specifically requested by the companies to whom we sent them. I do not expect we are going to get 2,000 proposals. For that matter, I hope we will not get that many. It will be impossible to evaluate them. But we will, I am confident, get a very high, large number of proposals from organizations that do have the capability to do high-volume production housing and development.

But in addition, in Breakthrough, we are also looking for more advanced concepts that may not be ready for application but that need support in order to develop these more advanced ideas so that we have a continual improvement in the housing business, rather than taking only a single-step jump through Operation Breakthrough. We just have to keep a continual improvement going.

We expect in this meeting that we have scheduled Friday with the industrial people who are interested in Breakthrough to have something over a thousand people representing these companies present.

Senator PERCY. Are you going to be looking to Congress for more money than you planned to ask for to make this operation a success?

Mr. FINGER. For fiscal year 1970, we think the funds we have requested, both the combination of housing program funds and the research and technology program funds, should take care of our needs for this year. There is no question that as we go on in this program, if it is at all successful, we are going to have to have an increase in funding to take care of the full benefits of it and achieve the results from it.

Senator PERCY. The New York State Legislature has given the New York State Urban Development Corp. the power to go into any locality in the State and build what it deems necessary regardless of local zoning and code restrictions. Have any other States tried to overcome these obstacles to greater industrialized housing provided by local zoning in the same way?

Mr. FINGER. Not quite in the same way. That is a fairly unique authority, but there are other States working in that direction—New Jersey, Pennsylvania, other States are considering moving in that direction. The States now have authority in the area of building codes. We have asked them to take a role in these issues and to work with municipalities as well as counties and the States in order to try to en-

courage all of them to take part in our program so they will accept the testing that we do, the evaluation and designs that we develop, regardless of existing code requirements. But that is a very powerful authority that the Urban Development Corp. has in New York. We think it is a very beneficial one and will be very helpful.

Senator PERCY. If it is that beneficial and foresighted would you share that knowledge with other States? Who will bring that knowledge to the attention of other States as to how New York has broken through on this problem and really put some oomph behind a program to break down a restrictive set of codes that exists in municipalities that are the despair of builders and the despair of anyone looking to do the kind of breakthrough operation that you are working on?

Mr. FINGER. Senator Percy, we have brought it to the attention of other States and cities. In a series of meetings that we had early in May, the Urban Development concept was generally described. We just had a meeting last week in which we had representatives of most of the States, some Governors, quite a few mayors and representatives of cities, as well as county government, and we described there the Operation Breakthrough requirement that we break through some of these zoning and building code barriers to effective housing; and there again we described this as one possibility. But it does depend on each community and State determining what its best approach is. We cannot very well specify it as the approach to be followed at this moment.

Senator PERCY. Mr. Chairman, I have just a few more questions, but I would rather yield back to you and the other committee members and then come back later.

Chairman BOLLING. Thank you, Senator.

Mr. Biederman, you made a very minor point in terms of the scope of your whole statement that interested me, because it revealed another one of my total ignorances. I was not aware that a mobile home was treated as personal property for tax purposes as opposed to other types of homes. Would you explain to me in more or less general terms, if you know, No. 1, the reasons for that particular treatment, and No. 2, the effect?

Mr. BIEDERMAN. I have not been a history major, so it is kind of hard to tell you how it started. It had something to do, I suppose, with the fact that the mobile home is not attached to a permanent foundation. Most real estate tax laws relate to real taxable property as that which is permanently attached to the land. Since the mobile home is not, it slips around the side and in virtually every State that I know of, is not taxed as real property. The effect has been that the carrying costs of maintaining a mobile home have been reduced and the mobile home industry in general, which is manufacturing a less expensive or less costly product than a permanent house, has been able to capture well over 90 percent of the housing market below \$14,000.

Chairman BOLLING. That explains the phenomenon that I have been curious about.

You indicated in your testimony, if I am correct, that when Levitt began, it was building houses for less than \$8,000 and that now the average would run around \$29,000. Is that a change in the market to which Levitt directs its attention or a change in the cost of housing, or a combination of the two?

Mr. BIEDERMAN. It is primarily because we cannot afford to build a house for less. We think that the mass market is still below \$20,000. We cannot produce a house for under \$20,000 and stay in business.

Chairman BOLLING. That is the answer I expected. That leads me to the next point.

It seems to me that so far we have been really discussing middle-income housing, and I do not think we have even gotten to lower-middle-income housing. We are really talking about middle-income housing largely. I would like to find out what you gentlemen, either or both of you, think about, for example, the Douglas Commission that was mentioned by Senator Percy. This body estimated that one-third of the 60 million housing units in the United States need replacing—the present 60 million. It goes on to point out that the group needing new housing has an estimated average income per family of about \$5,800 per year.

Is this an insuperable gap? Is this a gap that can be met substantially by the development of industrial techniques, or does it indicate a need for a very large increase if those people are to be housed, if the national policy is to see to it that these people have decent housing; although perhaps a little uniform, at least it would involve an escape from the enormous diversity that one finds often in slums, and one does often find great diversity involved. What are the implications of those two figures—20 million housing units need to be replaced; the people that need new housing most are people with an income of \$5,800 or less?

Would either of you care to comment on the problem?

Mr. FINGER. May I comment briefly on one part of that question? There really is no low-cost housing that we can point to. As Mr. Biederman indicated, even a company that operates as efficiently as Levitt, can't produce housing down below \$20,000 effectively. There are some areas of the country where that may be possible, but at least where they operate, it is not. As a result, we must think in terms of the subsidies that are available in the Housing Act—the rent supplements and home ownership subsidies—as making housing available to lower- and moderate-income families, not through lowering the basic cost. The ceilings that are contained within even those subsidy provisions indicate that although there is difficulty in some areas living within those ceilings because of the recent rise in cost. Housing becomes available to lower- and moderate-income families through the subsidies contained in our housing acts and the appropriations requests we make.

Chairman BOLLING. Do those particular sets of subsidies that have been developed in a sort of hodge-podge fashion over the last 20 years—the first few years of which I incidentally served in the banking committee and concerned myself a good deal about—is there any realistic hope that the subsidies which now exist of all sorts, hidden and real and obvious and so on, can meet the need of the people we are talking about?

Mr. FINGER. It still does not get, Mr. Chairman—

Chairman BOLLING. It does not even get close, does it?

Mr. FINGER. It does not get to the very lowest income people. For example, the section 235 homeownership subsidy has within it a re-

quirement that the potential homeowner pay 20 percent of his income for the housing. The Government provides an interest subsidy, which could result in the interest paid by the buyer to be as low as 1 percent. That immediately puts a minimum salary level on that potential homeowner. That number varies by the cost of the house and the level of property taxes, so it differs from place to place. But it does put a minimum into the system. It does not, still, get to the lowest income families.

Public housing and rent supplement housing does provide a greater opportunity for lower income families to be housed primarily through rentals. Even here the very lowest income families have difficulty in meeting the needed rents.

Chairman BOLLING. In other words, what that amounts to, and I do not want to give the impression that I am downgrading the enormous importance of the kinds of contributions you have both made in terms of a higher level of income housing, because I think that is critically important, too. But what we are really talking about when we talk about doing something about the people that I suppose you could say need housing and have least ability to get it is something that would aggregate the market quite remarkably, and that is a tremendous Government subsidy.

Mr. BIEDERMAN. Section 235 could, if it were tied into a cost-of-living index and did not have fixed limits, and if it were funded far more extensively than it is now, could begin to meet the kind of needs you are talking about. But there are other aspects of the problem beyond subsidies.

When I said that our average-price house is now selling for about \$29,000, that considers the fact that we are selling \$50,000 houses, but we are also selling attached row houses that are completely air conditioned, that come with private gardens, that come with community swimming pools, that come with lawn maintenance, snow removal, streets, lighting, very, very comfortable, completely equipped kitchens, laundries, and sell for under \$20,000. This is not an advertisement for our product. The reason I bring this up is that these are townhouses and we achieve this because we are putting them on a minimum of eight units to the acre. We would like to build townhouses or attached row houses far more extensively than we do, but we cannot, because we cannot find the land zoned for townhouses or attached rowhouses. Obviously, since land is one of those commodities we cannot reproduce, we cannot manufacture it and the price of land is increasing all the time. This is the single greatest thing that is hitting us as far as the cost of housing is concerned. You compound that by restrictive zoning practices in some communities, as much as one house per 5 acres and the most of housing is maintained at a high level. If we could have PUD zoning, which is "Planned Urban Development," or planned urban residential development zoning, to allow for increased densities so we could get up to 12 townhouses per acre or 20 per acre, or garden apartments, or whatever, we could make a serious dent in the price of housing.

Chairman BOLLING. Would you translate that into what income level could afford that housing?

Mr. BIEDERMAN. The general rule of thumb is that a family can afford a house that is about twice their income.

Chairman BOLLING. That still applies? I know that is the old rule of thumb 20 and 30 years ago. But is it still a good rule of thumb today?

Senator PERCY. With present interest costs?

Mr. BIEDERMAN. Nobody can afford housing with present interest costs. It does apply, not with present interest costs.

Mr. FINGER. In effect, our housing act recognizes that. Section 235 calls for the potential homeowner to pay 20 percent of his income, including taxes and insurance, but not maintenance; so in total, it comes, even in that act, to 25 percent of his income for housing.

Mr. BIEDERMAN. The other aspect, if I may, that would have a serious effect on the price of housing is the fact that we are trying to keep the same number of cities we have and just expand them. And everybody wants to be within commuting distance, for some reason, to the center of town. We have the same number of major cities that this country had 60 or 70 years ago, but we have far more people than we had 60 or 70 years ago. It seems to me that we should start thinking about the creation of new cities. There are vast areas of this country—I think somebody once said we could house the entire population of the United States in Texas.

There are vast areas of this country that could, from the standpoint of transportation, of communication, very seriously house new cities, totally new cities.

Chairman BOLLING. Let me assure you that this subcommittee is thinking about that.

Senator Percy, I understand, has to leave and would like to ask a question. You are recognized, Senator Percy.

Senator PERCY. Thank you, Mr. Chairman. I would just like to commend you for your foresight in calling these hearings. I think they are going to be exceedingly valuable. I regret that I was late and have to leave now, but I have six simultaneous hearings today. All the television cameras are down on the other hearing, but I think there would be more profound change in American life and more good done for more people in this country by the proceedings of these 3 days than anything else that has gone on in this building and the building across the street.

From Mr. Finger's testimony, I think there is also wisdom in your decision to actually take the committee members to see the industrialized housing in other countries, and I deeply regret that I am not able to go. I regret also, that we have not been able to have a breakthrough in our old thinking and get new thinking in this country. I will do everything I can, even though I cannot be with you, to help you implement the concepts and ideas and breakthroughs you bring back.

I think we are very fortunate in having Secretary Finger in this field. He is a creative new thinker himself and has great expertise. Illinois enjoys working with him and Secretary Romney.

May I ask a question of Levitt? Is this a subsidiary of I.T. & T.?

Mr. BIEDERMAN. Yes, it is.

Senator PERCY. Are you a conglomerate?

Mr. BIEDERMAN. Levitt?

Senator PERCY. I.T. & T.

Mr. BIEDERMAN. If I knew what a conglomerate was, I could answer the question. I am not sure I do.

Senator PERCY. I think you do and I think you are a conglomerate and I hope you would never hesitate to admit that you are. I spent

many years in industry building a conglomerate company that I think is much more diversified, taking our technique in management and our capital into instrumentation, taking it into business machines and equipment. Exactly 20 years ago Hal Gensen was a fellow officer of Bell and Howell with me. The greatest regret I ever had was that we could not hold him. But his genius that he had taken through the industrial field of industry, his genius in what he has done now in putting together this conglomerate in the best sense of that term, and the breakthroughs of that fertile, imaginative, creative mind, with good management can take the very best of American industry, solid capital, and I hope break through the maze of red tape that you have to fight through in order to do what you are doing, create a fine business in an area of tremendous need in this country. And to the extent that we can help break the barriers and make the job easier to release the boundless energy of private enterprise to get this job done, that is our goal, our mission. I will be proud to work side by side with the other members of this committee in trying to help see the light at the end of the tunnel.

Mr. BIEDERMAN. Thank you, Senator Percy.

Chairman BOLLING. Thank you, Senator Percy.

Mr. Widnall, I should give you an opportunity. I apologize; I did not see you come in.

Representative WIDNALL. Thank you, Mr. Chairman.

Mr. Finger, Mr. Biederman, I regret I was unable to get here sooner, but I certainly will read your testimony with great interest. I know it has been to the point of something that is extremely important to the future of America.

Mr. Finger, do you envision the future demand for industrialized housing as consisting mainly of low-income housing financed by Government initiative, hence a Government-induced market, or do you anticipate a diversified demand?

Mr. FINGER. Congressman Widnall, I really believe that industrialized housing will provide housing across the board at all levels. I think it would be bad if there were an effort to produce it only at one cost level. It would mark it as low cost. I think it would have less chance of acceptability.

There is nothing that restricts its suitability to any simple price range. It is applicable to the full range of housing systems, going up into luxury prices, with variations. There will undoubtedly still always be a desire for custom-built housing among certain people in certain areas. But it should be possible to, and I think will, provide the needs for all of our people.

Representative WIDNALL. But the basic financing will be the guarantees made by the Government in the future; do you not think?

Mr. FINGER. For the low-income families, that is correct. That will still be the main means of making houses available to those people, through the subsidy programs and rent supplement programs.

Representative WIDNALL. What would you say has been the response of industry in this area? Which market do they foresee?

Mr. FINGER. Well, as we mentioned earlier, there really is not an industrialized housing production capability of very large magnitude built up. I think industry sees the need to provide for all housing.

There is, however, at this point in time a real need to provide for the lower priced housing range, the housing for lower income families, just

because there is less of that being built, less of it available for those families to acquire where they may want and need it. There is certainly an easier time for someone who can afford it to go out and pay whatever the market demands at this point for housing. Therefore, industry, I think, does look forward to the application of these subsidies and supplements in order to provide an incentive, a market incentive, as well as an incentive for them to go out and get financing and so on, to build these moderate- and low-income houses.

Mr. BIEDERMAN may want to add to that.

Mr. BIEDERMAN. I concur with Mr. Finger. I do not believe that industrialized housing is going to be limited to any economic strata. I think the techniques will be employed in all price ranges so that as a result, while Government subsidies may be required to fund subsidized housing for low-income groups, I do not think it will be required for industrialized housing for high-income group housing.

Mr. WIDNALL. Mr. Biederman, the low-cost housing, relatively low-cost housing that you spoke of just prior to the interrogation by me, have you completed much of that, and if so, where? Where can that be seen? I am talking about \$20,000 units, eight units to a tract.

Mr. BIEDERMAN. These units are in a project that we call Rittenhouse Park, which is 30 minutes outside of Philadelphia, near Burlington, N.J., in a town called Willingboro. To date, we have completed close to 700 of these units. They initially sold, 2 years ago, in a price range of \$13,500 to a top of \$15,500. The current price range is \$15,500 to \$19,500.

Representative WIDNALL. What size units?

Mr. BIEDERMAN. These townhouses go from a two bedroom, one-story unit of 985 square feet to a two-story, three bedroom unit of 1,450 square feet.

Representative WIDNALL. Would they be too small for public housing?

Mr. BIEDERMAN. Oh, no. They would be too large.

Representative WIDNALL. I have seen a lot of public housing where the room, the square footage, it seems to me, has been larger than that.

Mr. BIEDERMAN. Well, from the requirements that we have seen on most public housing jobs, and taking the FHA MPS, minimum property standards, as a guide, the room sizes that we have in these units are all in excess of the minimum property standards and in excess, for example, of New Jersey public housing and New York public housing.

Representative WIDNALL. In the construction of those units, are you using much prefabricated material?

Mr. BIEDERMAN. No, but we use only precut material. In other words, the carpenters on our job and the sheathers and the roofers do not require a saw. All the wood comes out precut and dimensioned, ready to be assembled. We have found, and we know this to be a fact, based on a great many studies that we have performed, that site-built, precut housing is considerably less expensive than prefabricated partitions built some place else and delivered to the site. However, on several of our jobs, we are using prefabricated partitions. This, on the surface, sounds a little foolish. We know it is more expensive. We are using it where we have extremely tight labor markets. If we cannot find the labor, then we cannot produce. We then must pay the premium to achieve the production. That is why we will use prefabricated partitions on several jobs.

Representative WIDNALL. I am taking this line of questioning, because of some of the rather exciting things I saw at the National Conference of Homebuilders in Houston, Tex. There they had some prefabricated construction that had a fairly low cost to the homeowner. It was both attractive and in every way seemed to be something that will be a definite contribution to the community, and certainly the people who own it would be glad to have as a home.

Restrictive union practices have often been cited as an effective obstacle to increased production and use of prefabricated, low-cost housing. Recently, the United Brotherhood of Carpenters and Joiners signed a national agreement to produce industrialized housing and erect it onsite.

Mr. Finger, I would like to ask you this: Does this indicate that craft union barriers are beginning to fall?

Mr. FINGER. I believe there is an indication that craft unions recognize the need for a change in the building industry. The agreement between Stirling-Homex and the carpenters is of course a very significant one.

It is important to point out, though, that even before this last agreement was signed, the carpenters were already operating in the Stirling-Homex plants, working on the prefabrication of Stirling-Homex homes. But this agreement carries that one step further to say they would also erect those prefabricated units onsite.

In addition to that, they also made an agreement that included the Urban League to train onsite people and bring more people into the craft union. So I think there is a very encouraging development. Our meetings with the labor people have indicated a recognition of the real demand for housing and the need to make some changes in the approaches that have become practice over some time.

One other indication of this, I think, is the agreement of the Detroit Building Trades Department to organize in-plant activities and organize in-plant on prefabricated housing at industrial wage rates, using industrial labor standards. So there are encouraging signs. I think we still have to work with them and indicate the importance to the country of adjusting our process of building so that we can really satisfy the needs of our people over the next decades.

Representative WIDNALL. Certainly it is a healthy advance?

Mr. FINGER. Yes, it is very encouraging.

Representative WIDNALL. I was very pleased to see it take place.

Now, the National Commission on Urban Problems described the building industry as "a loose conglomeration of small participants who come together on a project-by-project basis."

Do you feel this is an apt description?

Mr. FINGER. I think in general, it is, yes. Mr. Biederman indicated that Levitt last year turned out 6,000 housing units, or half of a percent of all the housing produced; and Levitt is clearly one of the big housing organizations. I should, however, say that the industry would not, it seems to me, choose to operate that way if they had a way of delivering to a large, pooled market without the fragmentation in the market that results from variability of building codes, various zoning restrictions, inspectors who implement building codes in ways that they have become accustomed to and therefore, a large organization can't very well market over a large region of the United States. So it

is also the market that encourages this kind of segmented approach of fragmentation. It does not put a premium or provide an incentive to significant capital investment in any one organization. An organization does not see a real gain because the market is so broken up and the building codes and zoning restrictions and variations in labor practices and consumer tastes variation make it difficult to market broadly.

So my impression has been, in the short time I have been here, that the fragmentation of the industry results to a large extent from factors that cause fragmentation of the market. If we could pool the market, we could encourage a greater pooling of the industry capability and, therefore, greater investment in plant capacity, greater investment in research and innovation and improvement. There would be incentives along those lines.

I think, also, it would really help the way we finance housing. It would not be a project-by-project basis, but we should be able to get a broader umbrella of financing available. As a result, these organizations should have greater leverage in the arrangements they make with suppliers, with labor, with other industrial groups, within the communities in which they operate so they could be stronger and be able to operate more nearly as a group. I think the overall effect would be beneficial. It is really that kind of change of process we are seeking.

Representative WIDNALL. I have just two more short questions.

Mr. FINGER, what effect will the development of an industrialized housing industry have on the overall construction industry?

Mr. FINGER. I think what we are looking at is a need for an increase in the construction industry activity, an increase in production. Therefore, I think we have to look at the changes we are talking about as being a means of supplementing the production that we now get and with time, increasing the efficiency of our present industry.

I suspect also that many of the companies that will propose in this Operation Breakthrough that will want to operate over a fairly large part of the country, will still go to the local builders, local labor, local contractors to do that final onsite field erection work that is required. But in general, I think there will be a supplement provided with an eventual filtering of that know-how into the existing building business.

What we are really looking for, though, is a total increase in our building capacity. Mr. Biederman may want to comment on that point, being in industry.

Representative WIDNALL. The two can go side by side?

Mr. FINGER. Yes.

Representative WIDNALL. And one can learn from the other?

Mr. FINGER. Yes.

Representative WIDNALL. Mr. Biederman, what are the advantages of a more stable construction industry with large-scale firms such as Levitt?

Mr. BIEDERMAN. I believe that on that kind of basis, we would be able to respond to the needs of the country far more effectively, because right now, with industry being composed of well over a hundred thousand builders, there is no real voice aside from the National Association of Home Builders, which, as you can imagine, would have difficulty getting the opinions of a hundred thousand builders, all of whom are concerned with these small projects. The needs of a small

builder, the requirements of a small builder, who is building less than 25 houses a year, are different from the needs of a large builder. The small builder can't devote adequate resources to plant facilities; can't devote adequate resources to research and development market techniques. If there were a constant large demand or market for housing that could be counted on so that major firms in the country could become involved and develop the wherewithal and the responsibility, then the moneys that should be spent on research, the moneys to be spent on development, the moneys that should be spent on plant facility could come about, because the industries would recognize that there would be a reception for their product.

I would like to underline what Mr. Finger said and point out that right now, we do not have the productive capability to meet the needs of the country. The country needs 2½ million houses a year. The most we were able to produce last year was 1,500,000. If there were some major firms using industrialized processes on a large scale, catering to large markets, they would be able to meet that kind of production need. They cannot do it now. There is no strong central body.

There is an organization called the Council of Housing Producers which is composed of the 12 or 13 largest builders in the United States. That council today is only responsible for a little over 25,000 of the housing units built in this country. They cannot respond any more extensively because they have not been able to aggregate a market sufficiently large to receive high-scale production and they have not been able to attract the labor or they have not been able to find the labor to build the units for the market that they are in. Under the Operation Breakthrough program, the aggregation of markets will permit these members of the Council of Housing Producers and people who are not even in the housing industry today to come into the housing industry and set up large firms.

So I think that HUD is absolutely correct in saying that an aggregation of market is very necessary to develop the kind of response on the part of industry, to create an incentive for industry to develop the productive capabilities. That is the advantage of having the large market.

Representative WIDNALL. That is all, Mr. Chairman.

Chairman BOLLING. Mr. Brown?

Representative BROWN. Thank you, Mr. Chairman.

I would like to make several comments on extraneous things that have come up through the testimony thus far.

I think I am correct that in some States mobile homes are taxed as real property if they lose their mobility. In other words, if you have a trailer fixed in one location and the wheels are off it for a long enough time, do you not get into a real estate tax problem?

Mr. BIEDERMAN. In California, for example, if the axle is removed, then the mobile home is judged as taxable property. If the axle stays on, it is personal property.

Representative BROWN. So you have that complication of local requirements of the law in even this area of mobile homes?

Mr. BIEDERMAN. Yes.

Representative BROWN. I also was pleased that Senator Percy did not suggest that he thought the Rayburn Building was esthetically acceptable. It seems to me that much of the Federal building we have

done, where obviously money is no object, comes out pretty bad esthetically. I am not sure that you can build cheaply and still have esthetically attractive and desirable building.

That leads me to a question about a comment that Mr. Biederman made and a comment that Mr. Finger did not make; an omission which worries me a little.

Mr. Biederman, you said that we need the means to discover and uncover what is acceptable to a mass market in order to justify mass production; in other words, what the tastes of the public are with reference to the kind of housing they would like to have. I notice in the seven points mentioned in Operation Breakthrough nothing about any effort to assess the market and discover what the people are interested in. Do we know what role, habit, or style preferences of the renter or buyer play in the housing field, either regionally or nationwide? I am under the impression, perhaps incorrectly, that one of the reasons that the Lustron Home experiment failed was because people decided they did not want metal homes, or homes made of metal parts, and that, therefore, it never really got off the ground in terms of attracting a mass market.

What study has been made here by HUD, or is anticipated by HUD on the one hand and by Levitt on the other, in planning the marketability of their homes; that is, to determine what the public really is interested in? I think this is significant if we are going into a viable industrialized production, and certainly, if we are going into what I gather is the implication of some of the other suggestions here, a federalizing of the market to some extent. I will go into that a little further, later.

Mr. FINGER. Congressman Brown, one of the essential ingredients of Operation Breakthrough is the construction of prototypes of the various concepts that we select from this competition, from the proposals submitted to us. We expect that we will pick somewhere between 10 and 20 contractors, each of whom will have, I am sure, a variety of designs. We propose to build these different concepts on eight regional prototype sites and then to invite sponsor organizations, private, nonprofit, public, as well as limited dividend sponsor organizations, consumer groups, into those sites to examine these various concepts and select those that they want to have produced in volume in their areas to satisfy their needs.

In addition, it does appear that many of the bigger builders have a very good feel for what the market does want. They have gone through many of the market analyses. So we are basing a good bit of our thrust on their understanding of this area.

In addition, another factor in determining where the prototype sites should be is the need to judge market variations throughout the country. We want the prototype sites in locations where there is a large market; where there are variations in climate and weather conditions and so on, but also where there is a variation in market taste. I am, in fact, setting up a way of judging this and I am frankly going to be relying quite heavily on the experience that FHA already has in market assurance or in assurance of its loan commitments throughout the country on the kind of housing units that appear to be in greatest demand. They have a history of demand, of foreclosures, and so on, that

I think should be of great help in this area. Therefore, I am proposing to use a good bit of that data.

So there are the three approaches that we are going to rely on. The prototype construction and the market evaluation by groups that come through to examine these units and their use of land; the proposals that have been made by industry which should have had experience with market assessment; and the third approach is the experience that may have been gained through the FHA files and the experience we have had in FHA.

Mr. BIEDERMAN. There is one thing I would like to add that I think is very, very important as far as user needs of low-cost housing. Our research has indicated that unless you involve the community, unless you have community participation in the project, regardless of what you provide, it will not be accepted to the same degree as that project which involved the community in the first place; which gave the community the ability to take pride in what was being built because they had a pride in seeing it built. This seems to be more particularly true with low-income groups than with middle-income and high-income groups.

Too often, we say that the low-income group wants this and wants that; and what do they need big closets for, they have not very many clothes; and we will put 20-story highrise buildings and give them all a nice apartment and therefore, they should like it, without ever consulting what they want. The experiences in Boston and more recently in New York have indicated very, very strongly that by involving the community where the project will be built, at the very early stages, a tremendous amount of success can be achieved that would not normally be achieved without this community participation. That very definitely is a part of user needs and marketability of product. We do it on a formal basis by having consumer roundtables for our middle-income and high-income housing; where we will ask housewives and homeowners, breadwinners, to come into our offices, sit with us, evaluate our designs in the very early stages, criticize them and actually design with us the product that we will be offering next year and the year after.

Representative BROWN. Does the industry generally, including the homebuilding magazines where you can send in for plans, the prefab builder, Kaiser, and that sort of operation, have an accumulation of information which might be provided to HUD in this area? And do you believe that this information could be beneficial when you get into this further consideration of industrialized housing?

Mr. BIEDERMAN. I would have to say that based on our experience, the sophistication of marketing techniques in the housing industry has not been very good.

Representative BROWN. Is this because it does not have to be very good; because usually the homebuyer, at least in a certain economic level, arranges his own purchase?

Mr. BIEDERMAN. Yes.

Representative BROWN. He buys his own house by what he sees and likes out of what is available, or else he plans his own home and builds it. Is that not essentially the problem?

Mr. BIEDERMAN. That is true. And the average builder will generally build what the fellow down the street is doing and try to sell it for \$50 less, without doing any market research of his own.

Representative BROWN. I think it should be made clear to the industry that this point is not overlooked.

I might say with reference to item No. 5 in your statement that I wish your would throw in VA applications. Then let me talk to you about what I would like to see done in the way of combining those two things so as to obviate a lot of red tape which the Federal Government has not expressed any interest in obviating, at least in the last year, because I have been working on it that long.

Mr. FINGER. I might mention, Mr. Brown, that the FHA has now made the determination to accept VA appraisals as a basis for its own, which is, I think, probably one step in the direction that you are thinking of, but may not cover the problem.

Representative BROWN. That is what I would call a real breakthrough. It should have been done about 20 years ago.

Mr. FINGER. I think it is somewhat of an indication of the problems that exist in this business.

Representative BROWN. No, the problems are not only in private industry. A lot of them are in the Government.

Mr. FINGER. Yes.

Representative BROWN. Regarding item 3, would you explain what it means to pool or aggregate the market for housing, including both the demand for housing and the available land for such housing? I do not know what you are saying.

Mr. FINGER. As it is done now, each local housing authority or sponsor goes out to make a contract on purchase of a housing type. If there is a benefit to the high-volume production, and we believe that there will be in both cost and quality and so on, then if a sponsor is to try to get the benefits of high volume, he would then be able to order only one type of housing.

However, if several sponsors get together and order, or several cities get together and order, or a State gets together and determines that it will order in volume, it can order a wide variety of housing types and each unit of that pooled order can then get the full variety. If it is a city, each city can get the full variety within the area in which it needs housing.

Now, it is not enough simply to have a need for housing or a demand for housing. You have to have land on which to place that housing. That becomes, as Mr. Biederman indicated, one of the major obstacles that we have, finding land where housing is needed and finding it at a cost that is reasonable, that does not drive the house out of market range. So we need both the land and available land identified in order to place orders.

But in order to get the real benefits of volume production, you have to have a continuing high-level ordering process.

Representative BROWN. Is it your suggestion that this all be done by the Government, or that it be done by private industry on a—

Mr. FINGER. I think there are several approaches to this. One is that the project developers themselves and sponsors, we believe, should work together to try to place their orders together and to identify the land that they have together, to put a hold on it so that it is available for housing. We are also asking local authorities and the State and local authorities to assist in this process, to encourage it, to provide what staff assistance is appropriate, to coordinate it and try

to order as a total market. We will provide whatever assistance we can, including providing grants for additional staff support to take care of this as part of the comprehensive planning program that we have. So we are trying to provide a mechanism of pooling these orders so that industry does have an incentive to try to pull together its total capability and provide the investment in facilities and plant in order to be able to change the approaches which we now need to provide for the volume needs we have over the next several decades.

Representative BROWN. One of the things you have touched on is the jumble of zoning restrictions. How do you intend to attack the problems? Would you suggest requiring federalizing of the zoning regulations around the country?

Mr. FINGER. I do not think we can do that.

Representative BROWN. What is the approach? Is that not the proposal that Mr. Biederman made?

Mr. BIEDERMAN. In the same sense as the proposal made relative to building codes. That is to establish national standards of environment by a national institute and these standards would be made available to State and municipalities. The standard should be geared and developed by experts within the States and within the municipalities, not handed down from Washington.

Representative BROWN. In other words, are you suggesting that if a community is to get a Federal grant for certain community purposes, it must provide within that community zoning appropriate to meet the housing needs of the community; that is, zoning where housing can be put in at a reasonable price?

Mr. BIEDERMAN. Yes.

Representative BROWN. Let me go back and ask a question about your testimony, Mr. Finger. You talk about the fact that industrialized housing was pioneered in France and yet that the rate of use of industrialized housing is still quite low by comparison with some other communities. Do you have any suggestion or some observation, you or Mr. Biederman, on your experience?

Mr. FINGER. My impression from what I have heard of it is that the availability of the industrialized housing concept did put a competitive pressure on the existing industry to try to improve the methods they apply. It did, therefore, have an effect in developing some greater competition than would otherwise have been the case. It did force some improvement.

Representative BROWN. Can you correlate that with the relative freedom of the society, and are you suggesting that in a freer society the implementation of industrialized housing and the competition of industrialized housing will drive down the costs of custom housing?

Mr. FINGER. I think it will have an effect on the traditional methods of building, so there will be improved management, improved scheduling methods, that will help in those areas as well. Yes, I am saying that I think there will be a beneficial effect result.

Representative BROWN. So that should we get the result of unesthetic industrialized housing, at least we will encourage the possibility of more esthetically appealing custom housing, will we not?

Mr. FINGER. Yes. I am very confident that we will not get unesthetic industrialized housing and should really work to assure that we do not.

Representative BROWN. Hearing what the gentleman from Illinois said about public housing, I am not as confident as you are.

Mr. FINGER. I think this will be largely privately financed, so maybe we can help in that case.

Mr. BIEDERMAN. I would like to stress again that we should not necessarily associate monotony or bad design with industrialized housing. We have put up an awful lot of public housing in this country that was not industrialized that was monotonous and ugly. There is no correlation necessarily between industrialized housing and unattractiveness.

Mr. FINGER. In fact, Congressman Brown, one of the points I was making here was that we can go through significant areas of our country where there are major housing developments, conventionally built, where there is essentially no variation from house to house as we go down the street. You really almost can't tell which is a two bedroom, which is a three or four, the porch line, the lines, everything is the same. They go one step further in lining them up along the street so there is also no variation in the way they use the land. I would say that is sort of monotonous and it is not industrialized.

Representative BROWN. Maybe it is just an inborn bias. I have seen much monotonous private housing, present company excluded, of course. But I have also seen much terribly monotonous public housing, and it seems that when the dead hand of Government takes on esthetic design, again even when money is no object, buildings are not always as attractive as they might be.

Let me move on to another point, and not belabor esthetics. Let us hope your assurance is correct and certainly, every effort ought to be made to assure that it is.

In your testimony, you say "In Europe as in the United States building industry in general, the homebuilding industry in particular, has borne the brunt of recessions. This has caused cautious investment in capital-intensive equipment and plants, and has led to the alternative course of rationalizing traditional construction, preserving the existing industry structure while making use of cost and time-saving techniques."

If we go into industrialized housing, what do you think the economic impact of recession might be on industrialized housing as opposed to the economic impact of a recession on the housing industry as it is now, where smaller units can drift in and out of it sort of at will?

I think that is a fundamental question and I wish we had more time. I am sorry to bring it up at the last part of the session this morning. But it is a significant concern, I would think.

Mr. FINGER. My feeling is that there is less of a chance of getting a recession, that there is a potentially significant—

Representative BROWN. Are you talking about a recession in the building industry?

Mr. FINGER. No; I am thinking more broadly now, really. I am really saying that there is an effect on our economy of the fact that today, we cannot provide for our housing needs and, as a result, the shelter component of our cost-of-living index rises more rapidly than any other component in our cost-of-living index. Over the past year, it rose about 10 or 11 percent—higher than any other element. Part of the reason for that, we believe, is that there is such a large deficit in housing today.

And if we could find ways of beginning to satisfy that need we should relieve some of the inflationary pressure and develop a greater stability to our economy.

So I guess I start with the feeling that anything that we can do that really does help to satisfy this great demand that exists for housing and that will undoubtedly exist into the indefinite future because of the rapid rise we see in our population, it seems to me that this industry will be kept busy and that its ability to satisfy that need will help to stabilize the economy. So I think there should be a better overall economic situation in the country.

Now, if there should be a recession, then I think the point you make is well taken. The impact on a single organization might be greater than it is now on any single organization. That is, the accumulated impact.

I do not really know how to answer that question fully.

Representative BROWN. I will let your answer stand. I think I would enjoy challenging it from an economic standpoint.

Mr. FINGER. I might add, I would want to call in some reinforcements that were really better versed in finance than I am.

Chairman BOLING. Perhaps you would like to have the agency submit a paper on this. It is a very interesting question.

Representative BROWN. I think it might be helpful.

(The table below was subsequently submitted:)

OCCUPIED HOUSING UNITS, TOTAL AND SUBSTANDARD, BY TENURE, 1940-66

	1940		1950		1960		1966	
	Number	Per- cent	Number	Per- cent	Number	Per- cent	Number	Per- cent
All occupied units.....	27,747,973		35,933,525		53,023,875		58,192,000	
Substandard occupied units..	9,767,991	35.20	10,261,735	28.55	8,473,695	15.98	5,718,000	9.84
Owner-occupied units.....	11,413,036		19,014,765		32,796,720		(1)	(1)
Substandard.....	3,431,407	30.06	4,368,250	22.97	3,729,568	11.37		
Tenant-occupied units.....	16,334,937		16,918,760		20,227,155		(1)	(1)
Substandard.....	6,336,584	38.79	5,893,485	34.83	7,744,187	23.45		

¹ Not available.

Note: Sources from the 1940, 1950, and 1960 censuses of the United States; 1966 data from Bureau of Census/Bureau of Labor Statistics publication entitled "Social and Economic Conditions of Negroes in the United States," BLS Report No. 332, Current Population Report, series P-23, No. 24, October 1967. For 1940, substandard is defined as units reported to be in need of major repairs or lacking adequate sanitary facilities. For 1950, 1960, and 1966 substandard is defined as units reported as dilapidated or lacking adequate sanitary facilities.

Representative BROWN. Mr. Biederman, if you have any comment, please make it in written form, because it is a significant part of this consideration. I am not sure that I am in complete agreement with you, Mr. Finger, on the fact of which comes first, the chicken or the egg. I think that certainly the activity in the housing field and building, has a significant impact upon the economy. Whether it is significant enough to maintain the economy if we cure the problems through industrialized housing is something that I am not sure that I—

Mr. FINGER. That alone would not insure stability, but it would contribute to it.

Representative BROWN. I am sure it would contribute to it. But assuming that we have a recession in spite of that, then what happens to the fact that you have this heavy investment in industrialized

housing and perhaps a complete dissolution of the demand that sustains it?

The same thing happens in the automobile industry. You can argue that the automobile industry helps maintain the economy, but when the economy goes, then we have real problems in the automobile industry.

I gather, Mr. Biederman, if I may finish up quickly on two or three other things, in reference to your specific proposal, that in the seventh proposal you are suggesting that we move in this country into a forced investment in housing through the vehicle of requiring segments of the private economy to invest in housing.

Mr. BIEDERMAN. Very definitely.

Representative BROWN. Why those specific segments? Why not others?

Mr. BIEDERMAN. Well, I have indicated here financial institutions. The intent of the statement was that any source that has funds that are being used for investment should be used, as least some percentage should be used, for real estate investment, real estate mortgages. I am not limiting it to pension funds—or any financial institution that is in an investment position.

Representative BROWN. What would you base the Federal Government's right to require that on? The licensing of the financial institution or—

Mr. BIEDERMAN. Well, right now, the Federal Government indicates that—excuse me. The States indicate that a savings and loan may not invest more than a certain percentage. The State governments indicate that credit unions are not allowed to invest more than a certain percentage of their funds in real estate. I am turning it around and saying the State government or the Federal Government, through the vehicle of the States, should require a minimum percentage that is higher than the maximum is now.

Representative BROWN. I think the turning around makes a significant difference in the right of the Federal Government to require versus its right to prohibit.

Chairman BOLLING. Of course, it could prohibit all the others and all that was left go to real estate, which is a technique often used.

Representative BROWN. I see. It occurs to me that a real problem in law exists in making that requirement. And it seems to me a pretty sharp departure from our traditional concepts of what we can do in this area of forcing investment. That is not to say that we may not come to that some day. We have come to a lot of things that once seemed to have a questionable base in law. But it strikes me as a rather unusual recommendation.

Mr. BIEDERMAN. My feeling is that unless we do some pretty unusual things, we are not going to meet our housing needs.

Representative BROWN. I would like to ask this question. How did we meet our housing needs before the Federal Government got into business?

Mr. BIEDERMAN. We have not met our housing needs.

Representative BROWN. How did we meet them years ago when we were beginning to develop a need? There must be some answer to that question. If we did not meet them, where did people live?

Mr. FINGER. What we actually had, Mr. Brown, and still have, are people living in substandard conditions and conditions that we now believe are just not suitable for people. That is why a good bit of what we have to take care of is replacement of stock that is in use that really should not be in use. I think that accounts for a particular part of it.

Representative BROWN. I realize you are not a history major, Mr. Biederman, because you mentioned that. When we go back to the beginning of the country, I realize that the Pilgrims in Massachusetts were probably living in substandard housing. Have we always been behind, or did we catch up some place along the line, and for some economic reason, slip behind again?

Mr. FINGER. We did produce a large number of housing units right after the war when there was a great need and private industry did go to work. It was during that period that the Lustron experience was developed and that was with Federal encouragement, actually. But even then, there were still substandard units available, crowded conditions. Those were not really taken care of even in that period.

I might add that the maximum production we have ever had was 2 million housing units in 1950, right in that period. We are now talking about going to 3½ million housing units by 1978. So there is almost a doubling over the maximum we have had. We have only been producing at the rate of a little under 1½ million over the past 10 years. So we have really been creating a deficit in this period and we have not taken care of the substandard units.

There are people who are prepared to buy housing who have funds and can't find what they want.

Mr. BIEDERMAN. If we address ourselves to how we have fallen behind or why we have fallen behind, I think the population increases in the last 50 years, certainly just in the last 10 years, have been far more dramatic than previous population increases. That has contributed to the deficit.

Representative BROWN. One of the other things you have mentioned, and one of the things which we have not really gotten resolved by the method suggested and which I think this particular committee ought to give more attention to, is the question of interest rates and what has happened to costs.

The question I am asking, and that I wish I had more time to explore, is whether we had in the history of our country a broader spread between the cost of building a house and the low income average or the average of what we call low-income people in terms of their capacity to pay? Has the spread been narrower, has it been greater? What has caused this sudden disjointing of the cost of housing from the capacity of people to purchase housing? When you talk about somebody being able to pay for a house twice their annual income, if you assume that the poverty level is \$3,000 a year annual income, two times that is \$6,000 and you cannot build a house for that. Has that always been true? In other words, has our "poverty level" always been such that you cannot afford housing? I wonder if that is the case.

Or perhaps the case is that the Federal Government has contributed a lot to this whole problem by inflation, which has jacked the interest rate right through the roof, a situation that has occurred before in our history. I think we could correlate it to what occurred in the 1920's and 1930's as to the cost of housing relative to the income of the poor, however you identify that segment of the economy. Maybe we ought to look at some of the contributions to the problem—to the problem, not to the solution—that are being made and have been made in the last 10 or 15 years by the Federal Government and cure some of those approaches of the Federal Government to this problem. In other words, if we did not have such a rapid rate of inflation, perhaps we could meet our housing needs through the exercise of private sectors of the economy.

I would like to go on from that point and ask whether the subsidization of interest rates or the subsidization of housing or even the subsidization of this new concept of construction is a contributing factor to the problem or to the solution? Are we contributing more to the problem than we are to the solution by doing this at this time?

Mr. BIEDERMAN. First we have to understand what is the problem. If we accept—

Representative BROWN. I think we know what the problem is.

Mr. BIEDERMAN. If we accept that the problem is not sufficient numbers of housing to house our people decently, then we have to attack that. Now, there are very few problems that I am aware of that you can attack without creating other problems during the course of the attack. But if, primarily, we want to provide decent housing for Americans, then we must address ourselves to that. Certainly, by subsidizing industrialized housing systems, we are going to be jacking up the price of materials, or by subsidizing industrial housing systems so that there will be more housing systems developed and, therefore, a greater demand on materials, and, therefore, an increased requirement for lumber, for example, then the price of lumber is going to increase, and therefore, contribute to inflation. There is no question that we are going to be developing ancillary problems in addressing ourselves to the prime problem of providing housing.

Representative BROWN. I learned when I was in college and taking economics—of course, it has changed so much that it is a little difficult to know what is true and more—that when the volume increases, the price usually comes down. I do not think that is the problem. The problem is what has been done to the money market by inflation and how the money market affects the housing market. Obviously, it does affect that market, because you mentioned earlier one of the big problems we have is the interest rate. How you attack the interest rates short of the Government acting like they do not exist and subsidizing them, I do not know. It seems perhaps we ought to attack more broadly by curing the interest rates and helping the housing situation in turn.

Mr. FINGER. May I go back to one of the earlier points you made? There are data to indicate that the number of substandard units has been decreasing with time. In other words, we are chewing into part of that problem.

Representative BROWN. Going back how far?

Mr. FINGER. I think it is down in half over some significant period. I can get that information for you. So there has been some real progress in trying to get rid of that problem. But there is no question that there were millions of substandard units that were being used in years past and the number has been coming down, so there has been some progress along those lines.

In regard to the interest situation, I think that does hurt us. If the interest rates weren't as high, there would be additional funds available in the mortgage market, since investors presently place funds in other sources with higher returns. So it clearly would help us.

As far as the subsidies and supplements go, we find tremendous numbers of applications on the books waiting for the additional appropriation that is now just about to come through in our fiscal year 1969 supplemental, waiting for that funding before they start housing development. All of the past funds, the \$25 million we have had in section 236 and in section 235, were allocated some months back and there are many builders who are concerned about the ability to maintain their capability to build in the price range that we need without those subsidies. They have not been able to start anything. They are concerned about maintaining their manpower, their labor force, their suppliers, and so on.

Representative BROWN. I would just like to suggest to you, Mr. Finger, that at some place in the studies you are doing in this whole area, you relate an average income of Americans—and I do not know, maybe you can only go back to 1913 in the way of Federal statistics in this area because of the income tax—and the cost of building an average home, and then throw into that curve some figures on the interest rates.

We are doing some wonderful things with computers. Maybe if you put some of those figures through computers, we will learn something about the impact of the economy generally on the housing market, and that might give us some advice as to what direction we ought to take in this. I think the directions you point out in spite of my somewhat vigorous comment about several of the specific recommendations, are very encouraging and ought to be given some thought. They are very beneficial in that regard. But you seem to be overlooking or ignoring some of the other obvious parts of the problem that maybe these answers, rather than helping to cure, are continuing to stimulate.

Mr. FINGER. I am sure these data are available and we will pull them together.

(The following table was later supplied :)

HOUSING STARTS, UNIT COSTS, AND INTEREST RATES, 1913-69

Year	Number of privately owned starts	Average construction cost per unit	Number of privately owned starts in 1-unit structures	Average construction cost per 1-unit structure	Average interest rates (in percent), all types of property, for—		Average yield on single-family home mortgages insured by FHA (in percent) ¹
					Manhattan	St. Louis	
1913	421,000	\$2,625	264,000	(?)	5.50	5.89	(?)
1914	421,000	2,575	263,000	(?)	5.58	5.90	(?)
1915	433,000	2,750	262,000	(?)	5.60	5.92	(?)
1916	437,000	2,875	267,000	(?)	5.50	5.90	(?)
1917	240,000	3,200	166,000	(?)	5.47	5.86	(?)
1918	118,000	3,325	91,000	(?)	5.55	5.90	(?)
1919	315,000	4,000	239,000	(?)	5.65	5.97	(?)
1920	247,000	4,325	202,000	(?)	5.75	6.00	(?)
1921	449,000	3,959	316,000	(?)	5.97	6.18	(?)
1922	716,000	4,125	437,000	(?)	5.95	6.09	(?)
1923	871,000	4,325	513,000	(?)	5.91	6.03	(?)
1924	893,000	4,550	534,000	(?)	5.92	6.03	(?)
1925	938,000	4,775	573,000	(?)	5.90	6.02	(?)
1926	849,000	4,850	491,000	(?)	5.89	6.02	(?)
1927	810,000	4,825	454,000	(?)	5.88	6.02	(?)
1928	753,000	4,800	436,000	(?)	5.85	6.00	(?)
1929	509,000	4,825	316,000	(?)	5.92	6.03	(?)
1930	330,000	4,525	227,000	(?)	5.95	6.04	(?)
1931	254,000	4,350	187,000	(?)	5.75	6.03	(?)
1932	134,000	3,050	118,000	(?)	5.77	6.02	(?)
1933	93,000	3,075	76,000	(?)	5.60	6.00	(?)
1934	126,000	2,925	109,000	(?)	5.45	5.78	(?)
1935	216,000	3,400	182,000	(?)	5.26	5.78	(?)
1936	304,000	3,925	238,000	(?)	5.09	5.75	(?)
1937	332,000	4,100	266,000	(?)	5.11	5.70	(?)
1938	399,000	3,900	316,000	(?)	5.00	5.50	(?)
1939	458,000	3,850	373,000	(?)	5.05	5.46	(?)
1940	530,000	3,925	448,000	\$4,075	5.03	5.29	(?)
1941	620,000	4,075	533,000	4,250	4.90	5.16	(?)
1942	301,000	3,775	252,000	3,900	4.98	5.15	(?)
1943	184,000	3,600	136,000	3,675	4.77	5.21	(?)
1944	139,000	3,475	115,000	3,450	4.71	5.16	(?)
1945	325,000	4,625	(?)	(?)	4.70	5.15	(?)
1946	1,015,000	5,600	(?)	(?)	4.74	5.00	(?)
1947	1,265,000	6,650	(?)	(?)	4.80	5.01	(?)
1948	1,344,000	7,700	(?)	(?)	4.91	5.13	4.31
1949	1,430,900	7,450	(?)	(?)	4.93	5.01	4.35
1950	1,908,000	8,450	(?)	(?)	4.95	4.96	4.09
1951	1,420,000	9,000	(?)	(?)	4.93	5.05	4.31
1952	1,446,000	9,075	(?)	(?)	5.00	5.26	4.30
1953	1,402,000	9,525	(?)	(?)	5.07	5.28	4.74
1954	1,432,000	10,250	(?)	(?)	(?)	(?)	4.56
1955	1,627,000	10,950	(?)	(?)	5.21	5.16	4.64
1956	1,325,900	11,725	(?)	(?)	(?)	(?)	4.81
1957	1,175,000	12,225	(?)	(?)	5.46	5.57	5.38
1958	1,314,000	11,975	(?)	(?)	5.57	5.65	5.35
1959	1,495,000	12,400	1,212,000	13,245	5.67	5.64	5.75
1960	1,230,000	12,675	973,000	13,800	5.75	5.81	6.19
1961	1,285,000	12,550	946,900	13,875	5.88	5.95	5.72
1962	1,439,000	12,550	968,000	14,325	5.91	5.84	5.59
1963	1,582,000	12,625	993,000	14,875	5.88	5.76	5.45
1964	1,502,900	13,100	944,000	15,550	5.86	5.69	5.45
1965	1,451,000	13,650	941,000	16,250	5.87	5.74	5.44
1966	1,142,000	14,250	755,000	16,875	5.94	5.97	6.45
1967	1,268,900	14,500	821,000	17,475	5.94	6.30	6.44
1968	1,484,900	15,025	875,000	18,675	(?)	(?)	7.52
1969	(?)	(?)	(?)	(?)	(?)	(?)	8.35

¹ Gross yield to investors, without allowance for servicing costs, based on prepayment of the mortgage at the end of 15 years.

² Not available.

Sources: Starts and construction costs from U.S. Department of Commerce, Bureau of the Census. Average interest rates for Manhattan and St. Louis from Real Estate Analyst, published by Roy Wenzlick Research Corp., St. Louis, Mo., various issues. Single family mortgages insured by FHA under sec. 203 from FHA, Division of Research and Statistics; rate given is for July 1.

Chairman BOLLING. Gentlemen, we thank you for your contribution. I would like to assure Mr. Brown that when I chair a subcommittee, there is no terminal facility at all. We continue until the witnesses rise and say they have to take a plane. This line of questioning, I think, is very useful. That is actually the reason this subcommittee exists, to get away from the standard-brand approach to the problem of urban affairs, which I do not even believe is an adequate title. I think they are national problems, not simply "urban."

We started out the processes of this subcommittee 2 years ago by bringing in an anthropologist to discuss his ideas, which we knew about, as to differences in use of space and the difference in the way people of different cultures communicate with each other. I cite that only as an illustration of the kind of approach that I am personally interested in. I left the House Banking Committee in 1955 on purpose, because I thought it was headed down a blind alley of specialization in the approach to urban problems. Far from fearing that the answer lies in the vast increase of the amount of public housing, I am convinced that the answer lies in a much more complicated, subtle, and interesting kind of approach to the problem of housing which I do not think we have even come close to approaching yet. I am sure that you, as well as I and others, will be watching with interest this umpteenth in the finely titled Operation Breakthrough that you have seen in the time I have been here. I am hopeful that this one will succeed, because I think—as I know the gentleman from Ohio does—that, solving the problem is a good deal more important than whose Presidential administration solves it.

So we are grateful to you both. I think that the gentleman from Ohio can take reassurance from the fact that I had something to do with who the two witnesses are. One comes from this administration and one comes from the private sector.

This subcommittee will stand recessed until Wednesday, July 23, when our witness will be Ezra Ehrenkrantz, president, Buildings Systems Development, Inc., and associate professor of architecture, University of California, Berkeley, and Peter Terzick, general treasurer, United Brotherhood of Carpenters, AFL-CIO.

We will meet at 10 a.m. in the auditorium of the New Senate Office Building, room G-308.

(Whereupon, at 12:30 p.m. the subcommittee recessed to reconvene at 10 a.m. Wednesday, July 23, 1969.)

(The publications referred to on pp. 4 and 19 follow.)



U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Breakthrough

MAY 1969

This preliminary presentation is the result of several months of discussion and consideration of housing needs and constraints. The program evolved from meetings with many interested groups and incorporates the ideas and work of many people. Although the program as presented is meant to be as complete as possible, it is intended that it will be further refined and expanded in the course of planned meetings with Governors, Mayors, state and local housing agencies, labor, consumer groups, potential developers and producers.

BREAKTHROUGH . . .

A new program to provide housing for all income levels through a partnership of labor, consumers, private enterprise, local State, and Federal Government -- with the use of modern techniques of production, marketing and management.

BREAKTHROUGH

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". . . With strong local leadership, with earnest and continuing federal cooperation, with a recognition that we have only begun to tap the enormous energies of private enterprise in meeting public problems, we can have a rebirth and renewal of America's cities. We can restore them as safe and pleasant places to live, and as what they should be -- places that lift the spirit and cap the glory of our civilization . . ."

Richard Nixon
August 1, 1968

"The job of organizing for this kind of housing breakthrough is the most complex job I've ever undertaken . . . It is even more complex than our Nation's space program -- because our housing program, to succeed, must marshal not only our most advanced and ingenious technology, but so many diverse elements: governments at every level, private industry and business large and small, labor unions, financial institutions, voluntary organizations, and the ambition and personal initiative of every citizen."

George Romney
March 11, 1969

"We must put housing on the front burner. We must focus our housing programs on housing for poor people. We believe in giving local authorities the tools and the money to get the job done. The States must have an expanded role, especially in getting sites, providing for low-income housing, and in breaking down the barriers of codes and zoning. We need simpler programs, a speed-up in processing, and more initiative from Federal agencies. We seek the utmost cooperation from builders, developers, and private industry."

National Commission on
Urban Problems (Douglas
Commission)
March 1969

"Private enterprise can best provide the muscle, the talent and the major effort -- when there are opportunities to earn reasonable profits and to function at maximum efficiency."

"Private enterprise has demonstrated it can build subsidized housing with speed, efficiency and economies. It must participate fully, along with non-profit sponsors and eligible public agencies, in the development of such housing."

The President's Committee
on Urban Housing
(Kaiser Committee)

THE PROBLEM

The national housing goal of "a decent home and a suitable living environment for every American family" is an accurate statement of this country's needs. But the facts are that today there are still 20 million Americans living in substandard housing.

New family formations and demolition of existing housing generate a need for 2,100,000 units per year, but last year we were able to produce only 1,548,000 units.

Congress has stated that to overcome this situation and to meet our expanding housing needs we will have to construct 26,000,000 units in the next ten years. But, at present rates of production we will fall more than 10 million units short of our housing needs.

Several factors contribute to the present inability to meet this goal:

- Limited availability and high cost of land, labor, money and materials.
- Obsolete housing and building codes.
- Zoning and restrictive land use patterns.
- HUD processing delays.
- Patterns of discrimination.
- Housing production capability.

Nevertheless, in the face of these constraints, housing represents the largest undeveloped market today. Filling this market could have as great an impact as the development of the railroads in the last century or the growth of the electronics industry in this century.

BREAKTHROUGH is aimed at developing an approach to meet the nation's housing needs. If we can mobilize our resources effectively, we have the capability to increase production of housing and control its cost.

To utilize this capability effectively, we must create a working partnership of Federal, State and local governments, labor, industry, the financial community, homebuilders and consumers.

Building this partnership to achieve a housing breakthrough is the objective of what we have called Operation BREAKTHROUGH.

THE PROGRAMMarket Aggregation and Economies of Scale

If the nation -- HUD, the States, the cities, lenders, industry, and labor -- is to provide the volume of housing urgently needed in the years ahead, a new scale of operations is needed. Producing a few hundred units or less, under separate development programs, will not suffice.

The housing industry has not been able to reach the efficiencies required to satisfy national housing needs, particularly in the lower-income end of the market. In order to reach our housing goals, producers must be encouraged in their efforts to obtain greater efficiency in design, production, transfer and operation of housing units. We must attain the entrepreneurial efficiencies in business organization, financing, and management made possible by larger scale operations.

Achieving greater efficiency and output does not mean mass production of large numbers of identical units, or units which differ markedly from those which are produced under conventional methods. Neither does it mean large-scale, high-density housing projects. Nor does it mean the domination of the field by a handful of large producers.

To introduce efficiency in housing production on a large scale will require the assembly of substantial local, regional, and perhaps national markets. With larger markets, producers can realize economies of scale not now available, they can recover the large investment in research and development and plant and equipment necessary to engage in a sizeable scale of operations.

Efficient methods of producing housing appear to have been stimulated in Europe by the sizeable markets provided for them. In England, by pooling local markets the organization of consortia of local public housing authorities resulted in new and rationalized building methods.

In this country, industry responded to a \$25 million market -- created by the pooling of twenty-two schools scheduled for construction in thirteen school districts in California -- by spending millions of dollars to develop building systems.

These examples and others are indications that once a market is assembled, builders and industry can be stimulated to supply it. This is our objective in the United States -- to make housing market assembly work on a broad scale.

Market Aggregation

State and local governments, with support from HUD, will be asked to undertake market aggregation which identifies available land, sponsors and demand for housing. Industry, labor and consumer groups will supplement this market information to the fullest extent possible. HUD will compile the resulting data and make it generally available.

The process of market aggregation involves a number of steps, described in greater detail in a later section of this discussion. It involves two basic steps:

- (1) Identification of land available for the construction of housing for low- and moderate-income families.
- (2) Identification of sponsors (local housing authorities, local public agencies, "turnkey" developers, non-profit organizations and limited dividend corporations eligible for participation in HUD-subsidized programs, for example), who may be willing to pool construction programs for a specified number of units on specified sites over a specified period of time.

One possible way of organizing a market is to form a consortium or a number of consortia of sponsors willing to commit land and a number of units in cities where a commitment to remove code barriers has been given. These groups would agree among themselves to common specifications and price for the housing units which they committed to the pooled market. They would agree upon common components, materials, equipment and other elements of construction but would retain full local authority to determine their own preferred site designs. If a contract were negotiated, they would agree upon the contractor. Thus, the participating sponsors would be making the decisions on the housing, but they would be making these decisions as a group rather than singly.

The assembled market would have to be sufficient in size to justify substantial investments by producers to meet it.

Housing Systems Development

Concurrent with the market aggregation, HUD will issue a call for the preparation of proposals from firms and consortia of firms with a capacity for developing high volume, rapid delivery housing systems of improved environmental quality at costs that will bring them within the reach of all families. It is expected that those interested in responding will represent a combination of the social, economic, technical and production talents necessary to execute the proposal requirements.

Since many of the materials and procedures suggested for implementing the program's goals may either be used in a new way or be new to the housing industry, HUD will assist and encourage development of testing procedures and identification of appropriate standards to provide a basis for evaluation of these innovations.

After the proposals have been evaluated, design and development contracts will be awarded to those submitting the best and most promising proposals. Some of these systems may be almost fully developed and need only minor system and design modifications before qualifying for prototype construction contract awards.

Other systems exist as concepts and will require a substantial amount of development and test effort in order to qualify for consideration as prototypes. Both types of proposals will be considered for contract awards.

The contract for prototype design and development will contain an option clause permitting the Department to review, revise and, if necessary, eliminate those systems found inadequate.

Prototypes will be constructed on sites selected by HUD. These prototypes are to serve as test and consumer acceptance models. Prototype sites will be distributed geographically to provide a range in climate and other conditions. Completed prototype components, units and systems will be tested in accord with recommended standards to assure their safety and durability.

Evaluation

Assessment of the prototypes by State and local governmental units and consumer groups will include matching selected prototype systems to the developed and identified local markets. Production contracts for housing to satisfy these markets will be concluded between the systems contractor and appropriate public or private local sponsors.

These contracts may include, at the option of the parties, the management of the completed housing projects. A substantial need for such management exists, and one of the program's aims is to generate new capabilities in this area.

This project is not a "one shot" effort. If it is to be successful it must be a continuing activity, designed to develop a more effective housing industry. To achieve this objective, BREAKTHROUGH will have the long-term support of the Department of Housing and Urban Development.

HUD Commitments

To encourage widespread initial participation and to ensure long-term continuation of the program, HUD is prepared to make the following commitments:

1. Establish a full-time program management staff within the Department, including both regional and national personnel, to assure responsiveness by HUD to the needs of the program.
2. Provide advice and assistance to state and local officials, as required, for local market aggregation.
3. Fund prototype design and development through direct contracts.
4. Fund or provide financial assistance for the construction of housing prototypes and provide program grants for related environmental facilities.

5. Support the establishment of a comprehensive program to test innovations in BREAKTHROUGH prototypes.
6. Support the continuing efforts of national, state and local authorities in reviewing and improving standards, codes and regulations affecting the development and production of housing.
7. Earmark housing and environmental system program funds to support BREAKTHROUGH construction.
8. Provide priority and coordinated processing of applications for financial and program support -- cut red tape.
9. Provide assistance to state and local governments and to the financial community in developing additional sources of permanent financing.

BREAKTHROUGH FOR THE STATES

This is the first national housing program in which the States will play a major role from its inception. It enables Governors' offices to make a significant contribution by:

- Spearheading a program which will meet the need for increased housing production.
- Involving State government in determining the quantity and location of new housing.
- Expanding and utilizing state planning programs.
- Attracting new industry.
- Increasing tax revenues generated by an expanded housing industry and related economic development.
- Developing an additional basis for partnership between State and local governments and the private sector.
- Identifying State government with innovation and progress.

HUD looks to State government to:

- Involve State leadership

Encourage legislative leaders, State government officials, citizens, industry and labor groups to participate in program planning and development. During the preliminary planning process, the Governor should:

- Appoint a liaison officer to coordinate information, staff and materials, and work with HUD.
- Designate a State agency or department responsible for implementing the program.

- Review and propose necessary changes to legislative and administrative regulations affecting the program.

- Inventory and Mobilize Resources

As a first step in market aggregation, it will be necessary to identify and utilize existing sources of information. These may include:

- Housing market data compiled by HUD.
- State, Regional and Local Agencies:
 - State Housing, Planning and Community Development Agencies, Regional Planning Bodies and Councils of Governments, Local Public Housing and Redevelopment Authorities.
- Products of State, Regional and Local planning activities, including those already funded by HUD:
 - State and Regional Comprehensive Plans, Community Renewal Plans, Workable Programs, and others.

- Begin Market Aggregation

The "market aggregation" effort is conceived as having the following elements:

- Development of an inventory of housing needs, by quantity, type of housing, location within the specific city or state, and particular population characteristics, such as family size.
- Identification of specific sites which can be made available for housing, encouragement of private sponsor groups to obtain title, instituting urban renewal plans or other activities.
- Investigation and classification of site characteristics, as these might affect housing design.

- Classification of sites on a locality-wide, regional or state-wide basis to permit a better understanding of the total market potential.
- Develop requirements for housing for the specific sites, in terms of density, unit size and demographic characteristics. It is expected that local community groups will assist the appropriate governmental units in developing this information.
- Initiate and expedite review of codes, zoning and administrative regulations to provide for waivers which will permit the use of proposed innovative systems.
- Develop, or encourage development of, local and regional financing sources which can provide seed money and investment capital for full-scale housing production, or permanent mortgage financing.

These governmental efforts, supported by community and neighborhood activities, are expected to result in an aggregated market which will provide a basis for local marketing, in quantity, of housing systems developed by private enterprise under this program.

BREAKTHROUGH FOR CITIES

BREAKTHROUGH provides the city a greater opportunity to take initiative in solving its own problems. It affords:

- Priority consideration for subsidized BREAKTHROUGH housing and supportive programs in urban renewal, planning, water and sewer, and community facilities.
- The opportunity to relieve urban congestion and resulting urban tensions.
- The opportunity to increase the supply of housing for low- and moderate-income families in urban renewal, neighborhood development and Model Cities areas in accordance with 1968 Housing Act requirements.
- An increased housing inventory subject to property taxes.
- The opportunity to use and implement the results of city planning programs.
- Increased markets to attract new industry and supporting businesses.
- New employment opportunities.
- A meaningful working partnership with State government and the private sector.

HUD is depending upon mayors and public and private local agencies to:

- Participate in the market aggregation process described in the previous section.
- Evaluate HUD market data on the area and supplement it with information and materials from local organizations such as the Housing Authority, Redevelopment Agency, Zoning Board, Board of Realtors, Chamber of Commerce and others.
- Review and revise local ordinances, codes and regulations which impede the application of new and tested housing systems and methods.

BREAKTHROUGH FOR INDUSTRY

BREAKTHROUGH is designed to assist industry by:

- Consolidating fragmented markets into identified markets large enough to justify volume production.
- Cutting HUD red tape.
- Stimulating new cooperation with local units of government.
- Facilitating use of innovative systems and techniques.
- Providing financial support for research and development activity.
- Providing opportunities for new methods of construction financing.
- Easing restrictive zoning and building codes.

HUD is relying upon industry to respond to the opportunities created by new aggregated markets through:

- Developing innovative building systems consistent with the need for quality design, safety, durability and consumer acceptance.
- Developing innovative proposals for site preparation and land development.
- Applying modern management techniques in the development and implementation of proposals.

BREAKTHROUGH FOR LABOR

BREAKTHROUGH provides the opportunity for labor to contribute to the housing needs of the low- and moderate-income groups which it has long championed. Because of the ever widening gap between current housing production and need, BREAKTHROUGH will not reduce the need for conventionally built housing. The program is designed to stimulate fuller employment and expand the labor market by:

- Creating more and better jobs:
- Providing continuity of employment by eliminating the "stop and go" nature of construction work.
- Expanding job opportunities in related industries created by new construction activity.

BREAKTHROUGH looks to labor to play its full part in meeting the nation's housing needs by:

- Providing guidance in establishing wage patterns, working conditions and job classifications.
- Consulting in drafting appropriate building codes.
- Participating in evaluating housing prototypes.
- Developing and participating in extensive manpower training programs.
- Encouraging adoption of fully tested and evaluated new building techniques.

BREAKTHROUGH FOR CONSUMER AND INTEREST GROUPS

To insure that the needs of consumers and interest groups are understood and incorporated into the program, representatives of the groups will be asked to make a continuing contribution to program design and implementation. Program features of particular interest to consumer groups include:

- Design and site planning incorporating consumer requirements.
- Cost savings stimulated by increased industry competition.
- Better quality homes which more people can afford.
- A broad choice of attractive models and housing environments.
- A wide inventory of family-sized units.
- New employment opportunities demanding varying skills.
- Opportunities for local subcontractors and small businesses.

HUD is requesting concerned citizens and organizations to:

- Identify consumer needs and desires and provide counsel on how they can be incorporated in prototypes.
- Participate in local program development activities.
- Encourage the development of new sources of labor and participation in manpower training programs.
- Participate in evaluating prototypes.
- Encourage potential sponsors to contribute to the program.
- Stimulate progressive community participation.

APPENDIX A

HUD has available many programs which would be used in support of the BREAKTHROUGH approach, these include:

A. Planning Assistance Programs

Comprehensive Urban Planning (Section 701)

Model Cities

New Communities (Title IV)

Community Renewal Program

B. Financial Assistance Programs

Interest Subsidies on Home Mortgages (Section 235)

Interest Subsidies on Rental and Cooperative Housing Mortgages (Section 236)

Rent Supplement Program

Home Ownership Mortgage Insurance

Leased Public Housing (Section 23)

Direct Loan Programs (Sections 221(d)(3) and 221(d)(4))

Neighborhood Development Program (Section 501)

Housing for the Elderly (Section 231)

Experimental Housing (Section 233)

Public Housing (including Turnkey)

Urban Renewal Program

C. Community Development Assistance

Water and Sewer Grants (Section 702)

Neighborhood Facilities (Section 703)

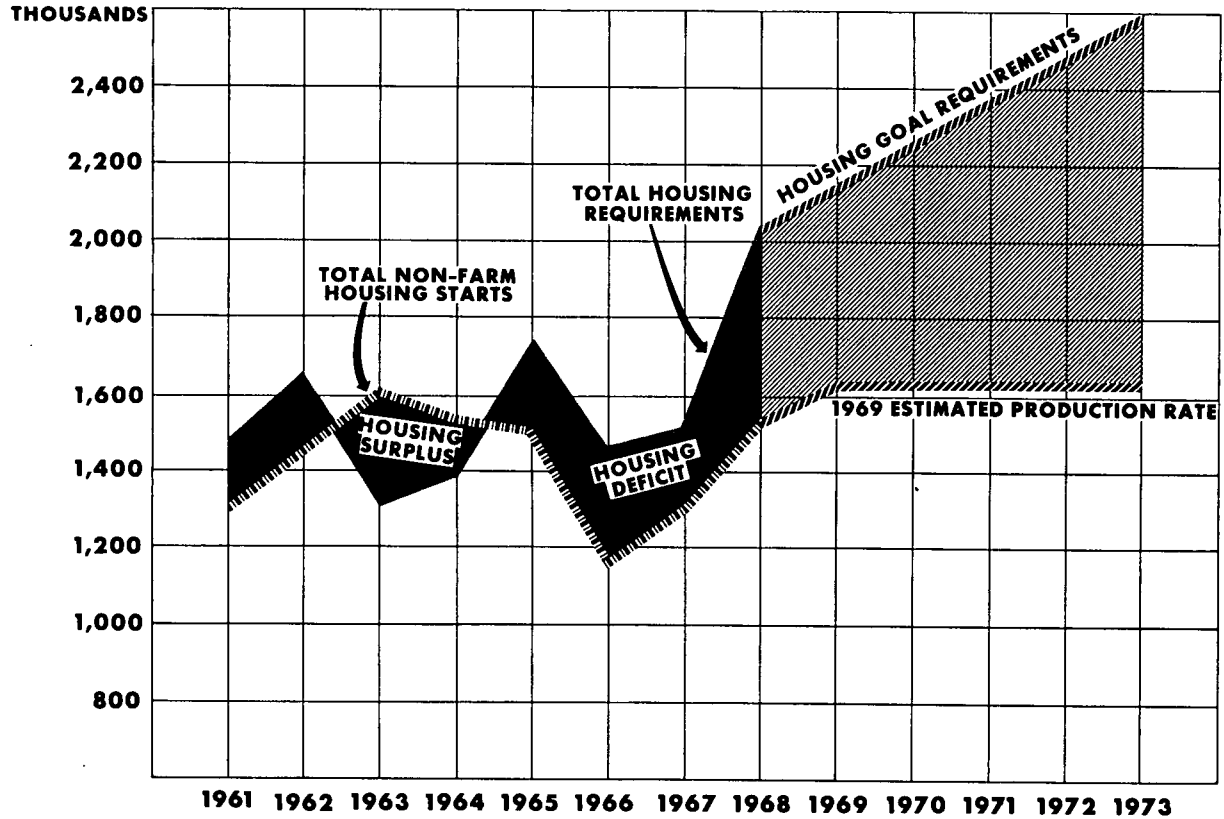
Open Space and Urban Beautification (Sections 702(a) and 706)

Public Facility Loans

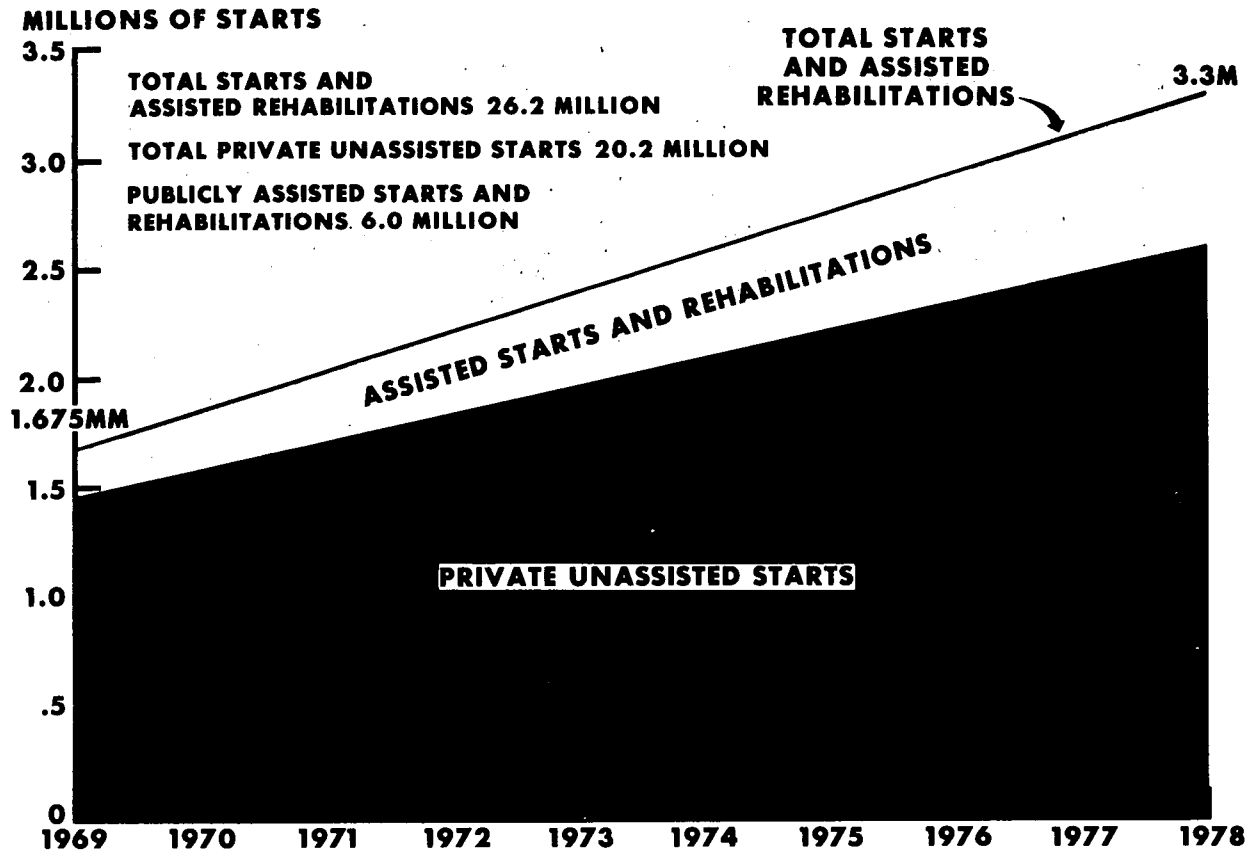
APPENDIX B

GRAPHS

HOUSING SUPPLY VS. HOUSING NEED 1961 - 1968



10 YEAR HOUSING GOALS

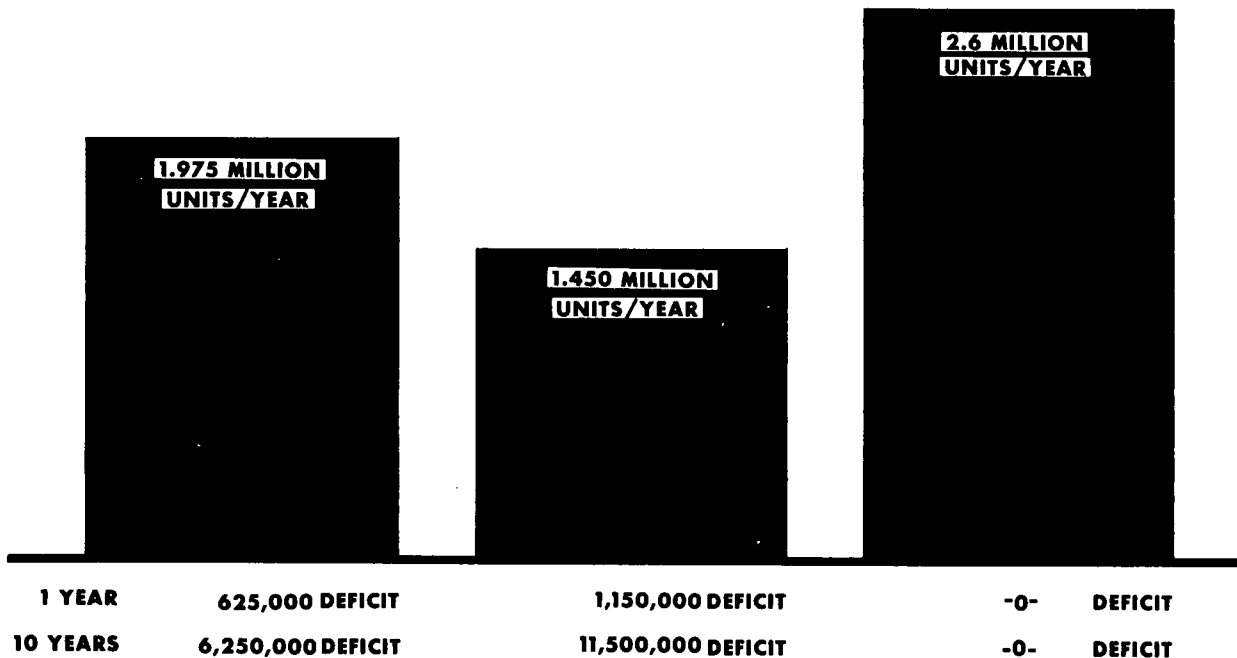


PRODUCTION NEEDED TO MEET 10 YEAR GOALS

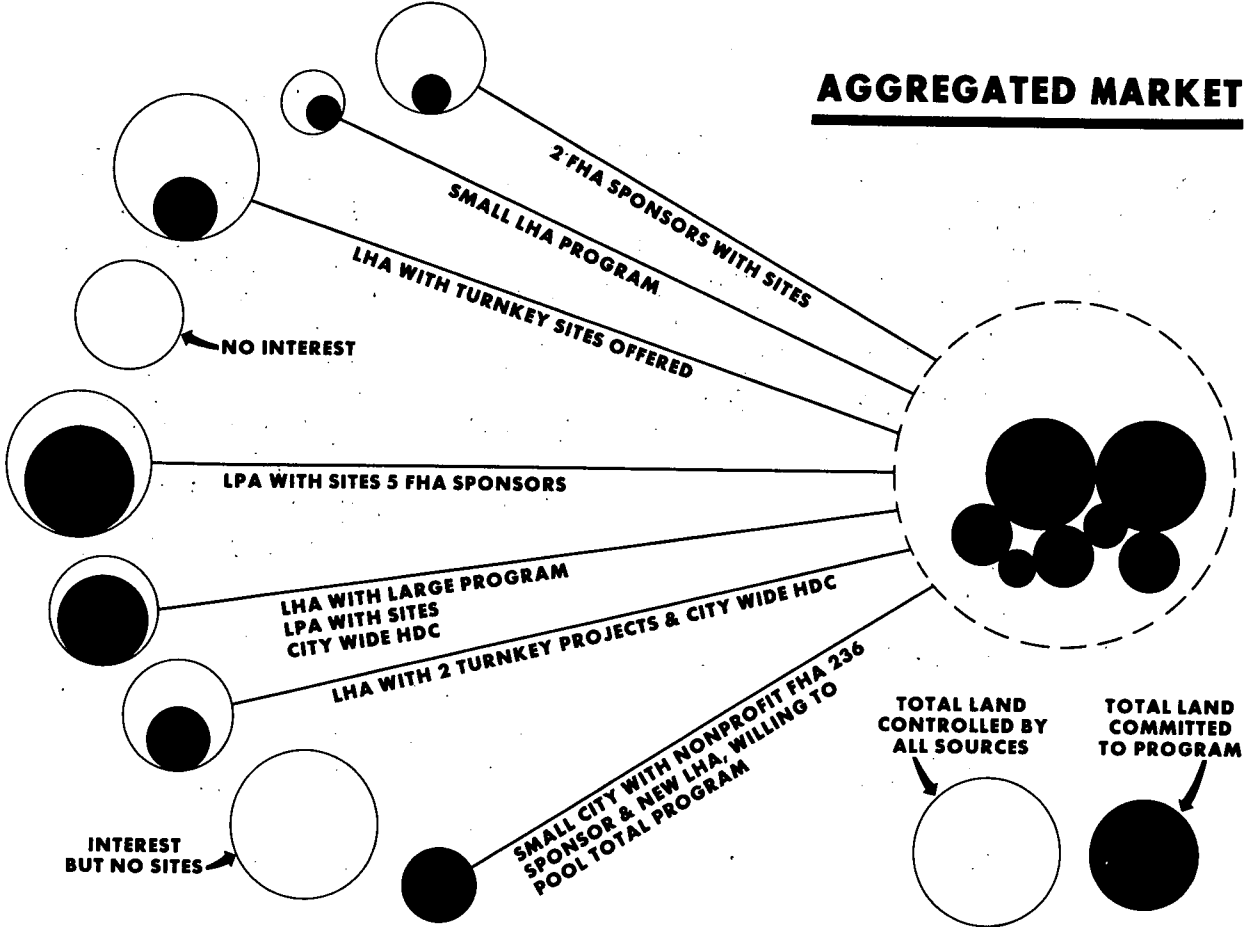
BEST PREVIOUS RATE: 1950

**AVERAGE RATE:
1959-1968**

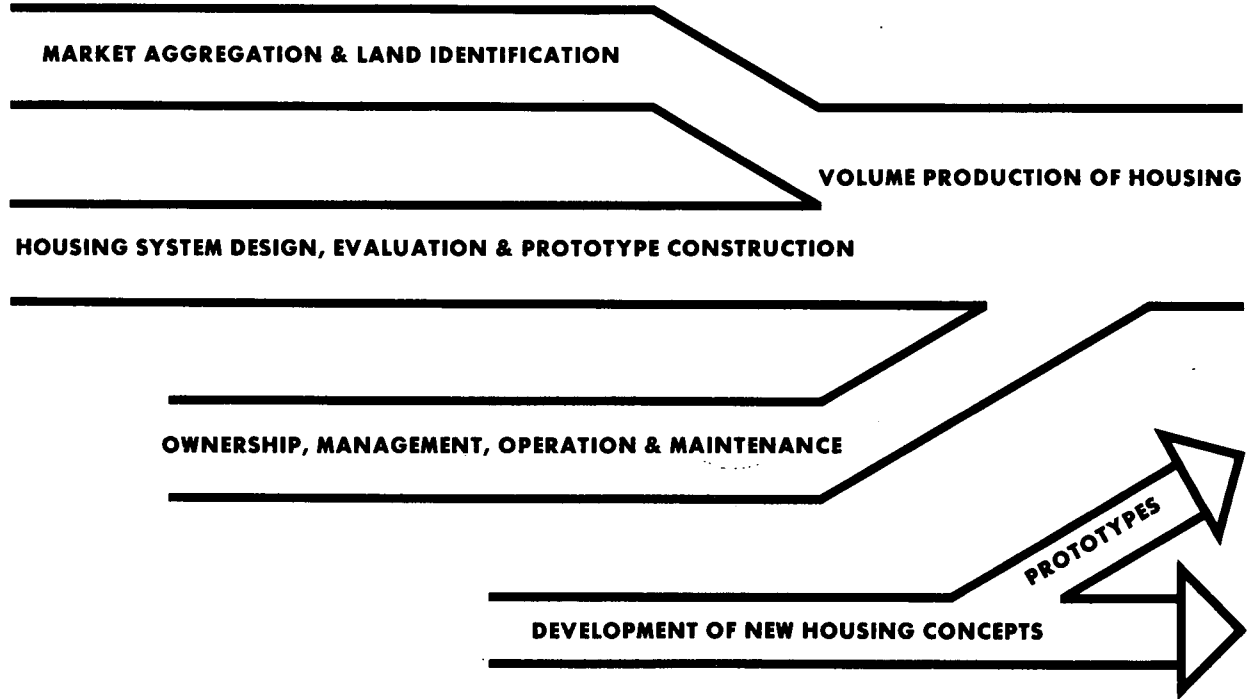
**AVERAGE ANNUAL RATE
NEEDED TO MEET 10 YEAR
GOALS:**



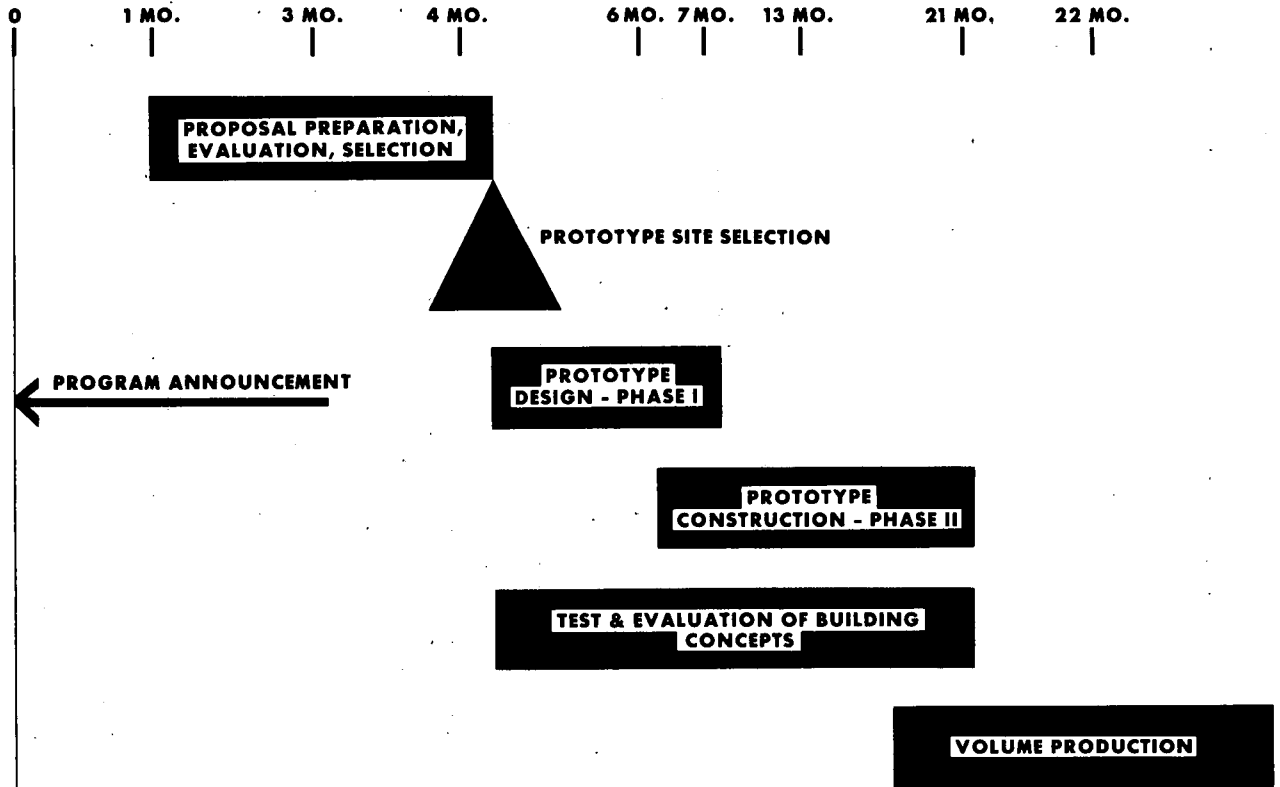
AGGREGATED MARKET



PROGRAM ELEMENTS



PROGRAM PLAN





DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
WASHINGTON, D. C. 20410

OFFICE OF THE ASSISTANT SECRETARY
FOR RESEARCH AND TECHNOLOGY

IN REPLY REFER TO:

Subject: Transmittal of Request for Proposal No. H-55-69
"Operation BREAKTHROUGH--Application of Improved
Housing Systems Concepts for Large Volume Pro-
duction."

Gentlemen:

The Department of Housing and Urban Development is undertaking a new program, to be identified as Operation BREAKTHROUGH, to provide housing for people of all income levels, through a partnership of labor, consumers, private industry, and local, state and Federal Government, and bringing into play the use of modern techniques of production, marketing and management.

There is a demonstrated need and demand for housing throughout the country, especially quality housing for low- and moderate-income families. However, the market represented by this demand is fragmented, with each local element having different rules and requirements, both as to the type of housing required and the regulations under which this housing is produced. The housing industry, in response to this fragmented market, is itself fragmented into many local units, thereby foregoing many of the potential economies that could result from large-volume production methods.

For this reason, as one part of Operation BREAKTHROUGH, state and local bodies are being asked to identify and aggregate the housing market and locate specific land available for installation of the required housing. This Department is working with these authorities and will provide assistance in this effort.

As the second major part of this program, private industry is asked to provide the housing systems and construction concepts which can supply these aggregated markets with quality housing produced in volume, with costs controlled through utilization of economies of scale, efficient management and improvement in existing systems of production, construction, land use, and equity financing.

Two types of proposals will be accepted in carrying out this technical program. The first, identified in the Request for Proposal as Type A, will provide for the design, testing and evaluation, and prototype construction of complete housing systems which can lead to volume production.

The technical efforts in BREAKTHROUGH are planned to follow a series of phases, to provide proper program control. Briefly, these consist of Phase I, Design and Planning, Phase II, Prototype Construction, and Phase III, Volume Production; the total program plan is described in Attachment C to the Request for Proposal, and I suggest that this section should be read first.

Contracts will be awarded to those firms or consortia of firms proposing on Type A which demonstrate a capability for, and concept of, developing and producing housing in quantity, with resulting benefits, and will provide for Phase I and Phase II activities. Phase III contracts are expected to be negotiated between the successful contractors and the representatives (such as sponsors, private developers or housing authorities) of individual "aggregated markets." HUD will apply all available incentives and programs to assure the application of the concepts of organizations supported in Phases I and II to projects developed by the "aggregated markets." Organizations interested in responding to this part of the program (Type A) are invited to align themselves into teams or consortia which include all of the various disciplines required.

The second type of proposal, identified in the Request for Proposal as Type B, will be accepted for advanced research and development of ideas or concepts which are not ready for prototype construction or which provide individual elements of a total system. These concepts may include both "hardware" items and elements concerned with management, financing, site development, and processing. We solicit the creative and innovative capabilities of the entire American economy for such ideas, which can provide a basis for a continuing, long-term program to encourage, and where necessary, support such further advanced development. Where HUD considers it beneficial to the overall housing program objectives, separate contracts may be negotiated for this work.

We encourage organizations which have a capability in, and concepts available for, any of the individual elements mentioned, but do not have all the capabilities to do all the elements, to submit their ideas. In this case, the proposer should indicate his willingness to have the fact that he proposed a portion of the total effort made known generally so that other proposers may consider the desirability of matching their efforts with his to form teams. If the Government determines it is in its best interest to do so, it may accept proposals from such newly formed consortia after the required submittal date of proposals.

Finally, we recognize that the existing housing industry is capable of providing housing to a significant and increasing segment of the market through the market aggregation and financing activities we expect to result from BREAKTHROUGH activities. In addition, we look to this program to provide other, long-term benefits to all segments of the industry; among these benefits we see new and improved products and methods, improved management systems, and greater business opportunities through local franchising and contracting arrangements, improved code and code enforcement methods, etc.

We encourage those firms presently producing housing in quantity to review their designs, methods and markets to determine whether they could achieve significant improvements through the support provided in Operation BREAKTHROUGH.

Sincerely yours,

A handwritten signature in cursive script that reads "Harold B. Finger".

Harold B. Finger
Assistant Secretary



DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
WASHINGTON, D. C. 20410

OFFICE OF THE ASSISTANT SECRETARY
FOR ADMINISTRATION

IN REPLY REFER TO:

REQUEST FOR PROPOSAL NO. H-55-69

Gentlemen:

Subject: Request for Proposal No. H-55-69
"Operation BREAKTHROUGH--Application of
Improved Housing Systems Concepts for
Large Volume Production."

You are invited to submit a proposal, to be received not later than September 19, 1969, at 3:00 p.m. EDT, to the Department of Housing and Urban Development in accordance with this Request for Proposal and the following attachments which are incorporated herein and made a part hereof:

- Attachment A: Proposal Instructions and Conditions
- Attachment B: Proposal Contents and Evaluation Criteria
- Attachment C: Program Plan
- Attachment D: (1) Special Provisions--Cost-Reimbursement Contracts
(2) Special Provisions--Fixed-Price Contracts
- Attachment E: (1) General Provisions--Cost-Reimbursement Contracts
(2) General Provisions--Fixed-Price Contracts
- Attachment F: Cost and Price Analysis--Research and Development Contracts
- Attachment G: Certificate of Current Cost and Pricing Data
- Attachment H: Certifications and Representations
- Attachment I: Draft Chapter 5, "Unit Design Criteria"

It is anticipated that a number of cost-reimbursement contracts will be awarded as a result of this Request for Proposal; however, the Department reserves the right to negotiate on the basis of fixed-price contracts in individual cases.

These contracts may provide for the design, development, application, and evaluation of complete housing systems appropriate for volume production, identified below as Type A, or for research and advanced development of innovative concepts for systems, subsystems or components which may be used in future housing programs, identified below as Type B.

Type A contracts for the development of housing systems will be awarded to those responsible offerors whose proposals are determined to be technically superior and which demonstrate the capability of the offeror to perform the entire range of effort outlined in the Statement of Work.

These contracts will be awarded for the Phase I Design and Planning effort, as described in Attachment C, and will include an option providing for Prototype Construction in Phase II. The detailed work plan and cost requirements for the Phase II effort will be negotiated at the end of Phase I. The Government expects to exercise this option to proceed to prototype construction unless the Phase I efforts indicate, in the opinion of the Government, that the proposed system cannot be produced in adequate volume, will not be acceptable to prospective users, is not economically feasible, that the proposer is not qualified to proceed with the prototype, construction and production effort, or for such other reasons as the Government may determine.

Type B contracts for research and advanced development of innovative concepts will be awarded to those responsible offerors whose proposals for building systems, building elements or materials, land use concepts, or business considerations (including legal, financing, processing and management techniques) are determined to be at a stage of development requiring additional design, development and testing prior to considering them for actual application in housing construction, and further determined to be of superior technical quality and/or potential. The contracts negotiated for this part of the program will include certain specified design and test effort only, with no initial option for prototype construction. Further support for testing, development or prototype construction of these concepts will be negotiated individually as may be appropriate in each instance, based on a continuing assessment of the concepts and the results of work performed.

Prospective offerors are advised that a general briefing and discussion of the Request for Proposal and the general program of Operation BREAK-THROUGH will be held in the Departmental Auditorium, on Constitution Avenue between 12th and 14th Streets, Washington, D.C. at 9:00 a.m. sharp on Friday, July 11, 1969. Individuals interested in attending this briefing are requested to complete and return the enclosed form. Due to limitations of space, we recommend that you make advance registrations, and we ask that no more than three representatives of any individual firm, including the separate companies represented in consortia, plan to attend.

The registration response form also performs two other services. First, it provides an opportunity for individual firms to list their interest in forming teams or consortia; this list will be made available to all participants. Second, we ask that anyone interested in remaining on the mailing list for future program material please check the appropriate box and return the form, whether or not they will be able to attend the meeting.

Questions should be submitted in writing to the address noted below, preferably in advance of the meeting; questions also will be taken from the floor to the extent possible. A transcript of the questions and answers will be made available to all addressees on the mailing list.

Questions which arise after this meeting are to be submitted in writing to the Director, Contracts and Agreements Division, address below. Answers to questions will be furnished through bulletins to all addressees on the mailing list.

To prevent opening by unauthorized individuals, your proposal should be identified on the envelope, or other wrapper, as follows:

PROPOSAL, submitted in response to RFP No. H-55-69
for "Operation BREAKTHROUGH, Application of Improved
Housing Systems Concepts for Large Volume Production"

Proposals should be addressed to:

Department of Housing and Urban Development
Contracts and Agreements Division
Room 2132
451 Seventh Street
Washington, D.C. 20410

Sincerely yours,



W. J. Prime, Director
Contracts and Agreements Division

REQUEST FOR ADVANCED REGISTRATION FOR GENERAL BRIEFING
ON OPERATION BREAKTHROUGH

Mr. Howard Frank
Room 8212
Department of Housing and Urban Development
451 Seventh Street, S.W.
Washington, D.C. 20410

Please register the following individuals for the general briefing on Request for Proposal No. H-55-69, "Operation BREAKTHROUGH--Application of Improved Housing Systems Concepts for Large Volume Production," to be held at 9:00 a.m. on Friday, July 11, 1969, at the Departmental Auditorium, Constitution Avenue between 12th and 14th Streets, Washington,

Name of Firm: _____

Address: _____

Telephone: Area Code: _____ / _____

Individuals: _____
(3 maximum) _____

We (are)(are not) interested in having our firm listed as being interested in forming a consortium with other firms. We are willing to discuss such arrangements on the basis of being:

- the prime contractor
- a sub-contractor or supplier
- Our primary capabilities are in:
 - Architectural design
 - Production techniques
 - Land and environmental planning
 - Structural Frame and Weather Envelope Systems
 - Plumbing Systems and Equipment
 - Heating/Ventilating/Air Conditioning Systems and Equipment
 - Electrical Systems and Equipment
 - Financial and Processing
 - Community and Governmental Relations
 - Other, Specify _____

Please place us on the mailing list for all forthcoming material.

Date: _____ Signed: _____

PROPOSAL INSTRUCTIONS AND CONDITIONS

I. NOTICE OF REQUIREMENT FOR CERTIFICATION OF NONSEGREGATED FACILITIES

Offerors are cautioned as follows: By signing this proposal, the bidder or offeror will be deemed to have signed and agreed to the provisions of the "Certification of Nonsegregated Facilities" in this solicitation. The certification provides that the offeror does not maintain or provide for his employees facilities which are segregated on a basis of race, creed, color, or national origin, whether such facilities are segregated by directive or on a de facto basis. The certification also provides that he will not maintain such segregated facilities. Failure of an offeror to agree to the Certification of Nonsegregated Facilities will render his offer nonresponsive to the terms of solicitations involving awards of contracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause.

II. LIMITATION

This Request for Proposal does not commit the Government to award a contract, to pay any costs incurred in the preparation of a proposal to this request, or to procure or contract for services or supplies. The Government reserves the right to accept or reject any or all proposals received as a result of this request, to negotiate with any qualified source, or to cancel in part or in its entirety, this Request for Proposal, if it is in the best interest of the Government to do so. The Contracting Officer may require the offerors selected to participate in negotiations, and to submit such price, technical, or other revisions of their proposals as may result from negotiations.

III. FORMAT

Proposals should not be submitted in an elaborate format and expensive binders. Legibility, clarity and completeness are important and essential.

IV. PROPOSAL SUBMISSION

Proposal shall be submitted in two separate parts. Part I shall consist of the technical and management submittal of the proposed work and shall provide the information requested in Attachment B, Proposal Contents and Evaluation Criteria. Part II shall consist of complete cost and pricing data, which shall include the Attachment entitled "Cost and Price Analysis-- Research and Development Contracts," completed by the offeror, and any addenda thereto. Each part of the proposal shall be complete in itself in order that the evaluation of both parts can be accomplished concurrently, and the evaluation of the technical and management submittal can be made strictly on the basis of its merit.

Proposals shall be submitted in six (6) copies each of Part I and two (2) copies each of Part II.

V. LATE PROPOSALS AND MODIFICATIONS

Proposals and modifications thereof, received at the office designated in this Request for Proposal after the exact hour and date specified for receipt of proposals will not be considered, unless

- (a) they are received before award is made, and
- (b) they can be proven to have been sent in adequate time to permit delivery under normal circumstances. This proof may be developed as follows:
 - A. -if sent by registered or certified mail for which an official, dated receipt is obtained, and if it is determined by the Government that the late receipt was due solely to delay in the mails;
 - B. -if sent by regular mail, and it is determined by the Government that the late receipt was due solely to mishandling after receipt at the Department; or
 - C. -if sent by Air Express or Air Freight, a valid, dated receipt is obtained, and if it is determined by the Government that the late receipt was due to weather delays or to mishandling at the Department.

However, a modification of a proposal which makes the terms of an otherwise successful proposal more favorable to the Government will be considered whenever it is received and may thereafter be accepted.

The Government reserves the right to waive this requirement and consider a proposal received after the closing time and date if the proposal is determined to be of unusual merit and if the Government determines that particular extenuating circumstances exist to justify the late receipt.

Proposers are cautioned to obtain all necessary receipts to provide proof of the date and time of mailing or shipping.

VI. RESPONSIBLE PROSPECTIVE CONTRACTORS

Type A Contracts, as defined in the Request for Proposal, will be awarded only to responsible prospective contractors. In order to qualify as responsible, a prospective Contractor must, in the opinion of the Government, meet the following standards as they relate to this Request for proposal:

- A. Have adequate financial resources for performance, or have the ability to obtain such resources as may be required;

- B. Have the necessary experience, organization, technical qualifications, skills, and facilities, or have the ability to obtain them (including probable subcontractor arrangements);
- C. Be able to comply with the proposed or required time of delivery or performance schedule;
- D. Have a satisfactory record of performance;
- E. Be able to comply with the requirements of the Equal Opportunity Clause;
- F. Be otherwise qualified and eligible to receive an award under applicable laws and regulations.

Type B Contracts, as defined in the Request for Proposal, will be awarded to responsible prospective contractors who meet such of the following standards and in such degree as the Government may determine necessary and required for performance of the particular contract:

- A. Have adequate financial resources for performance, or have the ability to obtain such resources as may be required.
- B. Have the necessary experience, organization, technical qualifications, skills, and facilities to undertake the particular activity;
- C. Be able to comply with the proposed or required time of delivery or performance schedule;
- D. Be able to comply with the requirement of the Equal Opportunity Clause;
- E. Be otherwise qualified and eligible to receive an award under applicable laws and regulations.

VII. SIGNATURE

The proposal shall be signed by an official authorized to legally bind the individual firm, team or consortia and shall contain a statement to the effect that the proposal is a firm offer for a 60-day (or more) period. The proposal shall also provide the following information: Name, title, address, and telephone number of individual(s) with authority to negotiate, and contractually bind the company, and also who may be contacted during the period of proposal evaluation.

VIII. CONTRACT AWARD

The Government may award one or more contracts, based on offers received, without discussion of such offers. Accordingly, each offer should be

submitted on the most favorable terms from a price and technical standpoint which the offeror can submit to the Government. However, the Government reserves the right to request additional data, or oral discussion or presentation, in support of written proposals.

If in the opinion of the Government, a proposal submitted in response to the requirements of a Type A contract does not meet the standards established for award of this type of contract, but may be appropriate for consideration for a Type B contract, the Government reserves the right to negotiate on the basis of a Type B contract.

Any contract awarded as a result of this Request for Proposal will contain the special and general provisions made a part of this Request for Proposals.

IX. RESPONSIVE PROPOSALS

In order to be considered responsive, proposals must be accompanied by all required certifications and representations. Upon completion of negotiation, the successful offeror will be required to submit a revised Certificate of Current Cost or Pricing Data.

X. PATENT RIGHTS

In determining the patent rights clause to be included as a part of the contract, the Government will follow the requirements of Title III of the Housing Act of 1948, as amended (12 U.S.C. 1701 e.) and the policy and criteria established by the Memorandum and Statement of Government Patent Policy issued by the President of the United States on October 10, 1963 (attached). This contract is determined to be within the scope of Section 1 (a) (1) of the President's Statement noted above, and Clause A of the General Provisions will be utilized. If the proposer considers that a different allocation of patent rights is appropriate, he shall provide information with his proposal supporting his position for consideration by the Secretary of Housing and Urban Development. This information must be adequate to establish either that the objectives of the contract would be materially advanced by leaving the commercial rights with the contractor, or that the equities are such as to require a different allocation of patent rights. If the Secretary determines that exceptional circumstances are present, he shall authorize the Contracting Officer to incorporate Clause B into the contract if such action, rather than dedication or publication of resulting inventions, will best serve the public interest.

The Government reserves the right to negotiate for the inclusion of a "background patents" provision in any contract if the Government determines that the proposer has a background patent position and that his background rights may tend to limit unduly the availability of the research results, or that the proposer's background position would be significantly enhanced by the contractual effort.

XI. RESTRICTIONS ON DISCLOSURE AND USE OF DATA IN PROPOSAL

The proposal may include data, such as a technical design or concept or financial and management plan, which the proposer does not want disclosed to the public for any purpose or used by the Government for any purpose other than evaluation of the proposal. If a proposer wishes so to restrict his proposal, he shall mark the title page with the following legend:

Data contained in pages _____ of this proposal furnished in connection with RFP NO. H-55-69 shall not be disclosed outside the Government and shall not be used for any purpose other than to evaluate the proposal: Provided, that if a contract is awarded to this proposer as a result of or in connection with the submission of this data, the Government shall have the right to use or disclose the data to the extent provided in the contract. This restriction does not limit the Government's right to use information contained in the data if it is obtained from another source without restriction.

The proposer shall mark each sheet of data which he wishes to restrict with the following legend:

Use or disclosure of proposal data is subject to the restriction on the title page of this Proposal.

PROPOSAL CONTENT AND EVALUATION CRITERIAI. OUTLINE OF PROPOSAL CONTENTPart I - Technical and Management

A proposal for a Type A contract, providing for the design, development and application of a complete housing system, complete with approaches for the effective use of land, to be considered responsive shall address each of the items listed below. These items have been selected and arranged to provide a basis for the rapid and impartial evaluation of the Proposal, with particular reference to the degree to which the proposed housing system will comply with the criteria and specifications presented in Attachment C, Program Plan.

Type B proposals, for research, development and design of innovative concepts for any individual or group of primary elements of building systems, materials, and techniques, land use concepts and business considerations (including legal, financing, processing and management techniques), shall address those items which are applicable to the particular situation. For example, appropriate statements are to be made with respect to the system description, adaptability, state of development, potential code problems and cost projections. Information on organization and on the detailed plan for the proposed research effort will also be required.

The Proposer is requested to keep his Proposal as concise as possible consistent with providing the requested information. Elaborate brochures and presentation methods are not desired.

A. Building System Concept

A description of the building system concept which will include the items listed below (the term, "building system concept," is considered to include the construction method and process, the effective and innovative use of land for single and multiple units, and the interrelations with utilities and other services):

1. System Description

Provide written and sketch details of the components of the total building system including floor plan and conceptual arrangement drawings and outline specification. Highlight innovative and unique features. Indicate the relationships between subsystems. Elements to be addressed include:

- General: Rationale for selection of individual subsystem elements and system integration; include factors of economy, producability, performance, and market acceptance and consumer preference, as they apply to each of the following items:

- Architectural: Floor plans at $\frac{1}{4}'' = 1' 0''$; arrangements of dwelling units in multi-unit structures; finishes and esthetic treatment; comparison with the Draft Unit Design Criteria (Attachment I) and national codes; ability to incorporate varying individual appearance elements to provide architectural diversity.
- Structural: Structural system and total weather envelope, including thermal and acoustical treatment and exterior finishes.
- Interior Work: Partitions, floor, wall and ceiling finishes, cabinetry, trim, built-in furniture, and stair treatment, if any.
- Mechanical: Heating, ventilating and/or air conditioning; plumbing and fuel supply system piping or conduits; waste disposal.
- Electrical: Power supply and distribution system; lighting system.
- Appliances and Equipment: Describe items which are included, and any special features, interface requirements, and proposed innovative systems.
- Foundations: Foundation requirements peculiar to the proposed system if separate from the structural system noted above; note applicability of the system to the conditions listed in Attachment C.
- Ancillary Structures and Facilities: Describe any feature provided separate from the basic living unit that normally are part of a total housing complex, such as central laundry facilities and communal areas.
- Land Use Concepts: Outline plans for innovative use of land to permit higher densities, effective community planning, and efficient utility systems.

2. System Adaptability

Address the methods planned for adapting the proposed system to the variety of housing types and site considerations noted in Attachment C. Describe, in narrative form and by concept drawings, any modifications or variations required to adapt the system to these varying situations:

- Housing Types: Describe the types of housing for which the system may be used, and indicate adjustments which may be required. State densities (in dwelling units per acre) considered appropriate for each type. Provide sketches.

- Climatic Areas: Designate the climatic areas where prototypes should be placed, and describe design changes required to adapt the system to each for which the system is suitable. Particular reference is to be made to system adaptability to resist severe weather conditions, such as hurricanes and extreme snow accumulation.
- Geology and Soils: Provide conceptual foundation designs for those geologic soil conditions considered as appropriate for the proposed system. Conversely, list the geologic and soil conditions which would preclude the use of the proposed system.
- Site Topography: Provide drawings or sketches which indicate adjustments or modifications required to adapt the system to various topographies.
- Site Size: Discuss the ability of the proposed system and its mix of housing types to adapt to various site sizes.
- Site Situations: Designated the types of sites for which the system is considered appropriate and describe conceptually the system treatment for each type. Describe the effects on system design and housing production due to transportation distances, labor and material availability or similar factors related to site situation.
- "Self-Help" Completion: Describe any adaptability of the proposed system to completion or other work by the prospective occupant, and the degree to which this might be practical. Note any skill levels or special training required.
- Changes: Discuss the flexibility of the system with regard to modifications in the system after construction, including expansion and rearrangements.
- Regional Applications: Discuss the regions or areas of the country where the Contractor is willing or interested in producing and constructing housing: state outline arrangements that would be acceptable for franchising, licensing or otherwise distributing the system to other parts of the country.

3. State of System Development

Describe the present state of development of the system and the subsystem components, including the degree of system integration and the testing of individual subsystems and components which have been completed. Outline standards and criteria used in such testing. Highlight any previous or current experience utilizing the proposed system with particular emphasis on cost, acceptability and production experience.

4. Constraints

Discuss and list restrictive provisions in the model codes listed in

4. Constraints (Continued)

Attachment C, which may be expected to conflict with or inhibit the use of innovative ideas in the proposed system. (This will provide a basis for determining test and evaluation activities, for comparison of conceptual ideas, and will provide information needed in the market aggregation activities related to constraint removal.)

- Discuss and list labor and trade practices which may require modification in implementing the proposed system. State assumptions as to labor productivity and wages used in preparing system cost projections.

5. System Cost Projections

Furnish cost projections for each of the following situations; "housing in place" is defined as including all costs except developed land:

- Prototype Construction: Construction of system prototypes on sites proposed in the climatic regions noted above.
- Volume Production, Minimum Economic Order: The minimum total order and minimum production rate considered acceptable by Proposer, and the cost of housing in place under these circumstances.
- Volume Production at a Rate of 1,000 Units/Year: The cost of housing in place based on a rate of 1,000 units per year for 5 years as established in Section 108 of the Housing and Urban Development Act of 1968.
- Volume Production, "Best" Rate: The annual production and construction rate resulting in the lowest unit cost of housing in place, and the cost of housing at that rate, based on the total system and all subsystems. Provide supporting data.
- Ownership and Operating Cost Projection: Annual costs of ownership and operation of a dwelling unit, including estimates for utility expenses, insurance and similar items. State assumptions.
- Maintenance Projection: Annual rate of expense averaged over a five-year cycle for property maintenance, including painting, repairs, and prorated replacement of equipment.
- Useful Life Projection: The probable useful life of the building using separate projections for the structural system, interior work, and mechanical and electrical system, if appropriate. State any conditions precedent to the estimate.

If awarded a contract, the Proposer will be expected to develop a firm cost estimate for the prototype construction and revised cost projections as for the full-scale production situations noted above, as part of his Phase I final report. These data will be factors considered by the Government in making its decision regarding the Phase II contract options.

B. Organization and Staffing

Describe the plan for organizing the total effort required to implement prototype design and construction, and conceptual plans for the organization required for large-scale production and construction of housing envisioned in the total Program. This plan must include the following elements:

1. Management

An outline of the proposed management framework, including lines of responsibility and illustrating the varied disciplines required. If the necessary multi-disciplinary talents are to be obtained by forming a consortium of firms and/or individuals, discuss the organizational and contractual relationships among the parties and their separate and mutual responsibilities, including plans for subcontracting major portions of the work.

2. Key Individuals

A list of key individuals who will be assigned major management and professional responsibilities. Indicate the responsibilities to be assigned, provide a brief resume for each individual, and indicate his qualifications for the proposed assignment.

3. Staffing

A plan outlining the rate of staff development in relation to the overall program plan.

C. Program Plan

Detail in the program plan the steps required to implement the design and planning effort in Phase I, and outline the procedure proposed for the ensuing phases. The following elements are required:

1. Network Analysis

A network schedule presentation of the tasks required to implement the total program and the milestones to be achieved at various intervals of time. This network is intended to demonstrate an understanding of the procedural steps involved in the various phases of the program, the dependency relationships among activities, and the probable time frame proposed for the program

2. Design Phase

A specific plan including descriptions of required tasks and their interrelationships for the Phase I design and planning effort which is necessary to move from the present stage of system development to the completion of detailed preliminary design for prototypes on the specific sites selected and designated by HUD, including a statement of the time required.

3. Testing Plan

A plan including a description of the required tests and their interrelationships for proving or otherwise demonstrating compliance with the performance specifications outlined in Attachment C of this Request for Proposal. List the existing standards and test procedures to be used, and specify requirements for new or additional standards to be developed where no satisfactory standards currently exist. Provide designs and plans for testing procedures for innovative features not meeting normal code requirements, which can provide assurance that these features are safe, sanitary, sound and that they meet proper performance criteria.

4. Prototype Construction Plan

An outline plan describing the work elements required for constructing prototype units in Phase II defining major milestones. Recommend the number of prototypes required for each housing type to be built on each site to adequately demonstrate the system and specify the climatic areas proposed for prototype units. Outline the plan proposed for testing and evaluation of prototype units. Discuss the type of production facility or facilities which will be used for prototype construction. Provide for preparation of cost and operation reports. Discuss the variety and quantity of labor skills required for prototype production, and indicate how these requirements will be satisfied. This plan will be finalized in the Design Phase if the Proposer is selected for Phase I.

5. Large-Scale Production Plan

An outline plan for producing housing at the large scale envisioned by the Program, making necessary assumptions as to market locations. Include a discussion of the types of production facilities which are expected to be used, the production sequence, plant locations, and shipping modes. Discuss the variety and quantity of labor skills required for full-scale production, with particular reference to the labor supply, the plans for training and use of unskilled and semi-skilled individuals, and the manner in which local labor

resources are to be utilized. This plan will be further developed in Phase I and finalized during Phase II.

6. Site Implementation Plan

A general discussion of the Proposer's concept of site master planning, specific site design and community involvement in the site development for volume production and installation of housing during Phase III. It is recognized that this concept may require modification for specific site and community situations where he may be requested to provide large quantities of housing; however, the quality of innovative planning in the concept will be of importance in evaluation. Particular attention shall be given to the proposed plans for using local labor, builder, real estate, financial and legal interests in accordance with Section 3 of the Housing and Urban Development Act of 1968.

7. Financial Plan

A statement of the financial position of the Proposer, with particular reference to his ability to obtain financing for prototype and production facilities utilizing firm HUD or other contract commitments, including any innovative plans to utilize new or different sources of financing.

8. Community Involvement Plan

A statement of the proposed method for the involvement of neighborhood contractors or subcontractors in the production and installation of the housing and its related environment.

Part II - Cost and Price Analysis

Furnish a cost or price analysis for Phase I using the forms provided in Attachment F, "Cost and Price Analysis." Round all amounts to the nearest dollar.

Execute Attachments G and H. Furnish name and telephone number of any Government audit organization having cognizance of your activity or located in your geographic area.

Provide a statement of acceptance of provisions of Attachments D and E, and submit information and supporting data to provide a basis for the Government determination of the proper patent clause to be incorporated in the contract.

II. EVALUATION CRITERIA

The Department of Housing and Urban Development, in its analysis of the proposals received in response to this Request for Proposals, will give primary consideration to those proposals which demonstrate the greatest potential for carrying out the objectives of this Program in accordance with the following general criteria.

Part I - Technical and Management

A. Building Systems Concept

1. Ability of the system and its designs to provide a marketable quality environment within the unit and among units.
2. Flexibility of the system design, insofar as it permits application to varying types of housing and to varying site considerations.
3. Flexibility of the system design, insofar as it provides the ability to adjust or modify unit sizes and arrangements, either during project design or after construction.
4. Projected costs of "housing in place" in full production, with particular reference to housing for low- and moderate-income families.
5. Potential rate of housing production in full-scale effort.
6. Efficiency in the use of materials and labor, with respect to cost in place, the conservation of scarce materials, and the effective use of a spectrum of labor skills, including unskilled or semi-skilled local labor. Potential for "self-help application.
7. Cost and time projections for prototype production.
8. Selection of materials for durability and ease of maintenance.
9. Degree of completeness of system design, evaluation and testing.
10. Concepts for the effective use of land and environment.

B. Organizational Capabilities

1. The management structure and organization staff plan of the proposed team.
2. The quality and diversity of management and professional talent proposed as "key individuals."
3. The financial capability and soundness of the proposed organization.

4. The production capability, experience and "know-how" of the proposed organization to implement the production, project development and erection requirements of the Program.
5. The ability to meet planned staff development for the various phases of the program.
6. Management plan to insure that all elements of the work are performed.

C. Program Plan

1. Understanding of the entire Program, including the function of the various phases and the requirements to use differing talents as the program plan evolves.
2. Proposed program for recognizing user needs in living unit design and site and community planning.
3. Prototype construction plans, with particular reference to the testing and evaluation aspects.
4. Large-scale production plans, including considerations of shipping and plant location factors.
5. Financial plan, including innovative concepts.

Part II - Cost and Price Analysis

The level of costs which are proposed, as these may compare with other proposals and be considered realistic for the effort planned; also, the quantity and level of detail in the information supplied.

PROGRAM PLAN

Operation BREAKTHROUGH -- Application of Improved Housing Systems Concepts
for Large Volume ProductionI. BACKGROUNDA. The Problem

This Nation has for the first time, in the Housing and Urban Development Act of 1968, stated its long-time policy of "a decent home and a suitable living environment for every American family" within the perspectives of a time period in which such a goal can be achieved, and the number of units required to meet this goal. The Congress declared 26 million housing units need to be built or rehabilitated over the next ten years. Of this number, it determined that six million of such units should be available for the housing needs of low and moderate income families.

The magnitude of this determination and the implication of a market of this size can be ascertained from the estimate that over 20 million housing units will be needed to meet the demands occasioned by population growth, replacement of demolished and destroyed buildings, internal migration and the maintenance of an adequate vacancy rate. By comparison, production during the period since 1946 has been as follows:

High Year:	1950	slightly less than 2,000,000 housing units
Low Year:	1966	slightly less than 1,200,000 housing units
Average per Year:	1950-1960	1,500,000 housing units
Average per Year:	1958-1966	1,400,000 housing units
Average per Year:	1946-1968	1,450,000 housing units

Of the six million housing units needed for low and moderate income families, it is estimated that four million will need to be newly built units, two million units would be supplied by rehabilitation.

In meeting the overall goals, it is anticipated that the number of units in each year's target will be increased annually so that the increase of the number of units started in any given year will not be disproportionately large. The generalized characteristics of the housing market are indicated by the following estimates of selected characteristics:

Of All Newly Started or Rehabilitated Housing Units:

30% will be in Central Cities 1/
70% will be outside Central Cities 2/

Of All Units to be Started or Rehabilitated with Public Assistance:

60% will be Multifamily Units
40% will be Detached or Town Houses
These units will be required in suburban areas as well as central cities.

1/ Central Cities are as defined by the Bureau of Census -- the major city in a Standard Metropolitan Statistical Area.

2/ Outside of Central City -- other communities in an SMSA and those communities which are not located within SMSA's.

Clearly, innovations are required in housing production and marketing processes, including land management, provision of community and utility services, building techniques and management, financing, and community participation and evaluation functions. Innovative designs, methods and processes must be developed and employed in each of these areas in order to use the available resources more efficiently, if the Nation is to expand significantly the production and marketing capability for all housing, including both the normal market and subsidized housing.

B. The Program Objectives

This Program has as its primary objective the establishment of self-sustaining mechanisms for rapid, volume production of marketable housing at progressively lower costs for people of all income levels, with particular emphasis on those groups and individuals which have had difficulty in obtaining satisfactory housing in the past. Progress toward the Program's primary objective will include the production of at least 1,000 dwelling units per year for five years, utilizing up to five different technologies, as called for by Section 108 of the Housing and Urban Development Act of 1968.

To assist in reaching the primary objective, the Program will address the following secondary objectives:

1. Stimulate the modernization and broadening of the housing industry through increased emphasis on better design and greater utilization of improved techniques within the current housing industry and through increased participation by other organizations that possess the necessary talents, interest and capability for such a commitment.
2. Increase participation and leadership by state and local governments in providing on-going planning and market and site aggregation for housing, its environment and the community.
3. Waive or remove constraints to the introduction and use of tested and proven innovations in design, construction, land acquisition and use, financing, labor utilization, materials, components and systems, sponsorship, consumer participation, management and maintenance.
4. Introduce new organizational concepts and management techniques for market and site aggregation and for design, production and marketing of living units.
5. Coordinate the application of all available government resources appropriate to a given site or sites for housing, environment, community services and facilities.
6. Encourage identification and development of performance standards for evaluation of innovations, working with authorities in this area.
7. Develop an on-going testing and evaluation mechanism and technique for judging the effectiveness of innovations.

8. Develop techniques for increased effective participation by consumers and community groups in planning and developing the total housing environment.

C. The Part of Government

The procedures outlined in Program Procedure, below, present the activities expected from the private enterprise sector of the Nation's economy. These efforts are directed to the development of new or improved housing production methods, to meet the national goals for volume, quality and economy.

Parallel to this private sector activity, an intensive effort by governmental units at all levels is being planned to provide an aggregated market for these systems. The Department of Housing and Urban Development will work with and assist state and local governments in implementing this effort, which is to be performed expeditiously, within the time schedules established for this program.

The "market aggregation" effort is conceived as having the following elements:

- Development of an inventory of housing needs, by quantity, type of housing, location within the specific city or state, and particular population characteristics, such as family size.
- Identification of specific sites which can be made available for housing, placing controls on these sites by options, encouragement of private sponsor groups to obtain title, instituting urban renewal plans or other activities.
- Investigation and classification of site characteristics, as these might affect housing design.
- Classification of sites on a locality-wide, regional or state-wide basis to permit a better understanding of the total market potential.
- Develop requirements for housing for the specific sites, in terms of density, human needs, unit size and demographic characteristics. It is expected that local community groups will assist the appropriate governmental units in developing this information.
- Identify and initiate development of environmental system and community services, schools, transportation system, health, training and recreational centers and commercial facilities. The Department will assist in processing applications for Federal grants for such services where appropriate.
- Initiate and expedite review of codes, zoning and administrative regulations and enforcement procedures to provide for waivers or variances where these are appropriate to permit the use of proven innovative systems.
- Work with local labor councils to establish local agreements providing for the use of innovative materials and methods in producing and constructing housing and in training and providing the necessary labor force.

- Develop, or encourage development of, local and regional financing sources which can provide seed money and investment capital for full-scale housing production, or permanent mortgage financing.

These governmental efforts, supported by community and neighborhood activities, are expected to result in an aggregated market which will provide a basis for local marketing, in quantity, of housing systems developed by private enterprise under this Program.

D. HUD Commitments

To encourage widespread initial participation and to ensure long-term continuation of this Program, the Department of Housing and Urban Development is prepared to make the following commitments:

1. Establish a full-time Program management staff within the Department at both regional and national level to assure responsiveness by HUD to the needs of the Program.
2. Provide advice and assistance to state and local officials, as required, for local market aggregation.
3. Fund the design and development work through direct contracts.
4. Provide or obtain funding for the construction of housing prototypes, and furnish program grants for related environmental facilities.
5. Support the continuing efforts of national, state and local authorities in reviewing and improving standards, codes and regulations affecting the development and production of housing. In particular, undertake the following activities:
 - To establish a centralized HUD staff to actively assist in the continuous development and review of standards of quality, including the objective evaluation of innovations in the housing and urban development field with reference to these standards.
 - To establish, or encourage the establishment of, a comprehensive program for testing of construction innovations, with assistance from prominent authorities. It is expected that this program will make maximum use of existing test facilities under a general plan and direction by HUD.
6. Guarantee the priority application of housing and environmental system program funds to support BREAKTHROUGH projects.
7. Provide priority and coordinated processing of applications for financial and program support. In fulfilling this commitment, technical and financial blanket approvals will be provided for each housing system approved on the basis of prototype evaluation.
8. Provide assistance to state and local governments and to the financial community in developing additional sources of permanent financing.

9. Allocate planning and community facility grants for local sewer, water and similar projects to communities participating in the program.

II. STATEMENT OF WORK FOR TYPE 'A' CONTRACT

A. Scope

The Contractor for a Type A contract shall, in Phase I, design, develop and fully document new housing concepts and construction techniques which can provide quality housing at high volume rates of production with costs controlled through the utilization of economies of scale, efficient management and improvement in existing construction and production techniques. If the Government exercises its option for prototype production in Phase II, the Contractor shall construct prototype housing units on assigned sites, and shall provide such testing and evaluation of these units as may be specified in the contract.

B. Products

The Contractor for a Type A contract will be required to provide the specific products noted in the description of the activities of each Phase of the program presented in Section III, below.

C. Reports and Status Reviews

The Contractor will be required to submit a monthly letter status report; the format and content of this report will be mutually agreed to by the Government and Contractor during contract negotiations. It is anticipated that this report will include the following items:

1. Major problems and proposed actions for solution
2. Technical progress as measured against the established schedule.
3. Expenditures and commitments, related to expenditure forecasts.
4. Proposed or potential deviations from original plan and program.

Status Reviews will be held at intervals representing 50% and 90% completion of design and otherwise when deemed necessary, at the Contractor's place of business or elsewhere as may be decided by the Contractor and the Government. This review is to provide the Government with an opportunity to review and evaluate the Contractor's performance and progress, and to allow the Contractor to identify problems requiring Government action and to obtain program redirection as may be required.

A final report will be required at the completion of each Phase of the contract; detailed requirements for this report will be negotiated at the appropriate times in contract award activities.

D. Government-Furnished Information and Program Elements

The Government will provide information and direction at the initiation of each Phase of the work in accordance with the listing in Section III, below.

E. Funding and Schedule

Funding procedures and schedule requirements for each Phase are noted in the appropriate portions of Section III, below.

III. PROGRAM PROCEDURE FOR TYPE 'A' CONTRACT

This program will be administered in a series of phases, to provide a mechanism for program control and funding. The individual phases and their major components are listed below.

The following sections outline: (1) the specific inputs the private enterprise teams can expect to receive at the initiation of each phase; (2) the products expected of the teams; (3) the funding arrangements anticipated for support of each phase's activities. The term "inputs" is defined as those items which will be provided to the Contractor through HUD or other auspices; the term "products" is defined as those items which the Proposer/Contractor will be contractually required to provide during or at the completion of each phase of the work.

A. Proposal Phase

The proposal phase is that period of time from the issuance of this Request for Proposal until a proposal is submitted to the Department for consideration for a Type A or Type B contract.

Inputs - Request for Proposal with Appendices; Information from General Briefing
Products - Contract Proposal as defined in Attachment B of this Request for Proposal
Funding - Proposer
Time - 3 months

B. Phase I - Design and Planning - Type A Contract

The Contractor will develop, design, and fully document new housing concepts and construction techniques which can provide quality housing at high volume rates of production with costs controlled through the utilization of economies of scale, efficient management, and improvement in existing construction and production techniques. The Contractor will be expected to work with the prototype site planner in specific site design activities.

Inputs - The contractor selected for Phase I contracts will be furnished the following information:

- Designation of specific sites for prototypes

- Modifications of the program plan and schedule, if appropriate.
- General master planning concepts for prototype sites and requirements for specific system designs for prototypes; master planning activities will continue through Phase I and will include coordination between planner and contractor.
- Details of the cost and information system structure and reporting requirements for Phase II.

Products - Preliminary drawings and outline specifications for each prototype housing type. These documents should be sufficiently detailed to permit technical evaluation of the system and its housing types, to permit accurate cost estimates for prototype construction and to show details of all innovative and unusual features and the major elements of all subsystems, and innovative production concepts.

- Sketches and descriptions illustrating the adaptability of the system and its various housing types to variations or site topography, situation, size and geology.
- Sketches and descriptions illustrating any innovative arrangements of housing types in mixed housing situations.
- Specific revisions required by the housing system of the codes and zoning requirements at each prototype site proposed for system construction.
- Any devices such as models, visual aids, etc. which assist in illustrating or demonstrating the unique features of the housing system.
- Reports on individual tests and evaluations conducted during the design and planning phase.
- Periodic reports and briefings as required by the contract. A final report of Phase I activities, including a specific proposal for Phase II which incorporates a cost proposal and a program plan including proposed organization and staffing, testing program Contractor's cost and information system and the relationships to the cost reporting requirements imposed by HUD and specific task descriptions with an associated network and task schedule. The network should clearly indicate the dependency or interface of events with the work of others including HUD.

Funding - Contracts for Phase I operations will normally be cost-reimbursable. Fixed price contracts may be negotiated in certain specific situations where it is in the best interest of the government to do so. These contracts will contain options which will be exercised by HUD for Phase II prototype construction, unless the results of Phase I indicate, in the government's opinion, that it is in the best interest of the government to terminate the contract at this time.

Timing - Contract award is planned for early Fall of 1969; the Phase I contract period will depend on individual system requirements. (Most contracts are expected to require 4 to 6 months for Phase I.)

C. Phase II - Prototype Construction and Evaluation - Type A Contract

Phase II provides for the construction of prototype units on one or more regional prototype sites, as may be negotiated, and for testing and evaluation of the completed housing units and components thereof in accordance with the testing procedures to be developed and approved.

Inputs - The contractors selected for Phase II contract options will be furnished the following information.

- Assignment of specific areas within prototype construction sites; control of land will remain with HUD. Final master planning of prototype sites, developed from the planning activities during Phase I and in cooperation with the Contractor.
- Modification of evaluation criteria, program schedule and plans for the subsequent phase, if appropriate.
- A summary of the potential housing market by housing type and size, by region and/or locality.

Products

- Working drawings and specifications for the prototype units for review and approval by HUD before construction is initiated.
- Construction of prototype housing including environmental work as appropriate to the site being addressed.
- Results of tests conducted during Phase II.
- Plans for the mass production of housing units in Phase III.
- Revised list of waivers required against provisions of the major codes, listed below, and the draft "Unit Design Criteria."
- A final report including a detailed cost and progress histories of Phase II work, and other reports and briefings required by the contract.

Funding - Contract options for Phase II will be negotiated as cost-reimbursable contracts, with maximum cost limitations. Title to completed prototype housing units will rest in or be controlled by HUD.

Timing - Options will be exercised approximately 30 days after final reports have been received on Phase I operations to those contractors selected to proceed to Phase II. The construction period is expected to take approximately twelve months to complete, but individual systems may require more or less time.

D. Phase III - Full Scale Production

Phase III will consist of the construction of housing in volume, on individual or group sites, in accordance with contracts to be negotiated between the Contractor and local housing authorities, sponsors, local governmental units, private developers or others who serve as representatives of "aggregated market" areas.

Inputs - Regional and local governmental units, in cooperation with local private developers or sponsors, as appropriate, with HUD assistance are expected to furnish the following:

- Aggregated markets matched with assembled specific sites.
- HUD will use all possible facilities to provide or assist in identification of financing sources for interim and permanent project financing.
- Waivers or variances to local codes, zoning and administrative practices, pending code amendments, following HUD approval of the housing system for regional or national application.
- Support in obtaining modification in local trade practices.
- HUD "blanket approval" of the system for use as appropriate.

Products - The private enterprise teams selected by the local and state officials or private developers or sponsors to provide housing in their areas will be expected to provide:

- Designs for specific sites.
- Assistance to local groups in making application for financial and program supports.
- Production facilities as required to provide housing for the contracted market.
- Production, erection and marketing of housing.
- A final report, including detailed cost and progress histories for each project, to assist the Department in future planning.

Funding - Interim and permanent funding to be obtained by the Contractor from sources developed by the governmental sector or the Contractor. Production facility financing will be obtained by the Contractor. Guarantees and subsidy programs will be provided by HUD statutory provisions.

Timing - Subsequent to completion of prototypes.

IV. STATEMENT OF WORK AND PROGRAM PROCEDURE - TYPE 'B' CONTRACT

A. Scope

The Contractor for a Type B contract shall research, develop and design innovative concepts, and provide full documentation of descriptions, operations, costs, results of tests and evaluation activities. This contract will contain no option providing for prototype construction.

B. Products

The Contractor will be required to provide information and other products listed below, to the extent that these items have been included in the contract:

- Sketches and descriptions illustrating the materials, components and systems which have been developed, including the mechanisms whereby these elements are incorporated into the total housing package.
- Reports on individual tests and evaluations conducted during the contract period.
- Any devices such as models and visual aids which assist in illustrating or demonstrating the innovative and unique features of the material, component or system.
- Discussion and evaluation of innovations in land use, processing, financing and other administrative matters which have been developed under the contract.
- Periodic and final reports and briefings as outlined below and required by the contract.

C. Reports and Status Reviews

The Contractor will be required to submit a monthly letter status report; the format and content of this report will be mutually agreed to by the Government and the Contractor during contract negotiations. It is anticipated that this report will include the following items:

1. Major problems and proposed actions for solution.
2. Technical progress as measured against the established schedule.
3. Expenditures and commitments, related to expenditure forecasts.
4. Proposed or potential deviations from original plan and program.

Status Reviews will be held when deemed necessary and as required by the contract, at the Contractor's place of business or elsewhere as may be decided by the Contractor and the Government. This review is to provide the Government with an opportunity to review and evaluate the Contractor's performance and progress, and to allow the Contractor to identify problems requiring Government action and to obtain program redirection as may be required.

A final report will be required at the completion of the contract; detailed requirements for this report will be negotiated at the appropriate time in contract award activities.

D. Government-Furnished Information

The Government will provide information and direction for the planned effort, including specific program requirements and reporting procedures, and information on standards and testing procedures. The Government also expects to develop with the Contractor necessary information to permit the use of the developed material, component or system in the production of housing.

E. Funding and Schedule

Contracts for Research and Advanced Development Activities will be cost-reimbursable or fixed-price contracts, as may be negotiated in each specific instance. The length of these contracts will depend on individual contract requirements.

V. DESIGN CRITERIA

Imaginative solutions to the problems inherent in large-scale production of acceptable housing are encouraged. The Proposer is accorded an opportunity for creation of a total living environment utilizing a wide variety of housing types and sizes considering normal design requirements for occupant and public health and safety and with minimum constraints practicable on production and erection. The following criteria and general outline specifications are provided as a guide to the level of quality and performance desired.

A. Site Considerations

Production housing may be constructed anywhere in the United States; design consideration must be given to the site elements listed below which will vary among locations.

1. Prototype Sites

Approximately eight prototype sites will be selected by HUD and brought under Government control prior to the release of the Phase I design contracts. The prototypes are to serve as test and consumer acceptance models. Systems selected for prototype construction may have one or more models of each housing type built on each site where the climate is appropriate. The number of models and the final selection of sites will be determined by HUD based on recommendations by the Proposer as to the number required for proper system evaluation.

While the prototype sites will be identified in the design contracts, the specific areas on the site to be assigned to a particular system will be the subject of negotiation and design integration during Phase I. Master planning for the prototype sites will be performed during Phase I by consultants working for HUD in cooperation with the Contractors' planners. Data provided in the proposals, including innovative concepts for the use of land and environment, may be used by HUD in its selection of these planning consultants.

2. Climate

To permit proper test of housing systems in various climates, the prototype sites will be located to provide the maximum possible climatic variation.

The Proposal is to indicate the climatic region(s) considered as appropriate locations for the proposed system. The proposed system must be designed to withstand conditions of the indicated region(s) including temperatures, humidity, rainfall, wind, hail, and snow accumulation.

3. Geologic and Soil Conditions

Systems are expected to be usable on sites consisting of natural, stable, well drained soils. In addition, proposed construction systems will be evaluated on the degree to which they are adaptable to one or more of the commonly encountered marginal soil conditions. These marginal soil conditions include:

- a. Poor natural drainage
- b. Unstable or high volume-change soils
- c. Disturbed, "made" or filled ground
- d. Flood plains
- e. Organic materials
- f. Shallow, or rock-soil mixtures
- g. Weak or compressible soils

Special engineering evaluations should be made where critical problems of earthquakes, landslides or sinkholes are potential or known to exist.

4. Site Topography

Site topography may vary as follows (note applicability of the proposed system):

- a. Level - Approximate gradient: 0 - 2%
- b. Undulating - Approximate gradient: 2 - 6%
- c. Rolling - Approximate gradient: 6 - 12%
- d. Hilly - Approximate gradient: 12 - 25%
- e. Steep - Approximate gradient: Over 25%

5. Site Size and Density

Production sites may be of such size as to constitute single unit lots, small multiple unit lots, and large tracts. The applicability of the proposed system to this range of site sizes or varying densities should be stated.

6. Site Situation

Production sites may be situated in urban, suburban, or rural areas, and may be large, open tracts or located between the boundaries of

existing structures. Sites may be undeveloped or partially cleared or may require partial or total removal of existing structures.

B. Building System Considerations

The following general considerations should be reflected in the development of the building system design.

1. Housing Types

This Proposal is to provide for building systems which address any one or combination of the following types:

- Single family, detached. These can be individual houses on single or multiple unit rural, suburban or urban sites.
- Single family, attached. Row or town house configurations.
- Multi-family, low-rise. Non-elevator structures, such as garden apartments with not more than two flights of stairs above grade. Separate consideration may be given to complexes of units with two or less bedrooms, and those with three or more bedrooms.
- Multi-family, high-rise. Structures requiring elevator service. Designs must give particular attention to interior traffic flow, personal security aspects, and community facilities. High-rise configurations may be incorporated into total community environments; design shall provide for good family living.

The Proposal is to indicate those types for which the proposed system is considered applicable. Final decisions as to type and location will be determined in negotiations between the Phase III contractors and the individual government agencies or sponsors groups who will be the ultimate purchasers.

2. Total System

Provide for a total building system, including land, utilities, architectural, structural, foundation, electrical, mechanical and other elements such as appliances and built-in furniture and storage elements. Innovative concepts are encouraged not only for the sub-system elements and various combinations of subsystems, but also for the total system.

3. Architectural Standards

To ensure equitable comparison among proposals, each is to indicate compliance with, or deviations from the draft "Unit Design Criteria," Attachment I. The appearance design should provide for a variety of architectural expressions.

Where the proposed system utilizes generalized standards lower than those set forth in these criteria include the reasoning behind such deviations.

4. Codes

The housing produced under this Program must be safe, sanitary, durable and structurally sound. However, it is expected that insofar as practicable, restrictive code requirements will have been waived or modified as necessary to permit utilization of the proposed system. For a basis of comparison, indicate where the proposed system differs from, or is in conflict with, provisions of the following nationally-recognized model codes:

- Building Officials Conference of America (BOCA) Code
- Southern Building Code
- Uniform Building Code (ICBO)
- National Building Code
- National Electric Code
- National Plumbing Code
- Uniform Plumbing Code
- BOCA Plumbing Code

5. Flexibility

The ability of a proposed system to provide for a number of family sizes, and possibly for subsequent changes in unit sizes to reflect changes in living habits or family makeup, places a premium on system flexibility. In particular, consideration should be given to the ease of expansion of single family units, and the possible adjustment of unit sizes in multi-family units. Such flexibility could be accomplished through "self-help" activities.

6. Interior Appointments

Dwelling units are expected to provide facilities for the following functions, among others:

- Sleeping
- Food preparation, cooking and serving
- Food and equipment storage
- Disposal of food and other waste materials
- Cleaning and/or washing of food service equipment
- Personal sanitation
- Recreational facilities

Built-in furniture may be included where it plays a direct part in the total design and efficiency.

7. Durability

In order to reduce maintenance and upkeep costs to the housing occupants, finishes and materials should be selected with regard to minimum maintenance costs as well as initial expenses.

8. Utilization of Labor

System designs must take into consideration the breadth of skilled-labor disciplines required for production and erection. Current and projected skill shortages demand that system designs provide for effective utilization of skills and furnish an opportunity to train and/or use semi-skilled and unskilled labor.

C. Environment and Community Considerations

Housing to be produced under this Program must be well designed. In particular, it shall provide an environment responsive to the needs of the intended occupants and of the neighborhood. It should make a full community-wide contribution to improving the urban environment, as called for under Section 4 of the Housing and Urban Development Act of 1968.

Contractors selected under Phase II for construction of prototypes shall cooperate with the site planners to ensure proper fitting of their prototype units into the site master plans. Contractors selected for construction of large-scale housing projects under Phase III will be responsible for their individual contracts and agreements with local government agencies and where appropriate, sponsor groups. The following relationships are considered to be of importance in developing such master plans, and the design of the individual units and structures should reflect such relationships insofar as practicable.

1. Dwelling Unit to Housing Complex

The environmental design should consider the relationship between individual units and the total complex as to traffic flow, privacy and security, particularly when multifamily and/or mixed housing types are involved.

2. Housing Complex to Site Environment

The environmental design relating to the total complex to its immediate surroundings should provide for communal facilities such as play areas, parking, and traffic flow, while making effective use of the total available land.

3. Site Environment to Community

The site and its associated environment should be so related to the immediate neighborhood as to constitute a viable part of the community. Commercial facilities, utility services, public and private transportation, schools, medical centers and similar elements must be considered if required in the site master plan.

Innovative concepts regarding site and community environment design, including utility system arrangements, should be considered.

SPECIAL PROVISIONS - COST-REIMBURSEMENT CONTRACTS

I. CONDUCT OF WORK AND REPORTS

- A. The Government Technical Representative for liaison with the Contractor as to the conduct of work hereunder (including the acceptance of the Contractor's reports) will be

HUD or a successor designated in writing by the Contracting Officer.

- B. The Government Technical Representative may issue written or oral instructions to fill in details in the Statement of Work described in this contract. Such instructions must be within the scope of the work set forth in this contract and may not be of such a nature as to affect price, period of performance, fixed fee, or any other provision of this contract.

- C. The Contractor's work hereunder will be carried out under the supervision of
See Attachment A for Schedule of Key Personnel to be provided as required under Clause 27, Key Personnel, General Provisions.

II. CONTRACT PERIOD COMPLETION AND DELIVERY SCHEDULE

A specific completion schedule will be developed for each contract generally based upon the time framework noted under Program Procedure in Attachment C.

III. FINANCIAL REPORT

The Contractor will submit a separate monthly financial report to the Government Technical Representative, with a copy direct to the Contracting Officer covering his effort and those of the subcontractors separately, by the 25th of each month, including the following information:

- (1) Man-hours expended by professional and non-professional categories during the report period broken down as to performance to the extent possible.
- (2) Funds expended to end of the report period.
- (3) Funds remaining unexpended at the end of the report period.
- (4) Estimated financial commitments (e.g., outstanding agreements).
- (5) Scheduled monthly forecast of fund expenditures for balance of contract performance period.

IV. ESTIMATED COST, FIXED FEE AND PAYMENT

- A. The estimated cost for the performance of this contract consisting of the allowable direct and indirect costs and the fixed fee, and the total of the estimated cost and fixed fee of the contract are set forth below:

Estimated Cost	
Fixed Fee	
	Total

- B. The fixed fee will be paid in monthly installments based upon the percentages of completion of work as determined by the Contracting Officer, subject to the withholding provisions of Clause 4, Allowable Cost, Fixed Fee, and Payment.
- C. Invoice or public voucher shall be identified by Contract No. H- and submitted in original and 5 copies to the following address:

Department of Housing and Urban Development
Contracts and Agreements Division
451 - 7th Street, S. W. (Room 2132)
Washington, D. C. 20410
Attention: ASA-2

V. INSPECTION AND ACCEPTANCE

Final inspection and acceptance of all work required under this contract shall be performed by the Government Technical Representative.

VI. GENERAL PROVISIONS

- A. General Provisions for Cost Reimbursement Research and Development Contracts, Attachment E-1, are incorporated herein and made a part hereof as amended below.
- B. Clause 29, "PUBLICATIONS," is amended by changing the title, "PUBLICATION," to read, "PUBLICATION AND INFORMATION RIGHTS," by changing the title of Section (d), "Publication by Government," to read, "Publication and Information Rights of the Government," and by adding the following new paragraph at the end of Section (d):
- "The Government shall also have the unlimited right to use, duplicate, or disclose all information, data, and findings resulting from this contract, in whole or in part, in any manner and for any purpose whatsoever, and have others do so."

- C. Clause 30, "PATENTS," is deleted in its entirety and the following clause is inserted:

"PATENTS

(a) Clause A

Section (1) Whenever any invention or discovery is conceived or reduced to practice by the Contractor or its Technical Personnel (each employee or consultant working under the administrative direction of the Contractor or any subcontractor hereunder) in the course of, or under this contract, the Contractor, or applicable subcontractor, shall promptly furnish the Contracting Officer with complete information thereon; Contractor agrees to grant the Government all right, title and interest in and to each such invention or discovery subject to the reservation of a nonexclusive and royalty-free license to the Contractor to such invention or discovery, and any patent application or patent resulting therefrom.

Section (2) The Contractor agrees:

- (a) to cooperate in the preparation and prosecution of any domestic or foreign patent application which the Government may decide to undertake covering any reported invention;
- (b) to execute all papers required in the prosecution of such patent applications, including the assignment thereto to the United States Government; and
- (c) to secure cooperation of Contractor's Technical Personnel in the preparation and execution of all such papers as may be required in the prosecution of such patent applications or in order to vest title in the subject matter involved in the United States, or to secure the right of free use thereof to the public.

Section (3) Prior to final payment under this contract, the Contractor shall file a final report disclosing to the Contracting Officer all inventions, improvements and discoveries developed in the performance of this contract, and shall certify on the last page of such report that to the best of his knowledge and belief such disclosure has been made therein or that there are no such unreported inventions.

Section (4) The Contractor shall include provisions appropriate to effectuate the purposes of this clause in all contracts of employment with persons who perform any part of the research or development or studies under this contract and in any consultants' agreements or subcontracts involving research or development or studies hereunder.

- Section (5) (a) The Contractor, at the time of first disclosing an invention pursuant to Section 1 of this clause, but not later than three (3) months after, may submit in writing to the Contracting Officer a request for greater rights than the license retained by the Contractor in Section 1 of this clause if: (a) the invention is not the primary object of the contract, and (b) the acquisition of such greater rights is a necessary incentive to call forth private risk capital and expense to bring the invention to the point of practicable application. Such request shall be considered by the Assistant Secretary, who in reviewing the Contractor's request for greater rights will take into consideration the most appropriate means for making the results of such invention available to the public, including the dedication of all patent rights, the patenting of the invention by the Government, or the granting of the Contractor's request, in whole or in part. Any grant of such greater rights shall be subject to the reservation of an irrevocable, royalty-free, nonexclusive, nontransferable license for the practice of the invention throughout the world for governmental purposes.
- (b) With respect to each invention on which the Contractor obtains greater rights under paragraph (a) above, the Contractor agrees to provide written reports at reasonable intervals when requested by the Department on:
- (i) The commercial use that is being made or is intended to be made of each such invention or discovery; and
 - (ii) The steps taken by the Contractor, his licensee, or his assignee, to bring the invention or discovery to a point of practical application or to make the invention or discovery available for licensing royalty-free or on terms that are reasonable in the circumstances.
- (c) With respect to each invention or discovery in which the Contractor obtains rights under paragraph (a) above, the Contractor grants the Department:
- (i) The right to require the granting of nonexclusive, royalty-free licenses to applicants, unless the Contractor, its licensee, or its assignee has taken effective steps within three (3) years after a patent issues on such invention or discovery to bring the invention or discovery to the point of practical application, or has made the invention or discovery available for licensing royalty-free or on terms that are reasonable in the circumstances, or can show cause why he should continue to retain the principal or exclusive rights for a further period of time; and

- (ii) The right to require the granting of licenses to applicants royalty-free or on terms that are reasonable in the circumstances to the extent that the invention or discovery is required for public use by governmental regulation, or as may be necessary to fulfill health or welfare needs, or for other public purposes stipulated in this contract.

(b) Clause B

Section (1) Whenever any invention or discovery is conceived or reduced to practice by the Contractor or its Technical Personnel (each employee or consultant working under the administrative direction of the Contractor or any subcontractor hereunder) in the course of, or under this contract, the Contractor, or applicable subcontractor, shall promptly furnish the Contracting Officer with complete information thereon; Contractor agrees to grant the Government all right, title and interest in and to each such invention or discovery, provided, however, that the Contractor shall retain (subject to 5 and 6 of this clause) at least a sole (except as against the Government or its account) irrevocable, royalty-free license, with the right to grant sublicenses under any such invention or discovery, and any patent application or patent resulting therefrom.

Section (2) The Contractor agrees:

- (a) to cooperate in the preparation and prosecution of any domestic or foreign patent application which the Government may decide to undertake covering any reported invention;
- (b) to execute all papers required in the prosecution of such patent applications, including the assignment thereto to the United States Government; and
- (c) to secure cooperation of Contractor's Technical Personnel in the preparation and execution of all such papers as may be required in the prosecution of such patent applications or in order to vest title in the subject matter involved in the United States, or to secure the right of free use thereof to the public.

Section (3) Prior to final payment under this contract, the Contractor shall file a final report disclosing to the Contracting Officer all inventions, improvements and discoveries developed in the performance of this contract, and shall certify on the last page of such report that to the best of his knowledge and belief such disclosure has been made therein or that there are no such unreported inventions.

- Section (4) The Contractor shall include provisions appropriate to effectuate the purposes of this clause in all contracts of employment with persons who perform any part of the research or development or studies under this contract and in any consultants' agreements or subcontracts involving research or development or studies hereunder.
- Section (5) With respect to each invention or discovery in which the Contractor retains sole rights under Section 1, the Contractor agrees to provide written reports at reasonable intervals when requested by the Department on:
- (a) The commercial use that is being made or is intended to be made of each such invention or discovery; and
 - (b) The steps taken by the Contractor, his licensee, or his assignee, to bring the invention or discovery to a point of practical application or to make the invention or discovery available for licensing royalty-free or on terms that are reasonable in the circumstances.
- Section (6) With respect to each invention in which the Contractor retains sole rights under Section 1, the Contractor grants the Department:
- (a) The right to require the granting of nonexclusive, royalty-free licenses to applicants, unless the Contractor, its licensee, or its assignee demonstrates to the Department's satisfaction, on request, that the Contractor, its licensee or its assignee has taken effective steps within three (3) years after a patent issues on such invention or discovery to bring the invention or discovery to the point of practical application, or has made the invention or discovery available for licensing royalty-free or on terms that are reasonable in the circumstances, or can show cause why he should continue to retain the principal or exclusive rights for a further period of time; and
 - (b) The right to require the granting of licenses to applicants royalty-free or on terms that are reasonable in the circumstances to the extent that the invention or discovery is required for public use by governmental regulation, or as may be necessary to fulfill health or welfare needs, or for other public purposes stipulated in this contract.

SPECIAL PROVISIONS - FIXED-PRICE CONTRACTS

I. CONDUCT OF WORK AND REPORTS

- A. The Government Technical Representative for liaison with the Contractor as to the conduct of work hereunder (including the acceptance of the Contractor's reports) will be

HUD or a successor designated in writing by the Contracting Officer.
- B. The Government Technical Representative may issue written or oral instructions to fill in details in the Statement of Work described in this contract. Such instructions must be within the scope of the work set forth in this contract and may not be of such a nature as to affect price, period of performance, fixed fee, or any other provision of this contract.
- C. The Contractor's work hereunder will be carried out under the supervision of
See Attachment A for Schedule of Key Personnel to be provided as required under Clause 27, Key Personnel, General Provisions.

II. CONTRACT PERIOD COMPLETION AND DELIVERY SCHEDULE

A specific completion schedule will be developed for each contract generally based upon the time framework noted under Program Procedure in Attachment C.

III. REPORTS

The Contractor shall provide reports as described in Attachment C.

IV. PRICE; PAYMENT AND SUBMISSION OF INVOICES

- A. The Government shall pay the Contractor as full compensation for performance of this contract, inclusive of all costs and expenses, a total firm-fixed price of \$
- B. Invoices or public vouchers shall be identified by Contract No. and submitted in original and 5 copies to the following address:

Department of Housing and Urban Development
Contracts and Agreements Division
451 - 7th Street, S. W. (Room 2132)
Washington, D. C. 20410
Attention: ASA-2

V. INSPECTION AND ACCEPTANCE

Final inspection and acceptance of all work required under this contract shall be performed by the Government Technical Representative.

VI. GENERAL PROVISIONS

General Provisions for Fixed-Price Research and Development Contracts, HUD 736 (10-68) is incorporated herein and made a part hereof, as amended below:

- A. Clause 6, "EXAMINATION OF RECORDS" is deleted in its entirety, and the following clause is inserted:

EXAMINATION OF RECORDS

(a) The Contractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until expiration of 3 years after final payment under this contract, or of the time periods for the particular records specified in Part 1-20 of the Federal Procurement Regulations (41 CFR Part 1-20), whichever expires earlier, have access to and the right to examine any directly pertinent books, documents, papers, and records of the Contractor involving transactions related to this contract.

(b) The Contractor further agrees to include in all his subcontracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until expiration of 3 years after final payment under the subcontract, or of the time periods for the particular records specified in Part 1-20 of the Federal Procurement Regulations (41 CFR Part 1-20), whichever expires earlier, have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor, involving transactions related to the subcontract. The term "subcontract" as used in this clause excludes (1) purchase orders not exceeding \$2,500 and (2) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public.

(c) Paragraphs (a) and (b) above are extended to provide equal rights to authorized representatives of the Department of Housing and Urban Development.

- B. Clause 16, "EQUAL OPPORTUNITY" is modified as follows:

The term "race, color, religion, sex, or national origin" is substituted for the term "race, creed, color, or national origin".

- C. Clause 19, "PUBLICATION" is deleted in its entirety, and the following clause is inserted:

PUBLICATION AND INFORMATION RIGHTS

(a) Definition. For the purpose of this clause, "publication" includes (1) any document containing information intended for public consumption or (2) the act of, or any act which may result in, disclosing information to the public.

(b) General. The results of the research and development and studies conducted under this contract are to be made available to the public through dedication, assignment to the Government, or such other means as the Secretary of Housing and Urban Development shall determine, as required under title III of the Housing Act of 1948, as amended (12 U.S.C. 1701e).

(c) Reports Furnished the Government. All intermediate and final reports of the research and development and studies conducted hereunder shall indicate on the cover or other initial page that the research and development and studies forming the basis for the report were conducted pursuant to a contract with the Department of Housing and Urban Development. Such reports are official Government property and may not be published or reproduced (in toto, in verbatim excerpt, or in form approximating either of these) as an unofficial paper or article. The Contractor or Technical Personnel (each employee or consultant working under the administrative direction of the Contractor or any subcontractor hereunder) may publish such reports in whole or in part in a non-Government publication only in accordance with this paragraph (c) and paragraph (e) (1) of this clause.

(d) Publication and Information Rights of Government. The Government shall have full right to publish all information, data, and findings developed as a result of the research and development and studies conducted hereunder. Such publication will, at the option of the Contractor (except in the case of verbatim excerpts from the Contractor's report), credit the Contractor and its principal personnel involved by foreword or initial footnote to the publication in form substantially as follows:

The (research) (development) (studies) forming the basis for this report were conducted through contract with (Name of Contractor) by (Name or names of principal personnel). Except for verbatim excerpts from the Contractor's reports or from other identified sources, the Department of Housing and Urban Development accepts responsibility for the conclusions herein stated.

The Government shall also have the unlimited right to use, duplicate, or disclose all information, data, and findings resulting from this contract, in whole or in part, in any manner and for any purpose whatsoever, and have others do so.

(e) Publication by Contractor or Technical Personnel.

(1) Publication in whole or in part of Contractor's reports furnished the Government. Unless such reports have been placed in the public domain by Government publication, the Contractor or Technical Personnel (each employee or consultant working under the administrative direction of the Contractor or any subcontractor hereunder) may publish a report furnished the Government, in toto or in verbatim excerpt, but consistent with paragraph (c) of this clause may not secure copyright therein, subject to the following conditions, and the conditions in paragraph (e) (4) and paragraph (f):

(i) During the first six months after submission of the full final report, if written permission to publish is obtained from the Contracting Officer.

(ii) After six months following submission of the full final report, and if paragraph (e) (3) is inapplicable, if a foreword or footnote in the non-Government publication indicates the source of the verbatim material.

(2) Publication, except verbatim excerpts, concerning or based in whole or in part on results of research and development and studies hereunder. The Contractor or Technical Personnel may issue a publication concerning, or based in whole or part on the results of, the research and development studies conducted under this contract and may secure copyright therein but in so publishing is not authorized thereby to inhibit the unrestricted right of the Secretary of Housing and Urban Development to disclose or publish in such manner as he may deem to be in the public interest the results of such research and development and studies, subject to the following conditions and the requirement in paragraph (e) (4):

(i) During the first six months after submission of the final report, and if paragraph (e) (3) is inapplicable, subject to Government exercise of an option that the publication contain a foreword or initial footnote substantially as follows:

The (research) (development) (studies) forming (part of) the basis for this publication were conducted pursuant to a contract with the Department of Housing and Urban Development.

The substance of such (research) (development) (studies) is dedicated to the public. The author and publisher are solely responsible for the accuracy of statements or interpretations contained herein.

(3) General condition if HUD determines that Contractor's final report contains patentable subject matter developed in contract performance. If the Contracting Officer determines that the Contractor's full final report contains patentable subject matter developed in the performance of this contract and so notifies the Contractor in writing prior to six months from date of submission of such report, not publication of verbatim excerpts from Contractor's reports or publication concerning or based in whole or in part on the results of the research and development and studies hereunder shall be made without the written consent of the Contracting Officer.

(4) Copies of Contractor and Technical Personnel publications to be furnished the Government. The Contractor or Technical Personnel will furnish the Contracting Officer six (6) copies of any publications which are based in whole or in part on the research and development and studies conducted under this contract.

(f) Administratively confidential information. The Contractor shall not publish or otherwise disclose, except to the Government and except matters of public record, any information or data obtained hereunder from private individuals, organizations, or public agencies, in a publication whereby the information or data furnished by any particular person or establishment can be identified, except with the consent of such person or establishment (consistent with the inhibitions applicable to the Secretary of Housing and Urban Development under section 602(d) of the Housing Act of 1956, 12 U.S.C. 1701d-3(d)).

(g) Inclusion of Provisions in Contractor's Agreements. The Contractor shall include provisions appropriate to effectuate the purposes of this clause in all contracts of employment with persons who perform any part of the research or development or study under this contract and in any consultant's agreements or subcontracts involving research or development or study hereunder.

- D. Clause 20, "PATENTS," is deleted in its entirety and the following clause is inserted:

"PATENTS

(a) Clause A

Section (1) Whenever any invention or discovery is conceived or reduced to practice by the Contractor or its Technical Personnel (each employee or consultant working under the administrative direction of the Contractor or any subcontractor hereunder) in the course of, or under this contract, the Contractor, or applicable subcontractor, shall promptly furnish the Contracting Officer with complete information thereon; Contractor agrees to grant the Government all right, title and interest in and to each such invention or discovery subject to the reservation of a nonexclusive and royalty-free license to the Contractor to such invention or discovery, and any patent application or patent resulting therefrom.

Section (2) The Contractor agrees: . . .

- (a) to cooperate in the preparation and prosecution of any domestic or foreign patent application which the Government may decide to undertake covering any reported invention;
- (b) to execute all papers required in the prosecution of such patent applications, including the assignment thereto to the United States Government; and
- (c) to secure cooperation of Contractor's Technical Personnel in the preparation and execution of all such papers as may be required in the prosecution of such patent applications or in order to vest title in the subject matter involved in the United States, or to secure the right of free use thereof to the public.

Section (3) Prior to final payment under this contract, the Contractor shall file a final report disclosing to the Contracting Officer all inventions, improvements and discoveries developed in the performance of this contract, and shall certify on the last page of such report that to the best of his knowledge and belief such disclosure has been made therein or that there are no such unreported inventions.

Section (4) The Contractor shall include provisions appropriate to effectuate the purposes of this clause in all contracts of employment with persons who perform any part of the research or development or studies under this contract and in any consultants' agreements or subcontracts involving research or development or studies hereunder.

- Section (5) (a) The Contractor, at the time of first disclosing an invention pursuant to Section 1 of this clause, but not later than three (3) months after, may submit in writing to the Contracting Officer a request for greater rights than the license retained by the Contractor in Section 1 of this clause if: (a) the invention is not the primary object of the contract, and (b) the acquisition of such greater rights is a necessary incentive to call forth private risk capital and expense to bring the invention to the point of practicable application. Such request shall be considered by the Assistant Secretary, who in reviewing the Contractor's request for greater rights will take into consideration the most appropriate means for making the results of such invention available to the public, including the dedication of all patent rights, the patenting of the invention by the Government, or the granting of the Contractor's request, in whole or in part. Any grant of such greater rights shall be subject to the reservation of an irrevocable, royalty-free, nonexclusive, nontransferable license for the practice of the invention throughout the world for governmental purposes.
- (b) With respect to each invention on which the Contractor obtains greater rights under paragraph (a) above, the Contractor agrees to provide written reports at reasonable intervals when requested by the Department on:
- (i) The commercial use that is being made or is intended to be made of each such invention or discovery; and
 - (ii) The steps taken by the Contractor, his licensee, or his assignee, to bring the invention or discovery to a point of practical application or to make the invention or discovery available for licensing royalty-free or on terms that are reasonable in the circumstances.
- (c) With respect to each invention or discovery in which the Contractor obtains rights under paragraph (a) above, the Contractor grants the Department:
- (i) The right to require the granting of nonexclusive, royalty-free licenses to applicants, unless the Contractor, its licensee, or its assignee has taken effective steps within three (3) years after a patent issues on such invention or discovery to bring the invention or discovery to the point of practical application, or has made the invention or discovery available for licensing royalty-free or on terms that are reasonable in the circumstances, or can show cause why he should continue to retain the principal or exclusive rights for a further period of time; and

- (ii) The right to require the granting of licenses to applicants royalty-free or on terms that are reasonable in the circumstances to the extent that the invention or discovery is required for public use by governmental regulation, or as may be necessary to fulfill health or welfare needs, or for other public purposes stipulated in this contract.

(b) Clause B

Section (1) Whenever any invention or discovery is conceived or reduced to practice by the Contractor or its Technical Personnel (each employee or consultant working under the administrative direction of the Contractor or any subcontractor hereunder) in the course of, or under this contract, the Contractor, or applicable subcontractor, shall promptly furnish the Contracting Officer with complete information thereon; Contractor agrees to grant the Government all right, title and interest in and to each such invention or discovery, provided, however, that the Contractor shall retain (subject to 5 and 6 of this clause) at least a sole (except as against the Government or its account) irrevocable, royalty-free license, with the right to grant sublicenses under any such invention or discovery, and any patent application or patent resulting therefrom.

Section (2) The Contractor agrees:

- (a) to cooperate in the preparation and prosecution of any domestic or foreign patent application which the Government may decide to undertake covering any reported invention;
- (b) to execute all papers required in the prosecution of such patent applications, including the assignment thereto to the United States Government; and
- (c) to secure cooperation of Contractor's Technical Personnel in the preparation and execution of all such papers as may be required in the prosecution of such patent applications or in order to vest title in the subject matter involved in the United States, or to secure the right of free use thereof to the public.

Section (3) Prior to final payment under this contract, the Contractor shall file a final report disclosing to the Contracting Officer all inventions, improvements and discoveries developed in the performance of this contract, and shall certify on the last page of such report that to the best of his knowledge and belief such disclosure has been made therein or that there are no such unreported inventions.

- Section (4) The Contractor shall include provisions appropriate to effectuate the purposes of this clause in all contracts of employment with persons who perform any part of the research or development or studies under this contract and in any consultants' agreements or subcontracts involving research or development or studies hereunder.
- Section (5) With respect to each invention or discovery in which the Contractor retains sole rights under Section 1, the Contractor agrees to provide written reports at reasonable intervals when requested by the Department on:
- (a) The commercial use that is being made or is intended to be made of each such invention or discovery; and
 - (b) The steps taken by the Contractor, his licensee, or his assignee, to bring the invention or discovery to a point of practical application or to make the invention or discovery available for licensing royalty-free or on terms that are reasonable in the circumstances.
- Section (6) With respect to each invention in which the Contractor retains sole rights under Section 1, the Contractor grants the Department:
- (a) The right to require the granting of nonexclusive, royalty-free licenses to applicants, unless the Contractor, its licensee, or its assignee demonstrates to the Department's satisfaction, on request, that the Contractor, its licensee or its assignee has taken effective steps within three (3) years after a patent issues on such invention or discovery to bring the invention or discovery to the point of practical application, or has made the invention or discovery available for licensing royalty-free or on terms that are reasonable in the circumstances, or can show cause why he should continue to retain the principal or exclusive rights for a further period of time; and
 - (b) The right to require the granting of licenses to applicants royalty-free or on terms that are reasonable in the circumstances to the extent that the invention or discovery is required for public use by governmental regulation, or as may be necessary to fulfill health or welfare needs, or for other public purposes stipulated in this contract.

E. Clause 27, "CERTIFICATION OF NONSEGREGATED FACILITIES" is modified as follows:

The term "race, color, religion, or national origin" is substituted for the term "race, creed, color, or national origin".

U. S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

GENERAL PROVISIONS

Cost-Reimbursement Research and Development Contracts

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1. DEFINITIONS

As used throughout this contract, the following terms shall have the meanings set forth below:

(a) The term "Secretary" means the Secretary or Under Secretary of the Department of Housing and Urban Development; and the term "his duly authorized representative" means any person or persons or board (other than the Contracting Officer) authorized to act for the Secretary.

(b) The term "Contracting Officer" means the person executing the contract on behalf of the Government, and any other officer or civilian employee who is a properly designated Contracting Officer; and the term includes, except as otherwise provided in this contract, the authorized representative of a Contracting Officer acting within the limits of his authority.

(c) Except as otherwise provided in this contract, the term "subcontracts" includes purchase orders under this contract.

(d) The term "HUD" means the Department of Housing and Urban Development.

2. CHANGES

The Contracting Officer may at any time, by a written order and without notice to the sureties, if any, make changes, within the general scope of this contract, in any one or more of the following: (i) drawings, designs, or specifications; (ii) method of shipment or packing; (iii) place of inspection, delivery or acceptance; and (iv) the amount of Government-furnished property. If any such change causes an increase or decrease in the estimated cost of, or the time required for, performance of this contract, or otherwise affects any other provision of this contract, whether changed or not changed by any such order, an equitable adjustment shall be made (i) in the estimated cost or delivery schedule, or both, (ii) in the amount of any fee to be paid to the Contractor, and (iii) in such other provisions of the contract as may be so affected, and the contract shall be modified in writing accordingly. Any claim by the Contractor for adjustment under this clause must be asserted within sixty (60) days from the date of receipt by the Contractor of the notification of change; provided, however, that the Contracting Officer, if he decides that the facts justify such action, may receive and act upon any such claim asserted at any

time prior to final payment under this contract. Failure to agree to any adjustment shall be a dispute concerning a question of fact within the meaning of the clause of this contract entitled "Disputes." However, nothing in this clause shall excuse the Contractor from proceeding with the contract as changed.

3. LIMITATION OF COST

(a) It is estimated that the total cost to the Government, exclusive of any fixed fee, for the performance of this contract will not exceed the estimated cost set forth in the Schedule, and the Contractor agrees to use his best efforts to perform the work specified in the Schedule and all obligations under this contract within such estimated cost. If at any time the Contractor has reason to believe that the costs which he expects to incur in the performance of this contract in the next succeeding sixty (60) days, when added to all costs previously incurred, will exceed seventy-five percent (75%) of the estimated cost then set forth in the Schedule, or if at any time the Contractor has reason to believe that the total cost to the Government, exclusive of any fixed fee, for the performance of this contract will be greater or substantially less than the then estimated cost thereof, the Contractor shall notify the Contracting Officer in writing to that effect, giving the revised estimate of such total cost for the performance of this contract.

(b) The Government shall not be obligated to reimburse the Contractor for costs incurred in excess of the estimated cost set forth in the Schedule, and the Contractor shall not be obligated to continue performance under the contract or to incur costs in excess of the estimated cost set forth in the Schedule, unless and until the Contracting Officer shall have notified the Contractor in writing that such estimated cost has been increased and shall have specified in such notice a revised estimated cost which shall thereupon constitute the estimated cost of performance of this contract. When and to the extent that the estimated cost set forth in the Schedule has been increased, any costs incurred by the Contractor in excess of such estimated cost prior to the increase in estimated cost shall be allowable to the same extent as if such costs had been incurred after such increase in estimated cost.

4. ALLOWABLE COST, FIXED FEE, AND PAYMENT

(a) For the performance of this contract, the Government shall pay to the Contractor:

(i) the cost thereof (hereinafter referred to as "allowable cost") determined by the Contracting Officer to be allowable in accordance with --

(A) Subpart 1-15.2 (41 CFR 1-15.2) of the Federal Procurement Regulations as in effect on the date of this contract; and

(B) the terms of this contract; and

(ii) such fixed fee, if any, as may be provided for in the Schedule.

(b) Once each month (or at more frequent intervals, if approved by the Contracting Officer), the Contractor may submit to an authorized representative of the Contracting Officer, in such form and reasonable detail as such representative may require, an invoice or public voucher supported by a statement of cost incurred by the Contractor in the performance of this contract and claimed to constitute allowable cost.

(c) Promptly after receipt of each invoice or voucher and statement of cost, the Government shall, except as otherwise provided in this contract, subject to the provisions of (d) below, make payment thereon as approved by the Contracting Officer. Payment of the fixed fee, if any, shall be made to the Contractor as specified in the Schedule; Provided, However, that after payment of eighty-five percent (85%) of the fixed fee set forth in the Schedule, further payment on account of the fixed fee shall be withheld until a reserve of either fifteen percent (15%) of the total fixed fee, or one hundred thousand dollars (\$100,000), whichever is less, shall have been set aside.

(d) At any time or times prior to final payment under this contract the Contracting Officer may have the invoices or vouchers and statements of cost audited. Each payment theretofore made shall be subject to reduction for amounts included in the related invoice or voucher which are found by the Contracting Officer, on the basis of such audit, not to constitute allowable cost. Any payment may be reduced for overpayments, or increased for underpayments, on preceding invoices or vouchers.

(e) On receipt and approval of the invoice or voucher designated by the Contractor as the "completion invoice" or "completion voucher" and upon compliance by the Contractor with all the provisions of this contract (including, without limitation, the provisions relating to patents and the provisions of (f) below), the Government shall promptly pay to the Contractor any balance of allowable cost, and any part of the fixed fee, which has been withheld pursuant to (c) above or otherwise not paid to the Contractor. The completion invoice or voucher shall be submitted by the Contractor promptly following completion of the work under this contract but in no event later than one (1) year (or such longer period as the Contracting Officer may in his discretion approve in writing) from the date of such completion.

(f) The Contractor agrees that any refunds, rebates, credits, or other amounts (including any interest thereon) accruing to or received by the Contractor or any assignee under this contract shall be paid by the Contractor to the Government, to the extent that they are properly allocable to costs for which the Contractor has been reimbursed by the Government under this contract. Reasonable expenses incurred by the Contractor for the purpose of securing such refunds, rebates, credits, or other amounts shall be allowable costs hereunder when approved by the Contracting Officer. Prior to final payment under this contract, the Contractor and each assignee under this contract whose assignment is in effect at the time of final payment under this contract shall execute and deliver:

(i) an assignment to the Government, in form and substance satisfactory to the Contracting Officer, of refunds, rebates, credits, or other amounts (including any interest thereon) properly allocable to costs for which the Contractor has been reimbursed by the Government under this contract; and

(ii) a release discharging the Government, its officers, agents, and employees from all liabilities, obligations, and claims arising out of or under this contract, subject only to the following exceptions --

(A) specified claims in stated amounts or in estimated amounts where the amounts are not susceptible of exact statement by the Contractor;

(B) claims, together with reasonable expenses incidental thereto, based upon liabilities of the Contractor to third parties arising out of the performance of this contract; Provided, that such claims are not known to the Contractor on the date of the execution of the release; and Provided further, that the Contractor gives notice of such claims in writing to the Contracting Officer not more than six (6) years after the date of the release or the date of any notice to the Contractor that the Government is prepared to make final payment, whichever is earlier; and

(C) claims for reimbursement of costs (other than expenses of the Contractor by reason of its indemnification of the Government against patent liability), including reasonable expenses incidental thereto, incurred by the Contractor under the provisions of this contract relating to patents.

(g) Any cost incurred by the Contractor under the terms of this contract which would constitute allowable cost under the provisions of this clause shall be included in determining the amount payable under this contract, notwithstanding any provisions contained in the specifications or other documents incorporated in this contract by reference, designating services to be performed or materials to be furnished by the Contractor at his expense or without cost to the Government.

5. INSPECTION

The Government, through any authorized representatives, has the right, at all reasonable times, to inspect, or otherwise evaluate the work performed or being performed hereunder and the premises in which it is being performed. If any inspection or evaluation is made by the Government on the premises of the Contractor or a subcontractor, the Contractor shall provide and shall require subcontractors to provide all reasonable facilities and assistance for the safety and convenience of the Government representatives in the performance of their duties. All inspections and evaluations shall be performed in such a manner as will not unduly delay the work.

6. ASSIGNMENT OF CLAIMS

(a) Pursuant to the provisions of the Assignment of Claims Act of 1940, as amended (31 U.S.C. 203, 41 U.S.C. 15), if this contract provides for payments aggregating \$1,000 or more, claims for moneys due or to become due the Contractor from the Government under this contract may be assigned to a bank, trust company, or other financing institution, including any Federal lending agency, and may thereafter be further assigned and re-assigned to any such institution. Any such assignment or reassignment shall cover all amounts payable under this contract and not already paid, and shall not be made to more than one party, except that any such assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in such financing. Unless otherwise provided in this contract, payments to an assignee of any moneys due or to become due under this contract shall not, to the extent provided in said Act, as amended, be subject to reduction or setoff. (The preceding sentence applies only if this contract is made in time of war or national emergency as defined in said Act and is with the Department of Defense, the General Services Administration, the Atomic Energy Commission, the National Aeronautics and Space Administration, the Federal Aviation Agency, or any other department or agency of the United States designated by the President pursuant to Clause 4 of the proviso of section 1 of the Assignment of Claims Act of 1940, as amended by the Act of May 15, 1951, 65 Stat. 41.)

(b) In no event shall copies of this contract or of any plans, specifications, or other similar documents relating to work under this contract, if marked "Top Secret," "Secret," or "Confidential," be furnished to any assignee of any claim arising under this contract or to any other person not entitled to receive the same. However, a copy of any part or all of this contract so marked may be furnished, or any information contained therein may be disclosed, to such assignee upon the prior written authorization of the Contracting Officer.

7. EXAMINATION OF RECORDS

(a) The Contractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until expiration of 3 years after final payment under this contract, or of the time periods for the particular records specified in Part 1-20 of the Federal Procurement Regulations (41 CFR Part 1-20), whichever expires earlier, have access to and the right to examine any directly pertinent books, documents, papers, and records of the Contractor involving transactions related to this contract.

(b) The Contractor further agrees to include in all his subcontracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until expiration of 3 years after final payment under the subcontract, or of the time periods for the particular records specified in Part 1-20 of the Federal Procurement Regulations (41 CFR Part 1-20), whichever expires

earlier, have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor, involving transactions related to the subcontract. The term "subcontract" as used in this clause excludes (1) purchase orders not exceeding \$2,500 and (2) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public.

(c) Paragraphs (a) and (b) above are extended to provide equal rights to authorized representatives of the Department of Housing and Urban Development.

8. SUBCONTRACTS

(a) The Contractor shall give advance notification to the Contracting Officer of any proposed subcontract hereunder which (i) is on a cost, cost-plus-a-fee, time and material, or labor-hour basis, or (ii) is on a fixed-price basis exceeding in dollar amount either \$25,000 or five percent (5%) of the total estimated cost of this contract.

(b) In the case of a proposed subcontract which (i) is on a cost, cost-plus-a-fee, time and material, or labor-hour basis and which would involve an estimated amount in excess of \$10,000, including any fee; or (ii) is proposed to exceed \$100,000; or (iii) is one of a number of subcontracts under this contract with a single subcontractor for the same or related supplies or services which, in the aggregate, are expected to exceed \$100,000; the advance notification required by (a) above shall include:

(i) a description of the supplies or services to be called for by the subcontract;

(ii) identification of the proposed subcontractor and an explanation of why and how the proposed subcontractor was selected, including the degree of competition obtained;

(iii) the proposed subcontract price, together with the Contractor's cost or price analysis thereof;

(iv) the subcontractor's current, complete, and accurate cost or pricing data and Certificate of Current Cost or Pricing Data when such data and certificate are required, by other provisions of this contract, to be obtained from the subcontractor; and

(v) identification of the type of subcontract proposed to be used.

(c) The Contractor shall not, without the prior written consent of the Contracting Officer, place any subcontract which (i) is on a cost or cost-plus-a-fee basis, or (ii) is on a fixed-price basis exceeding in dollar amount either \$25,000 or five percent (5%) of the total estimated cost of this contract, or (iii) provides for the fabrication, purchase, rental, installation, or other acquisition of any item of industrial facilities, or of special tooling having a value in excess of \$1,000, or (iv) is on a time and material or labor-hour basis, or (v) has experimental, developmental, or research work as one of its purposes. The Contracting Officer may, in his discretion, ratify

in writing any such subcontract; such action shall constitute the consent of the Contracting Officer as required by this paragraph (c).

(d) The Contractor agrees that no subcontract placed under this contract shall provide for payment on a cost-plus-a-percentage-of-cost basis.

(e) The Contracting Officer may, in his discretion, specifically approve in writing any of the provisions of a subcontract. However, such approval or the consent of the Contracting Officer obtained as required by this clause shall not be construed to constitute a determination of the allowability of any cost under this contract, unless such approval specifically provides that it constitutes a determination of the allowability of such cost.

(f) The Contractor shall give the Contracting Officer immediate notice in writing of any action or suit filed, and prompt notice of any claim made against the Contractor by any subcontractor or vendor which, in the opinion of the Contractor, may result in litigation, related in any way to this contract with respect to which the Contractor may be entitled to reimbursement from the Government.

(g) Notwithstanding (c) above, the Contractor may enter into subcontracts within (ii) or, if the subcontract is for special tooling, within (iii), of (c) above, without the prior written consent of the Contracting Officer if the Contracting Officer has, in writing, approved the Contractor's purchasing system and the subcontract is within the limitations of such approval.

9. UTILIZATION OF SMALL BUSINESS CONCERNS

(a) It is the policy of the Government as declared by the Congress that a fair proportion of the purchases and contracts for supplies and services for the Government be placed with small business concerns.

(b) The Contractor agrees to accomplish the maximum amount of subcontracting to small business concerns that the Contractor finds to be consistent with the efficient performance of this contract.

10. TERMINATION FOR DEFAULT OR FOR CONVENIENCE OF THE GOVERNMENT

(a) The performance of work under the contract may be terminated by the Government in accordance with this clause in whole, or from time to time in part:

(1) Whenever the Contractor shall default in performance of this contract in accordance with its terms (including in the term "default" any such failure by the Contractor to make progress in the prosecution of the work hereunder as endangers such performance), and shall fail to cure such default within a period of ten days (or such longer period as the Contracting Officer may allow) after receipt from the Contracting Officer of a notice specifying the default; or

(2) Whenever for any reason the Contracting Officer shall determine that such termination is in the best interest of the Government. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying whether termination is for the default of the Contractor or for the convenience of the Government, the extent to which performance of work under the contract is terminated, and the date upon which such termination becomes effective. If, after notice of termination of this contract for default under (1) above, it is determined for any reason that the Contractor was not in default pursuant to (1), or that the Contractor's failure to perform or to make progress in performance is due to causes beyond the control and without the fault or negligence of the Contractor pursuant to the provisions of the clause of this contract relating to excusable delays, the Notice of Termination shall be deemed to have been issued under (2) above, and the rights and obligations of the parties hereto shall in such event be governed accordingly.

(b) After receipt of a Notice of Termination and except as otherwise directed by the Contracting Officer, the Contractor shall:

(1) Stop work under the contract on the date and to the extent specified in the Notice of Termination;

(2) Place no further orders or subcontracts for materials, services, or facilities, except as may be necessary for completion of such portion of the work under the contract as is not terminated;

(3) Terminate all orders and subcontracts to the extent that they relate to the performance of work terminated by the Notice of Termination;

(4) Assign to the Government, in the manner and to the extent directed by the Contracting Officer, all of the right, title, and interest of the Contractor under the orders or subcontracts so terminated, in which case the Government shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts;

(5) With the approval or ratification of the Contracting Officer, to the extent he may require, which approval or ratification shall be final and conclusive for all purposes of this clause, settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, the cost of which would be reimbursable in whole or in part, in accordance with the provisions of this contract;

(6) Transfer title to the Government (to the extent that title has not already been transferred) and deliver in the manner, at the times, and to the extent directed by the Contracting Officer, (i) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced as a part of, or acquired in respect of the performance of, the work terminated by the Notice of Termination; (ii) the completed or partially completed plans, drawings, information, and other property which, if the contract had been completed, would be required to be furnished to the Government; and (iii) the jigs, dies, and fixtures, and other special tools and tooling acquired or manufactured for the performance of this contract for the cost of which the Contractor has been or will be reimbursed under this contract;

(7) Use his best efforts to sell, in the manner, at the times, to the extent, and at the price or prices directed or authorized by the Contracting Officer, any property of the types referred to in (6) above: Provided, however, That the Contractor (i) shall not be required to extend credit to any purchaser, and (ii) may acquire any such property under the conditions prescribed by and at a price or prices approved by the Contracting Officer: And provided further, That the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the Government to the Contractor under this contract or shall otherwise be credited to the price or cost of the work covered by this contract or paid in such other manner as the Contracting Officer may direct;

(8) Complete performance of such part of the work as shall not have been terminated by the Notice of Termination; and

(9) Take such action as may be necessary, or as the Contracting Officer may direct, for the protection and preservation of the property related to this contract which is in the possession of the Contractor and in which the Government has or may acquire an interest.

The Contractor shall proceed immediately with the performance of the above obligations notwithstanding any delay in determining or adjusting the amount of the fee, or any item of reimbursable cost, under this clause. At any time after expiration of the plant clearance period, as defined in Subpart 1-8.1 of the Federal Procurement Regulations (41 CFR 1-8.1), as the definition may be amended from time to time, the Contractor may submit to the Contracting Officer a list, certified as to quantity and quality, of any or all items of termination inventory not previously disposed

of, exclusive of items the disposition of which has been directed or authorized by the Contracting Officer, and may request the Government to remove such items or enter into a storage agreement covering them. Not later than fifteen (15) days thereafter, the Government will accept such items and remove them or enter into a storage agreement covering the same: Provided, That the list submitted shall be subject to verification by the Contracting Officer upon removal of the items or, if the items are stored, within forty-five (45) days from the date of submission of the list, and any necessary adjustment to correct the list as submitted shall be made prior to final settlement.

(c) After receipt of a Notice of Termination, the Contractor shall submit to the Contracting Officer his termination claim in the form and with the certification prescribed by the Contracting Officer. Such claim shall be submitted promptly but in no event later than one year from the effective date of termination, unless one or more extensions in writing are granted by the Contracting Officer upon request of the Contractor made in writing within such one-year period or authorized extension thereof. However, if the Contracting Officer determines that the facts justify such action, he may receive and act upon any such termination claim at any time after such one-year period or any extension thereof. Upon failure of the Contractor to submit his termination claim within the time allowed, the Contracting Officer may, subject to any review required by the contracting agency's procedures in effect as of the date of execution of this contract, determine, on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.

(d) Subject to the provisions of paragraph (c), and subject to any review required by the contracting agency's procedures in effect as of the date of execution of this contract, the Contractor and the Contracting Officer may agree upon the whole or any part of the amount or amounts to be paid (including an allowance for the fee) to the Contractor by reason of the total or partial termination of work pursuant to this clause. The contract shall be amended accordingly, and the Contractor shall be paid the agreed amount.

(e) In the event of the failure of the Contractor and the Contracting Officer to agree in whole or in part, as provided in paragraph (d), as to the amounts with respect to costs and fee, or as to the amount of the fee, to be paid to the Contractor in connection with the termination of work pursuant to this clause, the Contracting Officer shall, subject to any review required by the contracting agency's procedures in effect as of the date of execution of this contract, determine, on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and shall pay to the Contractor the amount determined as follows:

(1) If the settlement includes cost and fee --

(i) There shall be included therein all costs and expenses reimbursable in accordance with this contract, not previously paid to the Contractor for the performance of this contract prior to the effective date of the Notice of Termination, and such of these costs as may continue for a reasonable time thereafter with the approval of or as directed by the Contracting Officer: Provided, however, That the Contractor shall proceed as rapidly as practicable to discontinue such costs;

(ii) There shall be included therein so far as not included under (i) above, the cost of settling and paying claims arising out of the termination of work under subcontracts or orders, as provided in paragraph (b)(5) above, which are properly chargeable to the terminated portion of the contract;

(iii) There shall be included therein reasonable costs of settlement, including accounting, legal, clerical, and other expenses reasonably necessary for the preparation of settlement claims and supporting data with respect to the terminated portion of the contract and for the termination and settlement of subcontracts thereunder, together with reasonable storage, transportation, and other costs incurred in connection with the protection or disposition of termination inventory: Provided, however, That if the termination is for default of the Contractor there shall not be included any amounts for the preparation of the Contractor's settlement proposal; and

(iv) There shall be included therein a portion of the fee payable under the contract determined as follows--

(A) In the event of the termination of this contract for the convenience of the Government and not for the default of the Contractor, there shall be paid a percentage of the fee equivalent to the percentage of the completion of work contemplated by the contract, less fee payments previously made hereunder; or

(B) In the event of the termination of this contract for the default of the Contractor, the total fee payable shall be such proportionate part of the fee (or, if this contract calls for articles of different types, of such part of the fee as is reasonably allocable to the type of article under consideration) as the total number of articles delivered to and accepted by the Government bears to the total number of articles of a like kind called for by this contract.

If the amount determined under this subparagraph (1) is less than the total payment theretofore made to the Contractor, the Contractor shall repay to the Government the excess amount.

(2) If the settlement includes only the fee, the amount thereof will be determined in accordance with subparagraph (1)(iv) above.

(f) The Contractor shall have the right of appeal, under the clause of this contract entitled "Disputes," from any determination made by the Contracting Officer under paragraph (c) or (e)

above, except that, if the Contractor has failed to submit his claim within the time provided in paragraph (c) above and has failed to request extension of such time, he shall have no such right of appeal. In any case where the Contracting Officer has made a determination of the amount due under paragraph (c) or (e) above, the Government shall pay to the Contractor the following: (1) if there is no right of appeal hereunder or if no timely appeal has been taken, the amount so determined by the Contracting Officer, or (2) if an appeal has been taken, the amount finally determined on such appeal.

(g) In arriving at the amount due the Contractor under this clause there shall be deducted (1) all unliquidated advance or other payments theretofore made to the Contractor, applicable to the terminated portion of this contract, (2) any claim which the Government may have against the Contractor in connection with this contract, and (3) the agreed price for, or proceeds of sale of, any materials, supplies, or other things acquired by the Contractor or sold pursuant to the provisions of this clause and not otherwise recovered by or credited to the Government.

(h) In the event of a partial termination, the portion of the fee which is payable with respect to the work under the continued portion of the contract shall be equitably adjusted by agreement between the Contractor and the Contracting Officer, and such adjustment shall be evidenced by an amendment to this contract.

(i) The Government may from time to time, under such terms and conditions as it may prescribe, make partial payments and payments on account against costs incurred by the Contractor in connection with the terminated portion of the contract whenever in the opinion of the Contracting Officer the aggregate of such payments shall be within the amount to which the Contractor will be entitled hereunder. If the total of such payments is in excess of the amount finally determined to be due under this clause, such excess shall be payable by the Contractor to the Government upon demand, together with interest computed at the rate of 6 percent per annum, for the period from the date such excess payment is received by the Contractor to the date on which such excess is repaid to the Government: Provided, however, That no interest shall be charged with respect to any such excess payment attributable to a reduction in the Contractor's claim by reason of retention or other disposition of termination inventory until ten days after the date of such retention or disposition, or such later date as determined by the Contracting Officer by reason of the circumstances.

(j) The provisions of this clause relating to the fee shall be inapplicable if this contract does not provide for payment of a fee.

11. STANDARDS OF WORK

The Contractor agrees that the performance of work and services pursuant to the requirements of this contract shall conform to high professional standards.

12. EXCUSABLE DELAYS

Except with respect to defaults of subcontractors, the Contractor shall not be in default by reason of any failure in performance of this contract in accordance with its terms (including any failure by the Contractor to make progress in the prosecution of the work hereunder which endangers such performance) if such failure arises out of causes beyond the control and without the fault or negligence of the Contractor. Such causes may include, but are not restricted to: acts of God or of the public enemy; acts of the Government in either its sovereign or contractual capacity; fires; floods; epidemics; quarantine restrictions; strikes; freight embargoes; and unusually severe weather; but in every case the failure to perform must be beyond the control and without the fault or negligence of the Contractor. If the failure to perform is caused by the failure of a subcontractor to perform or make progress, and if such failure arises out of causes beyond the control of both the Contractor and subcontractor, and without the fault or negligence of either of them, the Contractor shall not be deemed to be in default, unless (a) the supplies or services to be furnished by the subcontractor were obtainable from other sources, (b) the Contracting Officer shall have ordered the Contractor in writing to procure such supplies or services from such other sources, and (c) the Contractor shall have failed to comply reasonably with such order. Upon request of the Contractor, the Contracting Officer shall ascertain the facts and extent of such failure and, if he shall determine that any failure to perform was occasioned by any one or more of the said causes, the delivery schedule shall be revised accordingly, subject to the rights of the Government under the clause hereof entitled "Termination for Default or for Convenience of the Government."

13. DISPUTES

(a) Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the Contracting Officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Contractor. The decision of the Contracting Officer shall be final and conclusive unless within 30 days from the date of receipt of such copy, the Contractor mails or otherwise furnishes to the Contracting Officer a written appeal addressed to the Secretary. The decision of the Secretary or his duly authorized representative for the determination of such appeals shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent, or capricious, or arbitrary, or so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence. In connection with any appeal proceeding under this clause, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of its appeal. Pending final decision of a dispute hereunder, the Contractor shall proceed diligently with the performance of the contract and in accordance with the Contracting Officer's decision.

(b) This "Disputes" clause does not preclude consideration of law questions in connection with decisions provided for in paragraph (a) above: Provided, That nothing in this contract shall be construed as making final the decision of any administrative official, representative, or board on a question of law.

14. CONVICT LABOR

In connection with the performance of work under this contract, the Contractor agrees not to employ any person undergoing sentence of imprisonment at hard labor.

15. CONTRACT WORK HOURS STANDARDS ACT -- OVERTIME COMPENSATION

This contract, to the extent that it is of a character specified in the Contract Work Hours Standards Act (40 U.S.C. 327-330), is subject to the following provisions and to all other applicable provisions and exceptions of such Act and the regulations of the Secretary of Labor thereunder.

(a) Overtime Requirements. No Contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any laborer or mechanic in any workweek in which he is employed on such work to work in excess of eight hours in any calendar day or in excess of forty hours in such workweek on work subject to the provisions of the Contract Work Hours Standards Act unless such laborer or mechanic receives compensation at a rate not less than one and one-half times his basic rate of pay for all such hours worked in excess of eight hours in any calendar day or in excess of forty hours in such workweek, whichever is the greater number of overtime hours.

(b) Violation; Liability for Unpaid Wages; Liquidated Damages. In the event of any violation of the provisions of paragraph (a), the Contractor and any subcontractor responsible therefor shall be liable to any affected employee for his unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic employed in violation of the provisions of paragraph (a) in the sum of \$10 for each calendar day on which such employee was required or permitted to be employed on such work in excess of eight hours or in excess of the standard workweek of forty hours without payment of the overtime wages required by paragraph (a).

(c) Withholding for Unpaid Wages and Liquidated Damages. The Contracting Officer may withhold from the Government Prime Contractor, from any moneys payable on account of work performed by the Contractor or subcontractor, such sums as may administratively be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the provisions of paragraph (b).

(d) Subcontracts. The Contractor shall insert paragraphs (a) through (d) of this clause in all subcontracts, and shall require their inclusion in all subcontracts of any tier.

(e) Records. The Contractor shall maintain payroll records containing the information specified in 29 CFR 516.2(a). Such records shall be preserved for three years from the completion of the contract.

16. WALSH-HEALEY PUBLIC CONTRACTS ACT

If this contract is for the manufacture or furnishing of materials, supplies, articles, or equipment in an amount which exceeds or may exceed \$10,000 and is otherwise subject to the Walsh-Healey Public Contracts Act, as amended (41 U.S.C. 35-45), there are hereby incorporated by reference all representations and stipulations required by said Act and regulations issued thereunder by the Secretary of Labor, such representations and stipulations being subject to all applicable rulings and interpretations of the Secretary of Labor which are now or may hereafter be in effect.

17. EQUAL OPPORTUNITY

(The following clause is applicable unless this contract is exempt under the rules, regulations, and relevant orders of the Secretary of Labor (41 CFR, ch. 60).)

During the performance of this contract, the Contractor agrees as follows:

(a) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Contracting Officer setting forth the provisions of this Equal Opportunity clause.

(b) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(c) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency Contracting Officer, advising the labor union or workers' representative of the Contractor's commitments under this Equal Opportunity clause, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(d) The Contractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(e) The Contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(f) In the event of the Contractor's non-compliance with the Equal Opportunity clause of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended, in whole or in part, and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(g) The Contractor will include the provisions of paragraphs (a) through (g) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, That in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

18. OFFICIALS NOT TO BENEFIT

No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

19. COVENANT AGAINST CONTINGENT FEES

The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. For breach or violation of this warranty the Government shall have the right to annul this contract without liability or in its discretion to deduct from the con-

tract price or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

20. GOVERNMENT PROPERTY

(a) The Government shall deliver to the Contractor, for use in connection with and under the terms of this contract, the property described as Government-furnished property in the Schedule or specifications, together with such related data and information as the Contractor may request and as may reasonably be required for the intended use of such property (hereinafter referred to as "Government-furnished property"). The delivery or performance dates for the supplies or services to be furnished by the Contractor under this contract are based upon the expectation that Government-furnished property suitable for use will be delivered to the Contractor at the times stated in the Schedule or, if not so stated, in sufficient time to enable the Contractor to meet such delivery or performance dates. In the event that Government-furnished property is not delivered to the Contractor by such time or times, the Contracting Officer shall, upon timely written request made by the Contractor, make a determination of the delay, if any, occasioned the Contractor and shall equitably adjust the estimated cost, fixed fee, or delivery or performance dates, or all of them, and any other contractual provisions affected by any such delay, in accordance with the procedures provided for in the clause of this contract entitled "Changes." In the event that Government-furnished property is received by the Contractor in a condition not suitable for the intended use, the Contractor shall, upon receipt thereof notify the Contracting Officer of such fact and, as directed by the Contracting Officer, either (i) return such property at the Government's expense or otherwise dispose of the property or (ii) effect repairs or modifications. Upon completion of (i) or (ii) above, the Contracting Officer upon written request of the Contractor shall equitably adjust the estimated cost, fixed fee, or delivery or performance dates, or all of them, and any other contractual provision affected by the return or disposition, or the repair or modification in accordance with the procedures provided for in the clause of this contract entitled "Changes." The foregoing provisions for adjustment are exclusive and the Government shall not be liable to suit for breach of contract by reason of any delay in delivery of Government-furnished property or delivery of such property in a condition not suitable for its intended use.

(b) Title to all property furnished by the Government shall remain in the Government. Title to all property purchased by the Contractor, for the cost of which the Contractor is entitled to be reimbursed as a direct item of cost under this contract, shall pass to and vest in the Government upon delivery of such property by the vendor. Title to other property, the cost of which is reimbursable to the Contractor under the contract, shall pass to and vest in the Government upon (i) issuance for use of such property in the performance of this contract, or (ii) commencement of processing or use of such property in the performance of this

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contract, or (iii) reimbursement of the cost thereof by the Government in whole or in part, whichever first occurs. All Government-furnished property, together with all property acquired by the Contractor title to which vests in the Government under this paragraph, are subject to the provisions of this clause and are hereinafter collectively referred to as "Government property". Title to the Government property shall not be affected by the incorporation or attachment thereof to any property not owned by the Government, nor shall such Government property, or any part thereof, be or become a fixture or lose its identity as personality by reason of affixation to any realty.

(c) The Contractor shall be directly responsible for and accountable for all Government property provided under this contract. The Contractor shall establish and maintain a system to control, protect, preserve and maintain all Government property. This system shall, upon request by the Contracting Officer, be submitted for review and, if satisfactory, approved in writing by the Contracting Officer. The Contractor shall maintain and make available such records as are required by the approved system and must account for all Government property until relieved of responsibility therefor in accordance with the written instructions of the Contracting Officer.

(d) The Government property shall, unless otherwise provided herein or approved by the Contracting Officer, be used only for the performance of this contract.

(e) The Contractor shall maintain and administer, in accordance with sound industrial practice, a program for the maintenance, repair, protection and preservation of Government property so as to assure its full availability and usefulness for the performance of this contract. The Contractor shall take all reasonable steps to comply with all appropriate directions or instructions which the Contracting Officer may prescribe as reasonably necessary for the protection of Government property.

(f) (1) The Contractor shall not be liable for any loss of or damage to the Government property, or for expenses incidental to such loss or damage, except that the Contractor shall be responsible for any such loss or damage (including expenses incidental thereto):

(i) which results from willful misconduct or lack of good faith on the part of any one of the Contractor's directors or officers, or on the part of any of his managers, superintendents, or other equivalent representatives, who has supervision or direction of --

(A) all or substantially all of the Contractor's business; or

(B) all or substantially all of the Contractor's operations at any one plant or separate location, in which this contract is being performed; or

(C) a separate and complete major industrial operation in connection with the performance of this contract;

(ii) which results from a failure on the part of the Contractor, due to the willful misconduct or lack of good faith on the part of any of his directors, officers, or other representatives mentioned in subparagraph (i) above --

(A) to maintain and administer, in accordance with sound industrial practice, the program for maintenance, repair, protection and preservation of Government property as required by paragraph (e) hereof, or

(B) to take all reasonable steps to comply with any appropriate written directions of the Contracting Officer under paragraph (e) hereof;

(iii) for which the Contractor is otherwise responsible under the express terms of the clause or clauses designated in the Schedule;

(iv) which results from a risk expressly required to be insured under this contract, but only to the extent of the insurance so required to be procured and maintained, or to the extent of insurance actually procured and maintained, whichever is greater; or

(v) which results from a risk which is in fact covered by insurance or for which the Contractor is otherwise reimbursed, but only to the extent of such insurance or reimbursement;

provided that, if more than one of the above exceptions shall be applicable in any case, the Contractor's liability under any one exception shall not be limited by any other exception. If the Contractor transfers Government property to the possession and control of a subcontractor, the transfer shall not affect the liability of the Contractor for loss or destruction of or damage to the property as set forth above. However, the Contractor shall require the subcontractor to assume the risk of, and be responsible for, any loss or destruction of or damage to the property while in the latter's possession or control, except to the extent that the subcontract, with the prior approval of the Contracting Officer, provides for the relief of the subcontractor from such liability. In the absence of such approval, the subcontract shall contain appropriate provisions requiring the return of all Government property in as good condition as when received, except for reasonable wear and tear or for the utilization of the property in accordance with the provisions of the prime contract.

(2) The Contractor shall not be reimbursed for, and shall not include as an item of overhead, the cost of insurance, or any provision for a reserve, covering the risk of loss of or damage to the Government property, except to the extent that the Government may have required the Contractor to carry such insurance under any other provisions of this contract.

(3) Upon the happening of loss or destruction of or damage to the Government property, the Contractor shall notify the Contracting Officer

thereof, and shall communicate with the Loss and Salvage Organization, if any, now or hereafter designated by the Contracting Officer, and with the assistance of the Loss and Salvage Organization so designated (unless the Contracting Officer has designated that no such organization be employed), shall take all reasonable steps to protect the Government property from further damage, separate the damaged and undamaged Government property, put all the Government property in the best possible order, and furnish to the Contracting Officer a statement of --

(i) the lost, destroyed and damaged Government property;

(ii) the time and origin of the loss, destruction or damage;

(iii) all known interests in commingled property of which the Government property is a part; and

(iv) the insurance, in any, covering any part of or interest in such commingled property.

The Contractor shall make repairs and renovations of the damaged Government property or take such other actions, as the Contracting Officer directs.

(4) In the event the Contractor is indemnified, reimbursed, or otherwise compensated for any loss or destruction of or damage to the Government property, he shall use the proceeds to repair, renovate or replace the Government property involved, or shall credit such proceeds against the cost of the work covered by the contract, or shall otherwise reimburse the Government, as directed by the Contracting Officer. The Contractor shall do nothing to prejudice the Government's right to recover against third parties for any such loss, destruction, or damage and, upon the request of the Contracting Officer, shall, at the Government's expense, furnish to the Government all reasonable assistance and cooperation (including the prosecution of suit and the execution of instruments of assignment in favor of the Government) in obtaining recovery. In addition, where the subcontractor has not been relieved from liability for any loss or destruction of or damage to Government property, the Contractor shall enforce the liability of the subcontractor for such loss or destruction of or damage to the Government property for the benefit of the Government.

(g) The Government, and any persons designated by it, shall at all reasonable times have access to the premises where any of the Government property is located, for the purpose of inspecting the Government property.

(h) Upon the completion of this contract, or at such earlier dates as may be fixed by the Contracting Officer, the Contractor shall submit to the Contracting Officer in a form acceptable to him, inventory schedules covering all items of the Government property not consumed in the performance of this contract, or not theretofore delivered to the Government, and shall deliver or make such other

disposal of such Government property as may be directed or authorized by the Contracting Officer. The net proceeds of any such disposal shall be credited to the cost of the work covered by the contract or shall be paid in such manner as the Contracting Officer may direct.

(i) Unless otherwise provided herein, the Government has no obligation to the Contractor with regard to restoration or rehabilitation of the Contractor's premises affected by the abandonment or removal of any Government property.

(j) All communications issued pursuant to this clause shall be in writing.

21. NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT

(The following clause is applicable if the amount of this contract exceeds \$10,000.)

(a) The Contractor shall report to the Contracting Officer, promptly and in reasonable written detail, each notice or claim of patent or copyright infringement based on the performance of this contract of which the Contractor has knowledge.

(b) In the event of any claim or suit against the Government on account of any alleged patent or copyright infringement arising out of the performance of this contract or out of the use of any supplies furnished or work or services performed hereunder, the Contractor shall furnish to the Government, when requested by the Contracting Officer, all evidence and information in possession of the Contractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except where the Contractor has agreed to indemnify the Government.

22. UTILIZATION OF CONCERNS IN LABOR SURPLUS AREAS

(The following clause is applicable if the amount of this contract exceeds \$5,000.)

It is the policy of the Government to place contracts with concerns which will perform such contracts substantially in or near concentrated unemployment or underemployment sections of States or in areas of persistent or substantial labor surplus, where this can be done consistent with the efficient performance of the contract and at prices no higher than are obtainable elsewhere. The Contractor agrees to use his best efforts to place his subcontracts in accordance with this policy. In complying with the foregoing and with paragraph (b) of the clause of this contract entitled "Utilization of Small Business Concerns" the Contractor in placing his subcontracts shall observe the following order of preference: (a) Certified-eligible concerns which are also small business concerns; (b) other certified-eligible concerns; (c) persistent labor surplus area concerns which are also small business concerns; (d) other persistent labor surplus area concerns; (e) substantial labor surplus area concerns which are also small business concerns; (f) other substantial labor surplus area concerns; and (g) small business concerns which are not labor surplus area concerns.

23. PAYMENT FOR OVERTIME AND SHIFT PREMIUMS

(a) Allowable cost shall not include any amount on account of overtime premiums or shift premiums, except to the extent that they either (i) are approved in writing on behalf of the Government; or (ii) are paid for work --

(A) necessary to cope with emergencies, such as those resulting from accidents, natural disasters, or breakdowns of production equipment, or occasional production bottlenecks of a sporadic nature;

(B) by indirect labor employees such as those performing duties in connection with administration, protection, transportation, maintenance, standby plant protection, operation of utilities, or accounting;

(C) in the performance of tests, industrial processes, laboratory procedures, loading or unloading of transportation media, and operations in flight or afloat which are continuous in nature and cannot reasonably be interrupted or otherwise completed; or

(D) which will result in lower overall cost to the Government.

(b) The cost of overtime premiums or shift premiums otherwise allowable under (a) above shall be allowed only to the extent the amount thereof is reasonable and properly allocable to the work under this contract.

24. NOTICE TO THE GOVERNMENT OF LABOR DISPUTES

(a) Whenever the Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance of this contract, the Contractor shall immediately give notice thereof, including all relevant information with respect thereto, to the Contracting Officer.

(b) The Contractor agrees to insert the substance of this clause, including this paragraph (b), in any subcontract hereunder as to which a labor dispute may delay the timely performance of this contract; except that each such subcontract shall provide that in the event its timely performance is delayed or threatened by delay by any actual or potential labor dispute, the subcontractor shall immediately notify his next higher tier subcontractor, or the prime contractor, as the case may be, of all relevant information with respect to such dispute.

25. COMPETITION IN SUBCONTRACTING

(The following clause is applicable if the amount of this contract exceeds \$10,000.)

The Contractor shall select subcontractors (including suppliers) on a competitive basis to the maximum practicable extent consistent with the objectives and requirements of the contract.

26. BUY AMERICAN ACT SUPPLY AND SERVICE CONTRACTS

(a) In acquiring end products, the Buy American Act (41 U.S.C. 10a-d) provides that the Government give preference to domestic source end products. For the purpose of this clause:

(i) "components" means those articles, materials, and supplies which are directly incorporated in the end products;

(ii) "end products" means those articles, materials, and supplies which are to be acquired under this contract for public use; and

(iii) a "domestic source end product" means (A) an unmanufactured end product which has been mined or produced in the United States and (B) an end product manufactured in the United States if the cost of the components thereof which are mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. For the purposes of this (a)(iii)(B), components of foreign origin of the same type or kind as the products referred to in (b)(ii) or (iii) of this clause shall be treated as components mined, produced, or manufactured in the United States.

(b) The Contractor agrees that there will be delivered under this contract only domestic source end products, except end products:

(i) which are for use outside the United States;

(ii) which the Government determines are not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality;

(iii) as to which the Secretary determines the domestic preference to be inconsistent with the public interest; or

(iv) as to which the Secretary determines the cost to the Government to be unreasonable.

(The foregoing requirements are administered in accordance with Executive Order No. 10582, dated December 17, 1954.)

27. KEY PERSONNEL

The personnel specified in an attachment to this contract are considered to be essential to the work being performed hereunder. Prior to diverting any of the specified individuals to other programs, the Contractor shall notify the Contracting Officer reasonably in advance and shall submit justification (including proposed substitutions) in sufficient detail to permit evaluation of the impact on the program. No diversion shall be made by the Contractor without the written consent of the Contracting Officer: Provided, That the Contracting Officer may ratify in writing such diversion and such ratification shall constitute the consent of the Contracting Officer required by this clause. The attachment to this contract may be amended from time to time during the course of the contract to either add or delete personnel, as appropriate.

28. NOTICE TO THE GOVERNMENT REGARDING LATE DELIVERY

In the event the Contractor encounters difficulty in meeting performance requirements, or anticipates difficulty in complying with the contract delivery schedule or date, the Contractor shall immediately notify the Contracting Officer thereof in writing, giving pertinent details, including the date by which it expects to complete performance or make delivery; Provided, however, that this data shall be informational only in character and that receipt thereof shall not be construed as a waiver by the Government of any contract delivery schedule or date, or any rights or remedies provided by law or under this contract.

29. PUBLICATION

(a) Definition. For the purpose of this clause, "publication" includes (1) any document containing information intended for public consumption or (2) the act of, or any act which may result in, disclosing information to the public.

(b) General. The results of the research and development and studies conducted under this contract are to be made available to the public through dedication, assignment to the Government, or such other means as the Secretary of Housing and Urban Development shall determine, as required under title III of the Housing Act of 1948, as amended (12 U.S.C. 1701e).

(c) Reports Furnished the Government. All intermediate and final reports of the research and development and studies conducted hereunder shall indicate on the cover or other initial page that the research and development and studies forming the basis for the report were conducted pursuant to a contract with the Department of Housing and Urban Development. Such reports are official Government property and may not be published or reproduced (in toto, in verbatim excerpt, or in form approximating either of these) as an unofficial paper or article. The Contractor or Technical Personnel (each employee or consultant working under the administrative direction of the Contractor or any subcontractor hereunder) may publish such reports in whole or in part in a non-Government publication only in accordance with this paragraph (c) and paragraph (e)(1) of this clause.

(d) Publication by Government. The Government shall have full right to publish all information, data, and findings developed as a result of the research and development and studies conducted hereunder. Such publication will, at the option of the Contractor (except in the case of verbatim excerpts from the Contractor's report), credit the Contractor and its principal personnel involved by foreword or initial footnote to the publication in form substantially as follows:

The (research) (development) (studies) forming the basis for this report were conducted through contract with (Name of Contractor) by (Name or names of principal personnel). Except for verbatim excerpts from the Contractor's reports or from other identified sources, the Department of Housing and Urban Development accepts responsibility for the conclusions herein stated.

(e) Publication by Contractor or Technical Personnel.

(1) Publication in whole or in part of Contractor's reports furnished the Government. Unless such reports have been placed in the public domain by Government publication, the Contractor or Technical Personnel (each employee or consultant working under the administrative direction of the Contractor or any subcontractor hereunder) may publish a report furnished the Government, in toto or in verbatim excerpt, but consistent with paragraph (c) of this clause may not secure copyright therein, subject to the following conditions, and the conditions in paragraph (e)(4) and paragraph (f):

(i) During the first six months after submission of the full final report, if written permission to publish is obtained from the Contracting Officer.

(ii) After six months following submission of the full final report, and if paragraph (e)(3) is inapplicable, if a foreword or footnote in the non-Government publication indicates the source of the verbatim material.

(2) Publication, except verbatim excerpts, concerning or based in whole or in part on results of research and development and studies hereunder. The Contractor or Technical Personnel may issue a publication concerning, or based in whole or in part on the results of, the research and development and studies conducted under this contract and may secure copyright therein but in so publishing is not authorized thereby to inhibit the unrestricted right of the Secretary of Housing and Urban Development to disclose or publish in such manner as he may deem to be in the public interest the results of such research and development and studies, subject to the following conditions and the requirement in paragraph (e)(4):

(i) During the first six months after submission of the full final report, and if paragraph (e)(3) is inapplicable, if written waiver of the waiting period is obtained from the Contracting Officer.

(ii) After six months following submission of the full final report, and if paragraph (e)(3) is inapplicable, subject to Government exercise of an option that the publication contain a foreword or initial footnote substantially as follows:

The (research) (development) (studies) forming (part of) the basis for this publication were conducted pursuant to a contract with the Department of Housing and Urban Development. The substance of such (research) (development) (studies) is dedicated to the public. The author and publisher are solely responsible for the accuracy of statements or interpretations contained herein.

(3) General condition if HUD determines that Contractor's final report contains patentable subject matter developed in contract performance. If the Contracting Officer determines that the Contractor's full final report contains patentable subject matter developed in the performance of this contract and so notifies the Contractor in writing prior to six months from date of submission of such report, no publication of verbatim excerpts from Contractor's reports or publication concerning or based in whole or in part on the results of the research and development and studies hereunder shall be made without the written consent of the Contracting Officer.

(4) Copies of Contractor and Technical Personnel publications to be furnished the Government. The Contractor or Technical Personnel will furnish the Contracting Officer six (6) copies of any publications which are based in whole or in part on the research and development and studies conducted under this contract.

(f) Administratively Confidential Information. The Contractor shall not publish or otherwise disclose, except to the Government and except matters of public record, any information or data obtained hereunder from private individuals, organizations, or public agencies, in a publication whereby the information or data furnished by any particular person or establishment can be identified, except with the consent of such person or establishment (consistent with the inhibitions applicable to the Secretary of Housing and Urban Development under section 602(d) of the Housing Act of 1956, 12 U.S.C. 1701d-3(d)).

(g) Inclusion of Provisions in Contractor's Agreements. The Contractor shall include provisions appropriate to effectuate the purposes of this clause in all contracts of employment with persons who perform any part of the research or development or study under this contract and in any consultant's agreements or subcontracts involving research or development or study hereunder.

30. PATENTS

(a) The patentable results of research and development and studies conducted under the contract and all information, designs, specifications, know-how, data, and findings developed in the performance of this contract shall be made available to the public through dedication, assignment to the Government, or such other means as the Secretary of Housing and Urban Development shall determine. The Contractor agrees (1) to cooperate in the preparation and prosecution of any domestic or foreign patent applications which the Government may decide to undertake covering the subject matter above described, (2) to execute all papers requisite in the prosecution of such patent applications, including assignments to the United States and dedications, and (3) to secure the cooperation of Technical Personnel (each employee or consultant working under the administrative direction of the Contractor or any subcontractor hereunder) in the preparation and the execution of all such papers as may be required in the prosecution of such patent applications or in order to vest title in the subject matter involved in the United States, or to secure the right of free use to the public.

(b) Prior to final payment under this contract, the Contractor shall file a final report disclosing to the Contracting Officer all inventions, improvements, and discoveries developed in the performance of this contract, and shall certify on the last page of such report that to the best of his knowledge and belief such disclosure has been made therein or that there are no such unreported inventions.

(c) The Contractor shall include provisions appropriate to effectuate the purposes of this clause in all contracts of employment with persons who perform any part of the research or development or studies under this contract and in any consultants' agreements or subcontracts involving research or development or studies hereunder.

31. CERTIFICATION OF NONSEGREGATED FACILITIES

(Applicable to (1) contracts, (2) subcontracts, and (3) agreements with applicants who are themselves performing federally assisted construction contracts, exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause.)

By the submission of this bid, the bidder, offeror, applicant, or subcontractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. He certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The

bidder, offeror, applicant, or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin, because of habit, local custom, or otherwise. He further agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that he will retain such certifications in his files; and that he will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

**NOTICE TO PROSPECTIVE SUBCONTRACTORS OF
REQUIREMENT FOR CERTIFICATIONS OF NON-
SEGREGATED FACILITIES**

A Certification of Nonsegregated Facilities must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

**32. PRICE REDUCTION FOR DEFECTIVE COST OR
PRICING DATA**

(a) If the Contracting Officer determines that any price, including profit or fee, negotiated in connection with this contract or any cost reimbursable under this contract was increased by any significant sums because the Contractor, or any subcontractor pursuant to the clause of this contract entitled "Subcontractor Cost or Pricing Data" or "Subcontractor Cost or Pricing Data - Price Adjustments," or any subcontract clause therein required, furnished incomplete or inaccurate cost or pricing data or data not current as certified in his Contractor's Certificate of Current Cost or Pricing Data, then such price or cost shall be reduced accordingly and the contract shall be modified in writing to reflect such reduction.

(b) Failure to agree on a reduction shall be a dispute concerning a question of fact within the meaning of the "Disputes" clause of this contract.

(NOTE: Since the contract is subject to reduction under this clause by reason of defective cost or pricing data submitted in connection with certain subcontracts, it is expected that the contractor may wish to include a clause in each such subcontract requiring the subcontractor to appropriately indemnify the contractor. It is also expected that any subcontractor subject to such indemnification will generally require substantially similar indemnification for defective cost or pricing data required to be submitted by his lower tier subcontractors.)

33. AUDIT AND RECORDS

(a) The Contractor shall maintain books, records, documents, and other evidence and accounting procedures and practices, sufficient to reflect properly all direct and indirect costs of whatever nature claimed to have been incurred and anticipated to be incurred for the performance of this contract. The foregoing constitute "records" for the purposes of this clause.

(b) The Contractor's plants, or such part thereof as may be engaged in the performance of this contract, and his records shall be subject at all reasonable times to inspection and audit by the Contracting Officer or his authorized representatives. In addition, for purposes of verifying that cost or pricing data submitted, in conjunction with the negotiation of this contract or any contract change or other modification involving an amount in excess of \$100,000, were accurate, complete, and current, the Contracting Officer, or his authorized representatives, shall, until the expiration of 3 years from the date of final payment under this contract, or of the time periods for the particular records specified in Part 1-20 of the Federal Procurement Regulations (41 CFR Part 1-20), whichever expires earlier, have the right to examine those books, records, documents, papers, and other supporting data which involve transactions related to this contract or which will permit adequate evaluation of the cost or pricing data submitted, along with the computations and projections used therein.

(c) The Contractor shall preserve and make available his records (1) until the expiration of 3 years from the date of final payment under this contract, or of the time periods for the particular records specified in 41 CFR Part 1-20, whichever expires earlier, and (2) for such longer period, if any, as is required by applicable statute, or by other clauses of this contract, or by (i) or (ii) below.

(4) If the contract is completely or partially terminated, the records relating to the work terminated shall be preserved and made available for a period of 3 years from the date of any resulting final settlement.

(11) Records which relate to (A) appeals under the "Disputes" clause of this contract, (B) litigation or the settlement of claims arising out of the performance of this contract, or (C) costs and expenses of this contract as to which exception has been taken by the Contracting Officer or any of his duly authorized representatives, shall be retained until such appeals, litigation, claims, or exceptions have been disposed of.

(d) (1) The Contractor shall insert the substance of this clause, including the whole of this paragraph (d), in each subcontract hereunder that is not firm fixed-price or fixed-price with escalation. When so inserted, changes shall be made to designate the higher-tier subcontractor at the level involved in place of the Contractor; to add "of the Government prime contract" after "Contracting Officer"; and to substitute "the Government prime contract" in place of "this contract" in (B) of paragraph (c) above.

(2) The Contractor shall insert the substance of the following clause in each firm fixed-price or fixed-price with escalation subcontract hereunder which when entered into exceeds \$100,000, except those subcontracts covered by subparagraph (3) below:

AUDIT

(a) For purposes of verifying that certified cost or pricing data submitted in conjunction with the negotiation of this contract or any contract change or other modification involving an amount in excess of \$100,000, were accurate, complete, and current, the Contracting Officer of the Government prime contract, or his authorized representatives, shall, until the expiration of 3 years from the date of final payment under this contract, or of the time periods for the particular records specified in Part 1-20 of the Federal Procurement Regulations (41 CFR Part 1-20), whichever expires earlier, have the right to examine those books, records, documents, papers, and other supporting data which involve transactions related to this contract or which will permit adequate evaluation of the cost or pricing data submitted, along with the computations and projections used therein.

(b) The subcontractor agrees to insert this clause, including this paragraph (b), in all subcontracts hereunder which when entered into exceed \$100,000 unless the price is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation.

(3) The Contractor shall insert the following clause in each firm fixed-price or fixed-price with escalation subcontract hereunder which when entered into exceeds \$100,000 where the price is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation.

AUDIT - PRICE ADJUSTMENTS

(a) This clause shall become operative only with respect to any change or other modification of this contract, which involves a price adjustment in excess of \$100,000 unless the price adjustment is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation: Provided, That such change or other modification to this contract must result from a change or other modification (1) to the Government prime contract, or (2) authorized under the provisions of the Government prime contract.

(b) For purposes of verifying that any certified cost or pricing data submitted in conjunction with a contract change or other modification were accurate, complete, and current, the Contracting Officer of the Government prime contract, or his authorized representatives, shall, until the expiration of 3 years from the date of final payment under this contract, or of the time periods for the particular records specified in Part 1-20 of the Federal Procurement Regulations (41 CFR Part 1-20), whichever expires earlier, have the right to examine those books, records, documents, papers, and other supporting data which involve transactions related to this contract or which will permit adequate evaluation of the cost or pricing data submitted, along with the computations and projections used therein.

(c) The subcontractor agrees to insert the substance of this clause including this paragraph (c) in all subcontracts hereunder which when entered into exceed \$100,000.

34. SUBCONTRACTOR COST AND PRICING DATA

(a) The Contractor shall require subcontractors hereunder to submit in writing cost or pricing data under the following circumstances:

(1) Prior to award of any cost-reimbursement type, time and material, labor-hour, incentive, or price redeterminable subcontract, the price of which is expected to exceed \$100,000; and

(2) Prior to the award of any other subcontract, the price of which is expected to exceed \$100,000 or to the pricing of any subcontract change or other modification for which the price adjustment is expected to exceed \$100,000, where the price or price adjustment is not based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation.

(b) The Contractor shall require subcontractors to certify, in substantially the same form as that used in the certificate by the Prime Contractor to the Government, that, to the best of their knowledge and belief, the cost and pricing data submitted under (a) above are accurate, complete, and current as of the date of the execution, which

date shall be as close as possible to the date of agreement on the negotiated price of the subcontract or subcontract change or modification.

(c) The Contractor shall insert the substance of this clause including this paragraph (c) in each of his cost-reimbursement type, time and material, labor-hour, price redeterminable, or incentive subcontracts hereunder, and in any other subcontract hereunder which exceeds \$100,000 unless the price thereof is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation. In each such excepted subcontract hereunder which exceeds \$100,000, the Contractor shall insert the substance of the following clause:

**SUBCONTRACTOR COST AND PRICING DATA-PRICE
ADJUSTMENTS**

(a) Paragraphs (b) and (c) of this clause shall become operative only with respect to any change or other modification made pursuant to one or more provisions of this contract which involves a price adjustment in excess of \$100,000. The requirements of this clause shall be limited to such price adjustments.

(b) The Contractor shall require subcontractors hereunder to submit cost or pricing data under the following circumstances:

(1) Prior to award of any cost-reimbursement type, time and material, labor-hour, incentive, or price redeterminable subcontract, the price of which is expected to exceed \$100,000; and

(2) Prior to award of any other subcontract, the price of which is expected to exceed \$100,000, or to the pricing of any subcontract change or other modification for which the price adjustment is expected to exceed \$100,000, where the price or price adjustment is not based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation.

(c) The Contractor shall require subcontractors to certify, in substantially the same form as that used in the Certificate by the Prime Contractor to the Government, that, to the best of their knowledge and belief, the cost and pricing data submitted under (b) above are accurate, complete, and current as of the date of the execution, which date shall be as close as possible to the date of agreement on the negotiated price of the contract modification.

(d) The Contractor shall insert the substance of this clause including this paragraph (d) in each subcontract hereunder which exceeds \$100,000.

35. NEGOTIATED OVERHEAD RATES

(This clause shall be applicable only when it has been determined that negotiated overhead rates are to be used.)

(a) Notwithstanding the provisions of the clause of this contract entitled "Allowable Cost, Fixed Fee, and Payment," the allowable indirect costs under this contract shall be obtained by applying negotiated overhead rates to bases agreed upon by the parties, as specified below.

(b) The Contractor, as soon as possible but not later than ninety (90) days after the expiration of his fiscal year, or such other period as may be specified in the contract, shall submit to the Contracting Officer, with a copy to the cognizant audit activity, a proposed final overhead rate or rates for that period based on the Contractor's actual cost experience during that period, together with supporting cost data. Negotiation of overhead rates by the Contractor and the Contracting Officer shall be undertaken as promptly as practicable after receipt of the Contractor's proposal.

(c) Allowability of costs and acceptability of cost allocation methods shall be determined in accordance with applicable Subpart 1-15.2 of Federal Procurement Regulations (41 CFR 1-15.2) as in effect on the date of this contract.

(d) The results of each negotiation shall be set forth in a modification to this contract, which shall specify (1) the agreed final rates, (2) the bases to which the rates apply, and (3) the periods for which the rates apply.

(e) Pending establishment of final overhead rates for any period, the Contractor shall be reimbursed either at negotiated provisional rates as provided in the contract, or at billing rates acceptable to the Contracting Officer, subject to appropriate adjustment when the final rates for that period are established. To prevent substantial over or under payment, and to apply either retroactively or prospectively: (1) Provisional rates may, at the request of either party, be revised by mutual agreement, and (2) billing rates may be adjusted at any time by the Contracting Officer. Any such revision of negotiated provisional rates provided in the contract shall be set forth in a modification to this contract.

(f) Any failure by the parties to agree on any final rates under this clause shall be considered a dispute concerning a question of fact for decision by the Contracting Officer within the meaning of the "Disputes" clause of this contract.

GENERAL PROVISIONS

(Fixed-Price Research and Development Contracts)

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1. DEFINITIONS

As used throughout this contract, the following terms shall have the meanings set forth below:

(a) The term "Secretary" means the Secretary or Under Secretary of the Department of Housing and Urban Development; and the term "his duly authorized representative" means any person or persons or board (other than the Contracting Officer) authorized to act for the Secretary.

(b) The term "Contracting Officer" means the person executing the contract on behalf of the Government, and any other officer or civilian employee who is a properly designated Contracting Officer; and the term includes, except as otherwise provided in this contract, the authorized representative of a Contracting Officer acting within the limits of his authority.

(c) Except as otherwise provided in this contract, the term "subcontracts" includes purchase orders under this contract.

(d) The term "HUD" means the Department of Housing and Urban Development.

2. PAYMENTS

The Contractor shall be paid, upon the submission of proper invoices or vouchers, the prices stipulated herein for work delivered or rendered and accepted less deductions, if any,

as herein provided. Unless otherwise specified, payment will be made upon acceptance of any portion of the work delivered or rendered for which a price is separately stated in the contract.

3. STANDARDS OF WORK

The Contractor agrees that the performance of work and services pursuant to the requirements of this contract shall conform to high professional standards.

4. INSPECTION

(a) All work under this contract shall be subject to inspection and test by the Government, to the extent practicable, at all times (including the period of performance) and places, and in any event prior to acceptance. The Government through any authorized representative may inspect the premises of the Contractor or any subcontractor engaged in the performance of this contract.

(b) The Government may reject any work that is defective or otherwise not in conformity with the requirements of this contract. If the Contractor fails or is unable to correct or to replace such work, the Contracting Officer may accept such work at a reduction in price which is equitable under the circumstances. Failure to agree on the reduction in price shall be a dispute concerning a question of fact within the meaning of the clause of this contract entitled "Disputes."

5. ASSIGNMENT OF CLAIMS

(a) Pursuant to the provisions of the Assignment of Claims Act of 1940, as amended (31 U.S.C. 203, 41 U.S.C. 15), if this contract provides for payments aggregating \$1,000 or more, claims for moneys due or to become due the Contractor from the Government under this contract may be assigned to a bank, trust company, or other financing institution, including any Federal lending agency, and may thereafter be further assigned and reassigned to any such institution. Any such assignment or reassignment shall cover all amounts payable under this contract and not already paid, and shall not be made to more than one party, except that any such assignment or reassignment may be made to one party as agent or trustee for two or more parties participating in such financing. Unless otherwise provided in this contract, payments to assignees of any moneys due or to become due under this contract shall not, to the extent provided in said Act, as amended, be subject to reduction or setoff. (The preceding sentence applies only if this contract is made in time of war or national emergency as defined in said Act and is with the Department of Defense, the General Services Administration, the Atomic Energy Commission, the National Aeronautics and Space Administration, the Federal Aviation Agency, or any other department or agency of the United States designated by the President pursuant to Clause 4 of the proviso of section 1 of the Assignment of Claims Act of 1940, as amended by the Act of May 15, 1951, 65 Stat. 41.)

(b) In no event shall copies of this contract or of any plans, specifications, or other similar documents relating to work under this contract, if marked "Top Secret," "Secret," or "Confidential," be furnished to any assignee of any claim arising under this contract or to any other person not entitled to receive the same. However, a copy of any part or all of this contract so marked may be furnished, or any information contained therein may be disclosed, to such assignee upon the prior written authorization of the Contracting Officer.

The last two sentences of paragraph (a) of the foregoing clause shall be deleted from contracts entered into with foreign contractors and may, in accordance with agency procedures, be deleted in other cases where special circumstances make it advisable in the best interests of the Government.

6. EXAMINATION OF RECORDS

(a) The Contractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three years after final payment under this contract, have access to and the right to examine any directly pertinent books, documents, papers, and records of the Contractor involving transactions related to this contract.

(b) The Contractor further agrees to include in all his subcontracts hereunder a provision to the effect that the subcontractor agrees that the Comptroller General of the United States or any of his duly authorized representatives shall, until the expiration of three years after final payment under the subcontract, have access to and the right to examine any directly pertinent books, documents, papers, and records of such subcontractor, involving transactions related to the subcontract. The term "subcontract" as used

in this clause excludes (i) purchase orders not exceeding \$2,500 and (ii) subcontracts or purchase orders for public utility services at rates established for uniform applicability to the general public.

(c) Paragraphs (a) and (b) above are extended to provide equal rights to authorized representatives of the Department of Housing and Urban Development.

7. FEDERAL, STATE AND LOCAL TAXES

(a) As used throughout this clause, the term "contract date" means the date of this contract. As to additional supplies or services procured by modification of this contract, the term "contract date" means the date of such modification.

(b) Except as may be otherwise provided in this contract, the contract price includes, to the extent allocable to this contract, all Federal, State and local taxes which, on the contract date:

(1) By Constitution, statute, or ordinance, are applicable to this contract, or to the transactions covered by this contract, or to property or interests in property; or

(2) Pursuant to written ruling or regulation, the authority charged with administering any such tax is assessing or applying to, and is not granting or honoring an exemption for, a contractor under this kind of contract, or the transactions covered by this contract, or property or interests in property.

(c) Except as may be otherwise provided in this contract, duties in effect on the contract date are included in the contract price, to the extent allocable to this contract.

(d) (1) If the Contractor is required to pay or bear the burden --

(i) Of any tax or duty which either was not to be included in the contract price pursuant to the requirements of paragraphs (b) and (c), or of a tax or duty specifically excluded from the contract price by a provision of this contract; or

(ii) Of an increase in rate of any tax or duty, whether or not such tax or duty was excluded from the contract price; or

(iii) Of any interest or penalty on any tax or duty referred to in (i) or (ii) above; the contract price shall be increased by the amount of such tax, duty, interest, or penalty allocable to this contract: Provided, That the Contractor, if requested by the Contracting Officer, warrants in writing that no amount of such tax, duty, or rate increase was included in the contract price as a contingency reserve or otherwise; and Provided further, That liability for such tax, duty, rate increase, interest, or penalty was not incurred through the fault or negligence of the Contractor or his failure to follow instructions of the Contracting Officer.

(2) If the Contractor is not required to pay or bear the burden, or obtains a refund or drawback, in whole or in part, of any tax, duty, interest, or penalty which:

(i) Was to be included in the contract price pursuant to the requirements of paragraphs (b) and (c);

(ii) Was included in the contract price; or

(iii) Was the basis of an increase in the contract price; the contract price shall be decreased by the amount of such relief, refund, or drawback allocable to this contract, or the allocable amount of such relief, refund, or drawback shall be paid to the Government, as directed by the Contracting Officer. The contract price also shall be similarly decreased if the Contractor, through his fault or negligence or his failure to follow instructions of the Contracting Officer, is required to pay or bear the burden, or does not obtain a refund or drawback of any such tax, duty, interest, or penalty. Interest paid or credited to the Contractor incident to a refund of taxes shall inure to the benefit of the Government to the extent that such interest was earned after the Contractor was paid or reimbursed by the Government for such taxes.

(3) Invoices or vouchers covering any adjustment of the contract price pursuant to this paragraph (d) shall set forth the amount thereof as a separate item and shall identify the particular tax or duty involved.

(4) This paragraph (d) shall not be applicable to social security taxes; income and franchise taxes, other than those levied on or measured by (i) sales or receipts from sales, or (ii) the Contractor's possession of, interest in, or use of property, title to which is in the Government; excess profits taxes; capital stock taxes; unemployment compensation taxes; or property taxes, other than such property taxes, allocable to this contract, as are assessed either on completed supplies covered by this contract, or on the Contractor's possession of, interest in, or use of property, title to which is in the Government.

(5) No adjustment pursuant to this paragraph (d) will be made under this contract unless the aggregate amount thereof is or may reasonably be expected to be over \$100.

(e) Unless there does not exist any reasonable basis to sustain an exemption, the Government upon request of the Contractor, without further liability, agrees, except as otherwise provided in this contract, to furnish evidence appropriate to establish exemption from any tax which the Contractor warrants in writing was excluded from the contract price. In addition, the Contracting Officer may furnish evidence appropriate to establish exemption from any tax that may, pursuant to this clause, give rise to either an increase or decrease in the contract price. Except as otherwise provided in this contract, evidence appropriate to establish exemption from duties will be furnished only at the discretion of the Contracting Officer.

(f) (1) The Contractor shall promptly notify

the Contracting Officer of all matters pertaining to Federal, State and local taxes, and duties, that reasonably may be expected to result in either an increase or decrease in the contract price.

(2) Whenever an increase or decrease in the contract price may be required under this clause, the Contractor shall take action as directed by the Contracting Officer, and the contract price shall be equitably adjusted to cover the costs of such action, including any interest, penalty, and reasonable attorneys' fees.

8. UTILIZATION OF SMALL BUSINESS CONCERNS

(a) It is the policy of the Government as declared by the Congress that a fair proportion of the purchases and contracts for supplies and services for the Government be placed with small business concerns.

(b) The Contractor agrees to accomplish the maximum amount of subcontracting to small business concerns that the Contractor finds to be consistent with the efficient performance of this contract.

9. DEFAULT

(a) The Government may, subject to the provisions of paragraph (c) of this clause, by written notice of default to the Contractor, terminate the whole or any part of this contract in any one of the following circumstances:

(1) If the Contractor fails to perform the work called for by this contract within the time(s) specified herein or any extension thereof; or

(2) If the Contractor fails to perform any of the other provisions of this contract, or so fails to prosecute the work as to endanger performance of this contract in accordance with its terms, and in either of these two circumstances does not cure such failure within a period of 10 days (or such longer period as the Contracting Officer may authorize in writing) after receipt of notice from the Contracting Officer specifying such failure.

(b) In the event the Government terminates this contract in whole or in part as provided in paragraph (a) of this clause, the Government may procure, upon such terms and in such manner as the Contracting Officer may deem appropriate, work similar to the work so terminated and the Contractor shall be liable to the Government for any excess costs for such similar work: Provided, That the Contractor shall continue the performance of this contract to the extent not terminated under the provisions of this clause.

(c) Except with respect to defaults of subcontractors, the Contractor shall not be liable for any excess costs if the failure to perform the contract arises out of causes beyond the control and without the fault or negligence of the Contractor. Such causes may include, but are not restricted to, acts of God or of the public enemy, acts of the Government in either its sovereign or contractual capacity, fires, floods, epidemics,

quarantine restrictions, strikes, freight embargoes, and unusually severe weather; but in every case the failure to perform must be beyond the control and without the fault or negligence of the Contractor. If the failure to perform is caused by the default of a subcontractor, and if such default arises out of causes beyond the control of both the Contractor and subcontractor, and without the fault or negligence of either of them, the Contractor shall not be liable for any excess costs for failure to perform unless the supplies or services to be furnished by the subcontractor were obtainable from other sources in sufficient time to permit the Contractor to meet the required delivery schedule or other performance requirements.

(d) If this contract is terminated as provided in paragraph (a) of this clause, the Government, in addition to any other rights provided in this clause, may require the Contractor to transfer title and deliver to the Government, in the manner and to the extent directed by the Contracting Officer, any of the completed or partially completed work not theretofore delivered to, and accepted by, the Government and any other property, including contract rights, specifically produced or specifically acquired for the performance of such part of this contract as has been terminated; and the Contractor shall, upon the direction of the Contracting Officer, protect and preserve property in the possession of the Contractor in which the Government has an interest. The Government shall pay to the Contractor the contract price, if separately stated, for completed work accepted by the Government and the amount agreed upon by the Contractor and the Contracting Officer for (1) completed work for which no separate price is stated, (2) partially completed work, (3) other property described above which is accepted by the Government, and (4) the protection and preservation of property. Failure to agree shall be a dispute concerning a question of fact within the meaning of the clause of this contract entitled "Disputes." The Government may withhold from amounts otherwise due the Contractor for such completed supplies or manufacturing materials such sum as the Contracting Officer determines to be necessary to protect the Government against loss because of outstanding liens or claims of former lien holders.

(e) If, after notice of termination of this contract under the provisions of this clause, it is determined for any reason that the Contractor was not in default under the provisions of this clause, or that the default was excusable under the provisions of this clause, the rights and obligations of the parties shall, if the contract contains a clause providing for termination for convenience of the Government, be the same as if the notice of termination had been issued pursuant to such clause. If, after notice of termination of this contract under the provisions of this clause, it is determined for any reason that the Contractor was not in default under the provisions of this clause, and if this contract does not contain a clause providing for termination for convenience of the Government, the contract shall be equitably adjusted to compensate for such termination and the contract modified accordingly; failure to agree to any such adjustment shall be a dispute concerning a question of fact within the meaning of the clause of this contract entitled "Disputes."

(f) The right and remedies of the Government provided in this clause shall not be exclusive and are in addition to any other rights and remedies provided by law or under this contract.

10. TERMINATION FOR CONVENIENCE OF THE GOVERNMENT

(a) The performance of work under this contract may be terminated by the Government in accordance with this clause in whole, or from time to time in part, whenever the Contracting Officer shall determine that such termination is in the best interest of the Government. Any such termination shall be effected by delivery to the Contractor of a Notice of Termination specifying the extent to which performance of work under the contract is terminated, and the date upon which such termination becomes effective.

(b) After receipt of a Notice of Termination, and except as otherwise directed by the Contracting Officer, the Contractor shall:

(1) Stop work under the contract on the date and to the extent specified in the Notice of Termination;

(2) Place no further orders or subcontracts for materials, services, or facilities, except as may be necessary for completion of such portion of the work under the contract as is not terminated;

(3) Terminate all orders and subcontracts to the extent that they relate to the performance of work terminated by the Notice of Termination;

(4) Assign to the Government, in the manner, at the times, and to the extent directed by the Contracting Officer, all of the right, title, and interest of the Contractor under the orders and subcontracts so terminated, in which case the Government shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts;

(5) Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Contracting Officer, to the extent he may require, which approval or ratification shall be final for all the purposes of this clause;

(6) Transfer title to the Government and deliver in the manner, at the times, and to the extent, if any, directed by the Contracting Officer, (i) the fabricated or unfabricated parts, work in process, completed work, supplies, and other material produced as a part of, or acquired in connection with the performance of, the work terminated by the Notice of Termination, and (ii) the completed or partially completed plans, drawings, information and other property which, if the contract had been completed, would have been required to be furnished to the Government;

(7) Use his best efforts to sell, in the manner, at the times, to the extent, and at the price or prices directed or authorized by the Contracting Officer, any property of the types referred to in (6) above: Provided, however, That the Contractor (1) shall not be required to extend credit to any purchaser, and (11) may acquire any such property under the conditions prescribed by and at a price or prices approved by the Contracting Officer: And provided further, That the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the Government to the Contractor under this contract or shall otherwise be credited to the price or cost of the work covered by this contract or paid in such other manner as the Contracting Officer may direct;

(8) Complete performance of such part of the work as shall not have been terminated by the Notice of Termination; and

(9) Take such action as may be necessary, or as the Contracting Officer may direct, for the protection and preservation of the property related to this contract which is in the possession of the Contractor and in which the Government has or may acquire an interest.

At any time after expiration of the plant clearance period, as defined in Subpart 1-8.1 of the Federal Procurement Regulations (41 CFR 1-8.1), as the definition may be amended from time to time, the Contractor may submit to the Contracting Officer a list, certified as to quantity and quality, of any or all items of termination inventory not previously disposed of, exclusive of items the disposition of which has been directed or authorized by the Contracting Officer, and may request the Government to remove such items or enter into a storage agreement covering them. Not later than fifteen (15) days thereafter, the Government will accept title to such items and remove them or enter into a storage agreement covering the same: Provided, That the list submitted shall be subject to verification by the Contracting Officer upon removal of the items or, if the items are stored, within forty-five (45) days from the date of submission of the list, and any necessary adjustment to correct the list as submitted shall be made prior to final settlement.

(c) After receipt of a Notice of Termination, the Contractor shall submit to the Contracting Officer his termination claim, in the form and with certification prescribed by the Contracting Officer. Such claim shall be submitted promptly but in no event later than one year from the effective date of termination, unless one or more extensions in writing are granted by the Contracting Officer upon request of the Contractor made in writing within such one-year period or authorized extension thereof. However, if the Contracting Officer determines that the facts justify such action, he may receive and act upon any such termination claim at any time after such one-year period or any extension thereof. Upon failure of the Contractor to submit his termination claim within the time allowed, the Contracting Officer may, subject to any review required by the contracting agency's procedures in effect as of the date of execution of this contract, determine, on the basis of

information available to him, the amount, if any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.

(d) Subject to the provisions of paragraph (c), and subject to any review required by the contracting agency's procedures in effect as of the date of execution of this contract, the Contractor and the Contracting Officer may agree upon the whole or any part of the amount or amounts to be paid to the Contractor by reason of the total or partial termination of work pursuant to this clause, which amount or amounts may include a reasonable allowance for profit on work done: Provided, That such agreed amount or amounts, exclusive of settlement costs, shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the contract price of work not terminated. The contract shall be amended accordingly, and the Contractor shall be paid the agreed amount. Nothing in paragraph (e) of this clause, prescribing the amount to be paid to the Contractor in the event of failure of the Contractor and the Contracting Officer to agree upon the whole amount to be paid to the Contractor by reason of the termination of work pursuant to this clause, shall be deemed to limit, restrict, or otherwise determine or affect the amount or amounts which may be agreed upon to be paid to the Contractor pursuant to this paragraph (d).

(e) In the event of the failure of the Contractor and the Contracting Officer to agree as provided in paragraph (d) upon the whole amount to be paid to the Contractor by reason of the termination of work pursuant to this clause, the Contracting Officer shall, subject to any review required by the contracting agency's procedures in effect as of the date of execution of this contract, determine, on the basis of information available to him, the amount, if any, due to the Contractor by reason of the termination and shall pay to the Contractor the amounts determined as follows:

(1) For completed supplies accepted by the Government (or sold or acquired as provided in paragraph (b)(7) above) and not theretofore paid for, a sum equivalent to the aggregate price for such supplies computed in accordance with the price or prices specified in the contract, appropriately adjusted for any saving of freight or other charges;

(2) The total of --

(i) The costs incurred in the performance of the work terminated, including initial costs and preparatory expense allocable thereto, but exclusive of any costs attributable to supplies paid or to be paid for under paragraph (e)(1) hereof;

(ii) The cost of settling and paying claims arising out of the termination of work under subcontracts or orders, as provided in paragraph (b)(5) above, which are properly chargeable to the terminated portion of the contract (exclusive of amounts paid or payable on account of supplies or materials delivered or services furnished by subcontractors or vendors prior to the effective date of the Notice of Termination, which amounts shall be included in the costs payable under (1) above); and

(11) A sum, as a profit, equal to 2 percent of that part of the amount determined under (i) above which represents the cost of articles and materials not processed by the Contractor, plus a sum equal to 8 percent of the remainder of such amount, but the aggregate of such sums shall not exceed 6 percent of the whole of the amount determined under (i) above: Provided, however, That if it appears that the Contractor would have sustained a loss on the entire contract had it been completed, no profit shall be included or allowed under this subdivision (11) and an appropriate adjustment shall be made reducing the amount of the settlement to reflect the indicated rate of loss; and

(3) The reasonable costs of settlement, including accounting, legal, clerical, and other expenses reasonably necessary for the preparation of settlement claims and supporting data with respect to the terminated portion of the contract and for the termination and settlement of subcontracts thereunder, together with reasonable storage, transportation, and other costs incurred in connection with the protection or disposition of property allocable to this contract.

The total sum to be paid to the Contractor under (1) and (2) of this paragraph (e) shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the contract price of work not terminated. Except for normal spoilage, and except to the extent that the Government shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor as provided in (e)(1) and (2)(1) above, the fair value, as determined by the Contracting Officer, of property which is destroyed, lost, stolen, or damaged so as to become undeliverable to the Government, or to a buyer pursuant to paragraph (b)(7).

(f) Any determination of costs under paragraph (c) or (e) hereof shall be governed by the principles for consideration of costs set forth in Subpart 1-15.2 of the Federal Procurement Regulations (41 CFR 1-15.2), as in effect on the date of this contract.

(g) The Contractor shall have the right to appeal, under the clause of this contract entitled "Disputes," from any determination made by the Contracting Officer under paragraph (c) or (e) above, except that, if the Contractor has failed to submit his claim within the time provided in paragraph (c) above and has failed to request extension of such time, he shall have no such right of appeal. In any case where the Contracting Officer has made a determination of the amount due under paragraph (c) or (e) above, the Government shall pay to the Contractor the following: (1) if there is no right of appeal hereunder or if no timely appeal has been taken, the amount so determined by the Contracting Officer; or (2) if an appeal has been taken, the amount finally determined on such appeal.

(h) In arriving at the amount due the Contractor under this clause there shall be deducted (1) all unliquidated advance or other payments on account theretofore made to the Contractor, applicable to the terminated portion of this con-

tract; (2) any claim which the Government may have against the Contractor in connection with this contract; and (3) the agreed price for, or the proceeds of sale of, any materials, supplies, or other things acquired by the Contractor or sold, pursuant to the provisions of this clause, and not otherwise recovered by or credited to the Government.

(i) If the termination hereunder be partial, prior to the settlement of the terminated portion of this contract, the Contractor may file with the Contracting Officer a request in writing for an equitable adjustment of the price or prices specified in the contract relating to the continued portion of the contract (the portion not terminated by the Notice of Termination), and such equitable adjustment as may be agreed upon shall be made in such price or prices.

(j) The Government may from time to time, under such terms and conditions as it may prescribe, make partial payments and payments on account against costs incurred by the Contractor in connection with the terminated portion of this contract whenever in the opinion of the Contracting Officer the aggregate of such payments shall be within the amount to which the Contractor will be entitled hereunder. If the total of such payments is in excess of the amount finally agreed or determined to be due under this clause, such excess shall be payable by the Contractor to the Government upon demand, together with interest computed at the rate of 6 percent per annum for the period from the date such excess payment is received by the Contractor to the date on which such excess is repaid to the Government: Provided, however, That no interest shall be charged with respect to any such excess payment attributable to a reduction in the Contractor's claim by reason of retention or other disposition of termination inventory until ten days after the date of such retention or disposition, or such later date as determined by the Contracting Officer by reason of the circumstances.

(k) Unless otherwise provided for in this contract, or by applicable statute, the Contractor, from the effective date of termination and for a period of three years after final settlement under this contract, shall preserve and make available to the Government at all reasonable times at the office of the Contractor but without direct charge to the Government, all his books, records, documents, and other evidence bearing on the costs and expenses of the Contractor under this contract and relating to the work terminated hereunder, or, to the extent approved by the Contracting Officer, photographs, microphotographs, or other authentic reproductions thereof.

11. DISPUTES

(a) Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the Contracting Officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Contractor. The decision of the Contracting Officer shall be final and conclusive unless within 30 days from the date of receipt of such copy, the Contractor mails or otherwise furnishes to the

Contracting Officer a written appeal addressed to the Secretary. The decision of the Secretary or his duly authorized representative for the determination of such appeals shall be final and conclusive unless determined by a court of competent jurisdiction to have been fraudulent, or capricious, or arbitrary, or so grossly erroneous as necessarily to imply bad faith, or not supported by substantial evidence. In connection with any appeal proceeding under this clause, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of its appeal. Pending final decision of a dispute hereunder, the Contractor shall proceed diligently with the performance of the contract and in accordance with the Contracting Officer's decision.

(b) This "Disputes" clause does not preclude consideration of law questions in connection with decisions provided for in paragraph (a) above: Provided, That nothing in this contract shall be construed as making final the decision of any administrative official, representative, or board on a question of law.

12. BUY AMERICAN ACT SUPPLY AND SERVICE CONTRACTS

(a) In acquiring end products, the Buy American Act (41 U.S. Code 108-d) provides that the Government give preference to domestic source end products. For the purpose of this clause:

(i) "Components" means those articles, materials, and supplies which are directly incorporated in the end products;

(ii) "End products" means those articles, materials, and supplies which are to be acquired under this contract for public use; and

(iii) A "domestic source end product" means (A) an unmanufactured end product which has been mined or produced in the United States and (B) an end product manufactured in the United States if the cost of the components thereof which are mined, produced, or manufactured in the United States exceeds 50 percent of the cost of all its components. For the purposes of this (a)(iii)(B), components of foreign origin of the same type or kind as the products referred to in (b) (ii) or (iii) of this clause shall be treated as components mined, produced, or manufactured in the United States.

(b) The Contractor agrees that there will be delivered under this contract only domestic source end products, except end products:

(i) Which are for use outside the United States;

(ii) Which the Government determines are not mined, produced, or manufactured in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality;

(iii) As to which the Secretary determines the domestic preference to be inconsistent with the public interest; or

(iv) As to which the Secretary determines the cost to the Government to be unreasonable.

(The foregoing requirements are administered in accordance with Executive Order No. 10582, dated December 17, 1954.)

13. CONVICT LABOR

In connection with the performance of work under this contract, the Contractor agrees not to employ any person undergoing sentence of imprisonment at hard labor.

14. WALSH-HEALEY PUBLIC CONTRACTS ACT

If this contract is for the manufacture or furnishing of materials, supplies, articles, or equipment in an amount which exceeds or may exceed \$10,000 and is otherwise subject to the Walsh-Healey Public Contracts Act, as amended (41 U.S. Code 35-45), there are hereby incorporated by reference all representations and stipulations required by said Act and regulations issued thereunder by the Secretary of Labor, such representations and stipulations being subject to all applicable rulings and interpretations of the Secretary of Labor which are now or may hereafter be in effect.

15. CONTRACT WORK HOURS STANDARDS ACT - OVERTIME COMPENSATION

This contract, to the extent that it is of a character specified in the Contract Work Hours Standards Act (40 U.S.C. 327-330), is subject to the following provisions and to all other applicable provisions and exceptions of such Act and the regulations of the Secretary of Labor thereunder.

(e) Overtime requirements. No Contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any laborer or mechanic in any workweek in which he is employed on such work to work in excess of eight hours in any calendar day or in excess of forty hours in such workweek on work subject to the provisions of the Contract Work Hours Standards Act unless such laborer or mechanic receives compensation at a rate not less than one and one-half times his basic rate of pay for all such hours worked in excess of eight hours in any calendar day or in excess of forty hours in such workweek, whichever is the greater number of overtime hours.

(b) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the provisions of paragraph (e), the Contractor and any subcontractor responsible therefor shall be liable to any affected employee for his unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic employed in violation of the provisions of paragraph (e) in the sum of \$10 for each calendar day on which such employee was required or permitted to be employed on such work in excess of eight hours or in excess of the standard workweek of forty hours without payment of the overtime wages required by paragraph (e).

(c) Withholding for unpaid wages and liquidated damages. The Contracting Officer may withhold from the Government Prime Contractor, from any moneys payable on account of work performed by the Contractor or subcontractor, such sums as may administratively be determined to be necessary to satisfy any liabilities of such Contractor or subcontractor for unpaid wages and liquidated damages as provided in the provisions of paragraph (b).

(d) Subcontracts. The Contractor shall insert paragraphs (a) through (d) of this clause in all subcontracts, and shall require their inclusion in all subcontracts of any tier.

(e) Records. The Contractor shall maintain payroll records containing the information specified in 29 CFR 516.2(a). Such records shall be preserved for three years from the completion of the contract.

16. EQUAL OPPORTUNITY

(The following clause is applicable unless this contract is exempt under the rules, regulations, and relevant orders of the Secretary of Labor (41 CFR, ch. 60).)

During the performance of this contract, the Contractor agrees as follows:

(a) The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color, or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Contracting Officer acting forth the provisions of this Equal Opportunity clause.

(b) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color, or national origin.

(c) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency Contracting Officer, advising the labor union or workers' representative of the Contractor's commitments under this Equal Opportunity clause, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(d) The Contractor will comply with all provisions of Executive Order No. 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(e) The Contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(f) In the event of the Contractor's non-compliance with the Equal Opportunity clause of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended, in whole or in part, and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(g) The Contractor will include the provisions of paragraphs (a) through (f) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the contracting agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, That in the event the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the contracting agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

17. OFFICIALS NOT TO BENEFIT

No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this contract, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

18. COVENANT AGAINST CONTINGENT FEES

The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. For breach or violation of this warranty the Government shall have the right to annul this contract without liability or in its discretion to deduct from the contract price or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

19. PUBLICATION

(a) Definition. For the purpose of this Clause, "Publication" includes (1) any document containing information intended for public consumption or (2) the act of, or any act which may result in, disclosing information to the public.

(b) General. The results of the research and studies conducted under this contract are to be made available to the public through dedication, assignment to the Government, or such other means as the Secretary of Housing and Urban Development shall determine, as required under Title III of the Housing Act of 1948, as amended (12 U.S.C. 1701e).

(c) Reports Furnished the Government. All intermediate and final reports of the research and studies conducted hereunder shall indicate on the cover or other initial page that the research and studies forming the basis for the report were conducted pursuant to a contract with the Department of Housing and Urban Development. Such reports are official Government property and may not be published or reproduced (in toto, in verbatim excerpt, or in form approximating either of these) as an unofficial paper or article. The Contractor or Technical Personnel may publish or reproduce verbatim excerpts from such a report in accordance with Section (e), (1), of this clause.

(d) Publication by Government. The Government shall have full right to publish all information, data, and findings developed as a result of the research and studies conducted hereunder.

Such publication will, at the option of the Contractor (except in the case of quoted excerpts from the Contractor's reports), credit the Contractor and its principal personnel involved by foreword or initial footnote to the publication in form substantially as follows:

The research and studies forming the basis for this report were conducted through contract with (Name of Contractor) by (Name or names of principal personnel). Except for verbatim excerpts quoted from the Contractor's report or from other identified sources, the Department of Housing and Urban Development accepts responsibility for the conclusions herein stated.

(e) Publication by Contractor or Technical Personnel.

(1) Verbatim excerpts from reports furnished the Government. The Contractor or Technical Personnel (each employee or consultant working under the direction of Contractor or any subcontractor hereunder) may publish a verbatim excerpt from a report furnished by the Government, but consistent with Section (c) of this clause may not secure copyright therein, and such publication in a foreword or footnote shall indicate the source of the verbatim material.

(2) Publication, except a verbatim excerpt, concerning or based in whole or in part on results of research and studies hereunder. The Contractor or Technical Personnel may issue a publication concerning, or based in whole or in part on the results of, the research and studies conducted pursuant to this contract subject to law, but in doing so is not authorized thereby to inhibit the free right of the Secretary of Housing and Urban Development from disclosing or publishing in such manner as he may deem to be in the public interest the results of such research and studies: Provided, That:

(i) Prior to Government acceptance of the final report hereunder, the Contractor or Technical Personnel may not secure copyright in any publication concerning, or based in whole or in part on the results of, the research and studies hereunder;

(ii) Prior to or simultaneous with the submission of the proposed material for publication, the Contractor or Technical Personnel shall submit a copy of the proposed publication to the Government; and

(iii) The Contractor or Technical Personnel shall include in any publication concerning, or based in whole or in part on the results of, the research and studies hereunder a foreword or initial footnote substantially as follows:

The research and studies forming (part of) the basis for this publication were conducted pursuant to a contract with the Department of Housing and Urban Development. The substance of such research and studies is dedicated to the public. This publication has been prepared prior to submission to and acceptance by the Department of Housing and Urban Development of the final report under the contract. The author and publisher are solely responsible for the accuracy of statements or interpretations contained herein.

(f) Administratively Confidential Information. The Contractor shall not publish or otherwise disclose, except to the Government and except matters of public record, any information or data obtained hereunder from private individuals, organizations, or public agencies, in a publication whereby the information or data furnished by any particular person or establishment can be identified, except with the consent of such person or establishment (consistent with the inhibitions applicable to the Secretary of Housing and Urban Development under section 602(d) of the Housing Act of 1956, 12 U.S.C. 1701d-3(d)).

(g) Inclusion of Provisions in Contractor's Agreements. The Contractor shall include provisions appropriate to effectuate the purposes of this Clause in all contracts of employment with persons who perform any part of the research or study or development under this contract and in any consultant's agreements or subcontract involving research or study or development hereunder.

20. PATENTS

The patentable results of research and development conducted under the contract and all information, designs, specifications, know-how, data, and findings developed in the performance of this contract shall be made available to the public through dedication, assignment to the Government, or such other means as the Secretary of Housing and Urban Development shall determine. The Contractor agrees (1) to cooperate in the preparation and prosecution of any domestic or foreign patent applications which the Government may decide to undertake covering the subject matter above described, (2) to execute all papers requisite in the prosecution of such patent applications, including assignments to the United States and dedications, and (3) to secure the cooperation of Technical Personnel (each employee or consultant working under the direction of the Contractor or subcontractor hereunder) in the preparation and the execution of all such papers as may be required in the prosecution of such patent applications or in order to vest title in the subject matter involved in the United States, or to secure the right to free use in the public.

In addition to any other reports required under this contract, the Contractor shall submit to the Contracting Officer a final report of all inventions, improvements and discoveries developed in the performance of this contract, and shall certify on the last page of such report that to the best of his knowledge and belief such disclosure has been made therein.

The Contractor shall include provisions appropriate to effectuate the purposes of this Clause in all contracts of employment with persons who perform any part of the research or development under this contract and in any consultant's agreements or subcontracts involving research or development hereunder.

21. UTILIZATION OF CONCERNS IN LABOR SURPLUS AREAS

It is the policy of the Government to place contracts with concerns which will perform such contracts substantially in or near concentrated unemployment or underemployment sections of States or in areas of persistent or substantial labor surplus, where this can be done consistent with the efficient performance of the contract and at prices no higher than are obtainable elsewhere. The Contractor agrees to use his best efforts to place his subcontracts in accordance with this policy. In complying with the foregoing and with paragraph (b) of the clause of this contract entitled "Utilization of Small Business Concerns" the Contractor in placing his subcontracts shall observe the following order of preference: (a) Certified-eligible concerns which are also small business concerns; (b) other certified-eligible concerns; (c) persistent labor surplus area concerns which are also small business concerns; (d) other persistent labor surplus area concerns; (e) substantial labor surplus area concerns which are also small business concerns; (f) other substantial labor surplus area concerns; and (g) small business concerns which are not labor surplus area concerns.

22. CHANGES

The Contracting Officer may at any time, by a written order, and without notice to the sureties, if any, make changes, within the general scope of this contract, in any one or more of the following: (i) drawings, designs, or specifications; (ii) method of shipment or pecking; and (iii) place of inspection, delivery, or acceptance. If any such change causes an increase or decrease in the cost of, or the time required for performance of, this contract, or otherwise affects any other provisions of this contract, whether changed or not changed by any other such order, an equitable adjustment shall be made (1) in the contract price or time of performance, or both, and (ii) in such other provisions of the contract as may be so affected, and the contract shall be modified in writing accordingly. Any claim by the Contractor for adjustment under this Clause must be asserted within thirty (30) days from the date of receipt by the Contractor of the notification of change; provided, however, that the Contracting Officer, if he decides that the facts justify such action, may receive and act upon any such claim asserted at any time prior to final payment under this contract. Failure to agree to any adjustment shall be a dispute concerning a question of fact within the meaning of the clause of this contract entitled "Disputes". However, nothing in this clause shall excuse the Contractor from proceeding with the contract as changed.

23. SUBCONTRACTS

No contract shall be made by the Contractor with any other party for furnishing any of the completed or substantially completed articles, or work herein contracted for without the written approval of the Contracting Officer as to sources.

24. NOTICE AND ASSISTANCE REGARDING PATENT AND COPYRIGHT INFRINGEMENT

(a) The Contractor shall report to the Contracting Officer, promptly and in reasonable written detail, each notice or claim of patent or copyright infringement based on the performance of this contract of which the Contractor has knowledge.

(b) In the event of any claim or suit against the Government, on account of any alleged patent or copyright infringement arising out of the performance of this contract or out of the use of any supplies furnished or work or services performed hereunder, the Contractor shall furnish to the Government, when requested by the Contracting Officer, all evidence and information in possession of the Contractor pertaining to such suit or claim. Such evidence and information shall be furnished at the expense of the Government except where the Contractor has agreed to indemnify the Government.

25. NOTICE TO GOVERNMENT REGARDING LATE DELIVERY

In the event the Contractor encounters difficulty in meeting performance requirements, or anticipates difficulty in complying with the con-

tract delivery schedule or date, the Contractor shall immediately notify the Contracting Officer thereof in writing, giving pertinent details, including the date by which it expects to complete performance or make delivery; provided, however, that this data shall be informational only in character and that receipt thereof shall not be construed as a waiver by the Government of any contract delivery schedule or date, or any rights or remedies provided by law or under this contract.

26. KEY PERSONNEL

The personnel specified in an attachment to this contract are considered to be essential to the work being performed hereunder. Prior to diverting any of the specified individuals to other programs, the Contractor shall notify the Contracting Officer reasonably in advance and shall submit justification (including proposed substitutions) in sufficient detail to permit evaluation of the impact on the program. No diversion shall be made by the Contractor without the written consent of the Contracting Officer: Provided, That the Contracting Officer may ratify in writing such diversion and such ratification shall constitute the consent of the Contracting Officer required by this Clause. The attachment to this contract may be amended from time to time during the course of the contract to either add or delete personnel, as appropriate.

27. CERTIFICATION OF NONSEGREGATED FACILITIES

(Applicable to (1) contracts, (2) subcontracts, and (3) agreements with applicants who are themselves performing federally assisted construction contracts, exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause.)

By submission of this bid, the bidder, offeror, applicant, or subcontractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. He certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The bidder, offeror, applicant, or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the

basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. He further agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that he will retain such certifications in his files; and that he will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS OF NON-SEGREGATED FACILITIES

A Certification of Nonsegregated Facilities must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

28. DISPOSITION OF MATERIAL

Upon termination or completion of all work under this contract, the Contractor shall deliver to the Government all materials received from the Government and all residual materials produced in connection with the performance of this contract. All materials produced or required to be delivered under this contract shall become and remain the property of the Government.

SUPPLEMENT TO PROPOSAL
CERTIFICATE OF CURRENT COST OR PRICING DATA

This is to certify that, to the best of my knowledge and belief, cost or pricing data submitted in writing, or specifically identified in writing if actual submission of the data is impracticable (see 1-3.807-3(h)(2)), to the Contracting Officer or his representative in support of _____ **are accurate, complete, and current as of _____ ***(date)

FIRM _____
NAME _____
TITLE _____

_____*
(Date of execution) ****

*For definition of "cost or pricing data," see FPR 1-3.807-3.
**Describe the proposal, quotation, request for price adjustments, or other submission involved, giving appropriate identifying number (e.g., RFP No. _____).
***This date shall be the date when the price negotiations were concluded and the contract price was agreed to. The responsibility of the contractor is not limited by the personal knowledge of the contractor's negotiator if the contractor had information reasonably available (see 1-3.807-5(a)) at the time of agreement, showing that the negotiated price is not based on accurate, complete, and current data.
****This date should be as close as practicable to the date when the price negotiations were concluded and the contract price was agreed upon.

CERTIFICATIONS AND REPRESENTATIONS

Offerors must COMPLETE, SIGN and ATTACH this page, in single copy, to any proposal submitted under the Request for Proposal identified above.

1. TYPE OF BUSINESS ORGANIZATION REPRESENTATION (Check appropriate box.)

Offeror represents that he operates as an individual, partnership, a nonprofit organization, a corporation, incorporated under the laws of the State of _____

2. SMALL BUSINESS REPRESENTATION (Check appropriate box.)

Offeror represents that he is, or is not, a small business concern. A small business concern for the purpose of Government procurement is a concern, including its affiliates, which is independently owned and operated, is not dominant in the field of operation in which it is bidding on Government contracts, and can further qualify under the criteria concerning number of employees, average annual receipts, or other criteria, as prescribed by the Small Business Administration. (See Code of Federal Regulations, Title 13, Part 121, as amended, which contains detailed industry definitions and related procedures.) Number of employees

3. CONTINGENT FEE REPRESENTATION (Check appropriate boxes.)

The offeror represents: (a) that he has, has not, employed or retained any company or person (other than a full-time bona fide employee working solely for the bidder) to solicit or secure this contract and (b) that he has, has not, paid or agreed to pay any company or person (other than a full-time bona fide employee working solely for the bidder) any fee, commission, percentage or brokerage fee, contingent upon or resulting from the award of this contract; and agrees to furnish information relating to (a) and (b) above as requested by the Contracting Officer. (NOTE: For interpretation of the representation, including the term "bona fide employee" see Code of Federal Regulations, Title 41, Chapter 1, Subpart 1-1.5.)

4. CERTIFICATION OF INDEPENDENT PRICE DETERMINATION

(a) By submission of this proposal, each offeror certifies, and in the case of a joint proposal each party thereto certifies as to its own organization, that in connection with this procurement:

(1) The prices in this proposal have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other offeror or with any competitor.

(2) Unless otherwise required by law, the prices which have been quoted in this proposal have not and will not knowingly be disclosed by the offeror prior to award directly or indirectly to any other offeror or to any competitor; and

(3) No attempt has been made or will be made by the offeror to induce any other person or firm to submit or not to submit a proposal for the purpose of restricting competition.

(b) Each person signing this proposal certifies that:

(1) He is the person in the offeror's organization responsible within that organization for the decision as to the prices being offered herein and that he has not participated, and will not participate, in any action contrary to (a)(1) through (a)(3) above; or

(2) (i) He is not the person in the offeror's organization responsible within that organization for the decision as to the prices being offered herein but that he has been authorized in writing to act as agent for the persons responsible for such decision in certifying that such persons have not participated, and will not participate, in any action contrary to (a)(1) through (a)(3) above, and as their agent does hereby so certify, and

(ii) he has not participated, and will not participate, in any action contrary to (a)(3) above.

(c) This certification is not applicable to a foreign offeror submitting a proposal for a contract which require performance or delivery outside the United States, its possessions, and Puerto Rico.

(d) A proposal will not be considered for award where (a)(1), (a)(3), or (b) above has been deleted or modified. Where (a)(2) above has been deleted or modified, the proposal will not be considered for award unless the offeror furnishes with the proposal a signed statement which sets forth in detail the circumstances of the disclosure and the head of the agency, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

5. EQUAL OPPORTUNITY REPRESENTATION

The offeror represents that he has, has not, participated in a previous contract or subcontract subject to the Equal Opportunity Clause herein, the clause originally contained in Section 301 of Executive Order No. 10625, or the clause originally contained in Section 201 of Executive Order No. 11114; that he has, has not, filed all required compliance reports; and that representations indicating submission of required reports, signed by proposed subcontractors, will be obtained prior to subcontract awards. (The above representations need not be submitted in connection with contracts or subcontracts which are exempt from the clause.)

6. NOTICE OF HELD SEPARATE FOR CERTIFICATION OF NONSEGREGATED FACILITIES

Bidders or offerors are cautioned as follows: By signing this bid or offer, the bidder or offeror will be deemed to have signed and agreed to the provisions of the "Certification of Nonsegregated Facilities" in this solicitation. The certification provides that the bidder or offeror does not maintain or provide for his employees facilities which are segregated on a basis of race, creed, color, or national origin, whether such facilities are segregated by directive or on a de facto basis. The certification also provides that he will not maintain such segregated facilities. Failure of a bidder or offeror to agree to the Certification of Nonsegregated Facilities will render his bid or offer nonresponsive to the terms of solicitation; involving awards of contracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause.

Name and Title of Person Signing

Signature

Date

NOTE: Offerors must set forth full, accurate, and complete information as required by this Solicitation (including attachments). The penalty for making false statements in offers is prescribed in 18 U. S. C. 1001.

UNIT DESIGN CRITERIA

These standards for housing comprise draft Chapter 5 of a future HUD publication which will replace both the existing FHA and HAA design and construction standards. Other Chapters on, for example, Building Design and Construction Materials are not included in this RFP in order to provide optimum freedom in Operation BREAKTHROUGH, within its stated limits.

Each major section of the Criteria is divided into two parts. The Mandatory part contains those performance standards that HUD believes to be essential. The Guides part (section numbers prefixed by G) provides ancillary information which is considered to be of assistance in design development, but is not mandatory. For example, the furniture clearance diagrams imply rectangular spaces though other room shapes would be acceptable if they meet the Mandatory standards.

Respondents to the Operation BREAKTHROUGH RFP are encouraged to put innovative design thinking forward even if it deviates from the Criteria. It is HUD's intention to evaluate the draft Criteria in conjunction with the RFP responses for eventual routine use in HUD housing programs.

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CHAPTER 5

UNIT DESIGN

500 GENERAL

1. Objectives. The design and planning of living units shall have a workable man-centered basis. Provision shall be made for the essential needs of people for space, light, food, water, sleep, safety, sanitation, comfort, companionship and periods of quietness. It is necessary that adequate housing quality be provided, yet reconciled with minimum cost by the efficient use of space.
2. Space needs shall be determined by family size, the functions of day to day living and the normal possessions of the family. Living units shall be planned to contain space sufficient to accommodate appropriate furniture or equipment for each habitable room. To demonstrate the furnishability, preliminary floor plans for each living unit design shall show the appropriate furniture drawn to scale.¹
3. The arrangement of rooms shall show a proper relationship one to the other, and provide reasonable privacy by: (1) locating exterior openings in relation to exterior conditions and, (2) having bathrooms accessible from bedrooms and other habitable rooms.
4. The circulation pattern throughout a living unit shall function satisfactorily. Serious conflicts in the appropriate use of each room and its furniture and equipment shall be avoided.
5. Single family houses and multiple living units at or near grade shall have a convenient relationship to outdoor areas.
6. The indoor space needs for family recreation and self-service activities shall be provided for: (play space for children, minor home repairs, etc.)

¹ See Figure 5.01 for a furniture key drawn to scale, and the listings of appropriate furniture and equipment to be accommodated under Sections 510, 520, 530, 540 and 550

GUIDESG500 GENERAL

The design of satisfactory and efficient housing units is a highly disciplined process. This is true of house-site relationship, construction techniques and architectural design. It must provide for the many general and detailed aspects of home life for each member of the family. Many intangibles are involved that must be satisfied and be translated into suitable space, ease of circulation, visual and auditory privacy, as well as important social, educational and recreational needs.

G500-1 Furnishability

- a. The criteria for the amount of space provided in habitable rooms of a living unit is its furnishability. The text material for each room provides a list of furniture for which appropriate space must be provided. Minimum recommended clearances for the use of the furniture for circulation and the performance of various living functions are also given.
- b. Furniture sizes given are standard sizes. However, it is well for the designer to keep in mind that families frequently have on hand, or buy, large and heavy furniture, particularly for the living room. In such cases, additional space is necessary to have planning arrangements function properly.
- c. In small rooms the use of built-in furniture can be advantageous as space-savers. Properly designed built-in storage units can increase usable floor space, and reduce the outlay for home furnishings. Where built-ins provide a functional equivalent to movable furniture as listed for the various areas of the living unit, their use can be considered an acceptable substitute.

G500-2 Combination Rooms

- a. The combination of more than one living function into a single space is a most common method of using space intensively and economically. Certain combinations and some limiting factors are given below and in G500-3.

GUIDES

- b. A frequent and favorable planning arrangement in lower income housing is a combined Kitchen-Dining Area. This permits a wide use of the space not only for the kitchen-dining functions but for study and informal social activity for the entire family.
- c. For two adjacent spaces to be considered a combined room, the clear opening between the spaces should permit the common use of spaces for the expansion of the differing functions. In general, the horizontal opening between combined spaces should be at least 8 ft.-0 in.
- d. A combined Living-Dining-Kitchen area should have the food preparation-cooking area screened from the living room sitting area.
- e. The living unit without a separate bedroom, (O-BR), generally provides more multiple use of space than any other combination. However, its acceptable use is limited to one or two persons.

G500-3 Other Habitable Room (OHR)

Apartment living units may contain an alcove or a separate room which may have multiple uses. An OHR may be used as a den, a general purpose family room, or for additional sleeping space. Although space for no specific furniture is required for such a room, the floor area should be at least as large as a Secondary, Single-Occupancy Bedroom and contain a clothes closet.

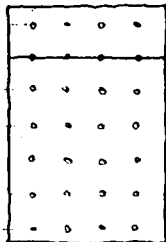
GUIDES

Fig. 5.01



Couch

Double Bed

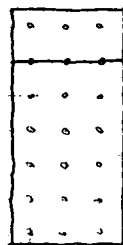
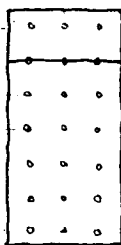


Easy Chair

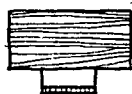


End Table

Twin Beds

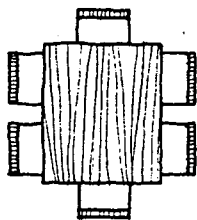
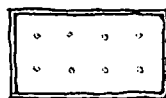


Television Set



Desk w/ Chair

Crib



Dining Table w/ Chairs

Dresser



Chair



Key to Essential Living Unit Furniture for which Well-Planned Space is to be Provided

1/4" = 1'-0"

510 LIVING AREA

1. Each living unit shall contain space that is conducive to general family living activities, among which are entertaining, reading, writing, listening to music, watching television, relaxing and frequently children's play. Unless specifically provided for elsewhere in the unit, appropriate space for these activities shall be provided in the living area.
2. Furniture that can be accommodated in the living area shall include the following items (sizes are minimums):

- 1 - couch, 3'-0" x 6'-10"
- 2 - easy chairs, 2'-6" x 3'-0"
- 1 - desk, 1'-8" x 3'-6"
- 1 - desk chair, 1'-6" x 1'-6"
- 1 - television set, 1'-4" x 2'-8"
- 1 - table, 1'-6" x 2'-6"

GUIDESG510 LIVING AREAG510-1 GENERAL

Necessary planning considerations should include: provision of adequate floor and wall space for furniture groupings, separation of trafficways from centers of activity and ease of access to furniture and windows.

G510-2 Circulation

- a. Convenient use of, and access to, furniture in the living space should provide the following minimum clearances.

- 60" minimum between facing seating
 - 24" minimum clearance where circulation occurs between furniture
 - 30" minimum clearance for use of desk
 - 36" minimum clearance for main trafficway
 - 60" minimum distance between television set and seating.
-

GUIDES

- b. Circulation through the living room should be as direct as possible, yet it should not interfere with the furniture placement.

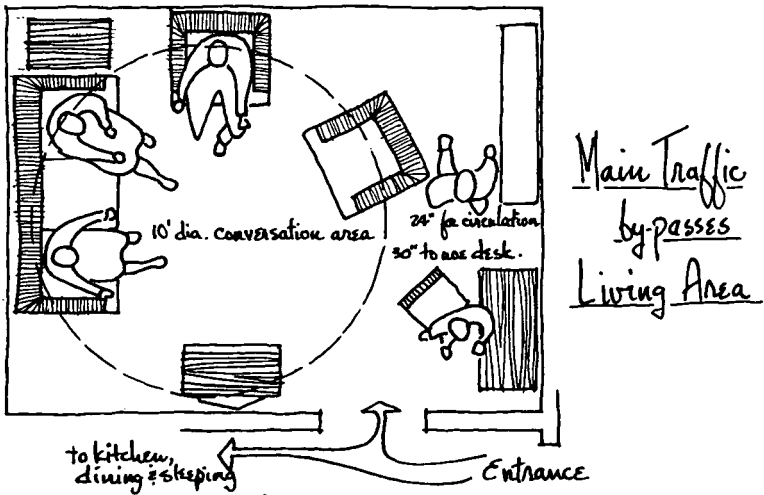
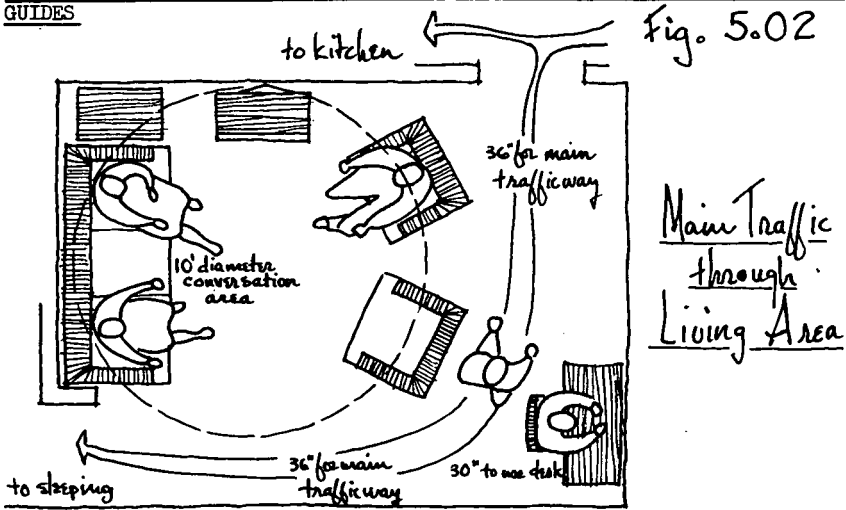
G510-3 Doors

The location of doors should fully consider the need for generous wall space for the placement of furniture.

G510-4 Conversation Area

People gather or congregate during social activities in rather small groups. A desirable conversation distance is of relatively small size, approximately 10 ft. in diameter.

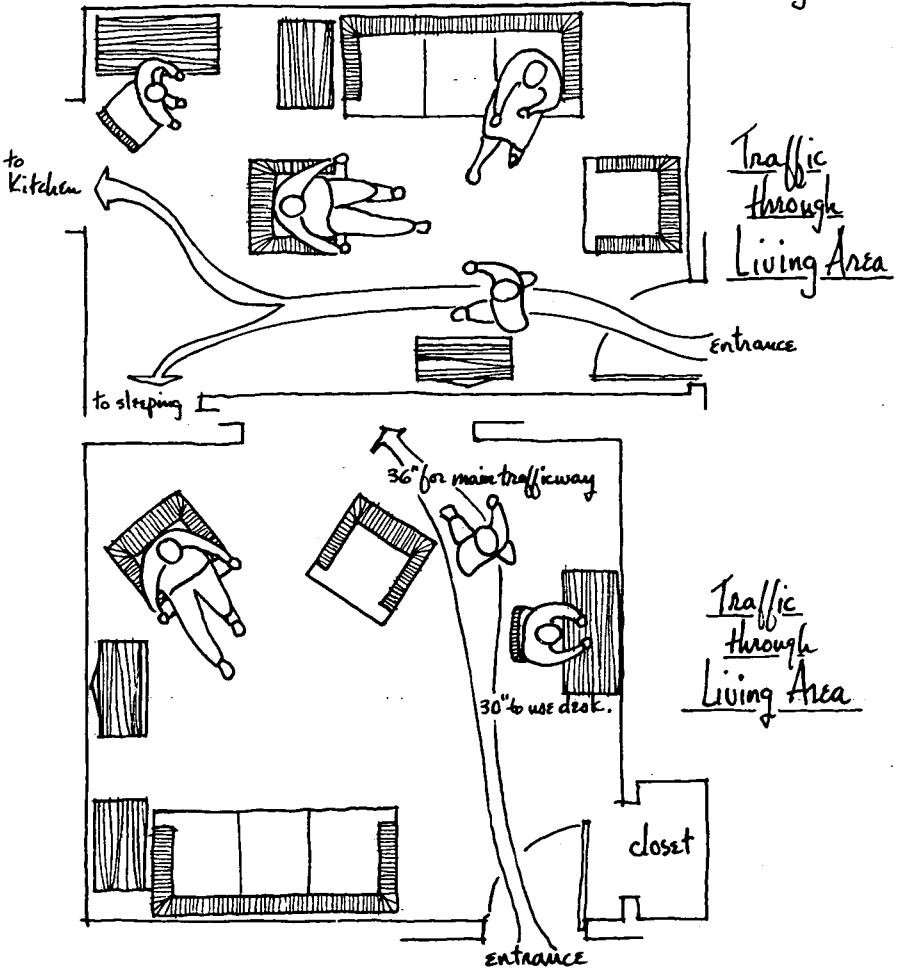
GUIDES



Minimum Clearances, Circulation and Conversation Areas for Living Rooms

GUIDES

Fig. 5.03



Minimum Clearances, Circulation and Conversation Areas for Living Rooms

520 DINING AREA

1. Each living unit shall contain space for the purpose of dining. This area may be combined with the living room or kitchen, or may be a separate room.
2. The amount of space allocated to dining shall be based on the number of persons to be served and proper circulation space. Appropriate space shall be provided for the storage of china and large dining articles either in the dining area itself or in the adjacent kitchen.
3. Space for accommodating the following size tables and chairs in the Dining Area shall be provided, according to the intended occupancy, as shown:

1 or 2 persons	- 2'-6" x 2'-6"
4 persons	- 2'-6" x 3'-2"
6 persons	- 3'-4" x 4'-0" or 4'-0" round
8 persons	- 3'-4" x 6'-0" or 4'-0" x 4'-0"
10 persons	- 3'-4" x 8'-0" or 4'-0" x 6'-0"
12 persons	- 4'-0" x 8'-0"
Dining chairs	- 1'-6" x 1'-6"
*Buffet or storage unit	- 1'-6" x 3'-6"

GUIDESG520 DINING AREA

- G520-1 Size of the individual eating space on the table should be based upon a frontage of 24 inches and an area of approximately 2 sq. ft. In addition, table space should be large enough to accommodate serving dishes.
- G520-2 Desirable room for seating is a clear 42" all around the dining table. The following minimum clearances from the edge of the table should be provided.

32"	for chairs plus access thereto
38"	for chairs plus access and passage
42"	for serving from behind chair
24"	for passage only
48"	from table to base cabinet (in kitchen)

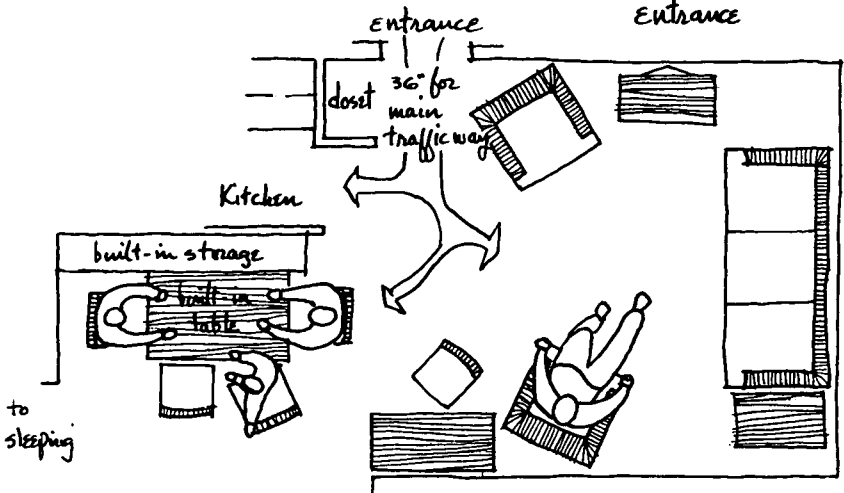
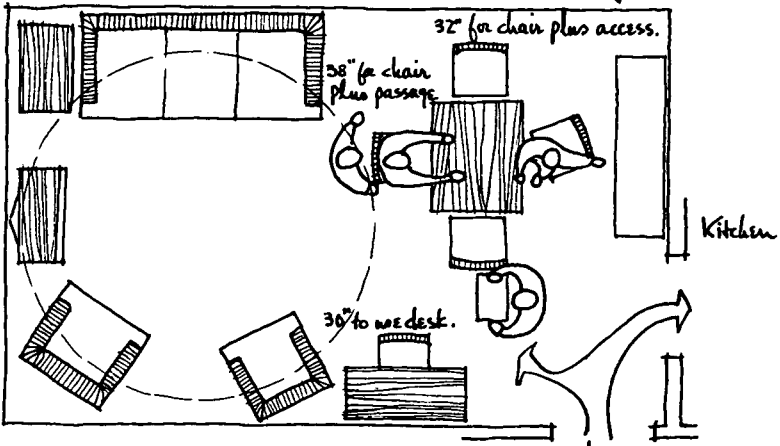
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Desirable additional furniture

GUIDES

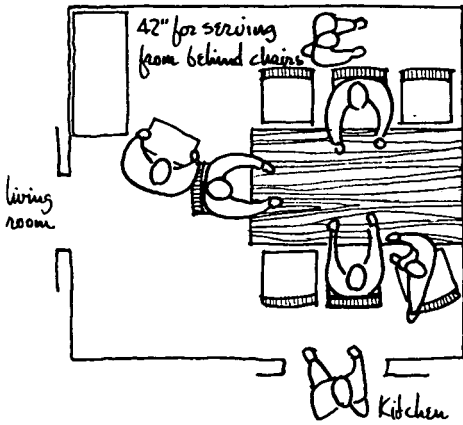
- G520-3 In sizing the separate dining room, provision should be made for circulation through the room in addition to space for dining.
- G520-4 The location of the Dining Area in the Kitchen is desirable for small houses and small apartments. This preference appears to stem from two needs: (1) Housekeeping advantages; (2) The dining table in the Kitchen provides a meeting place for the entire family. Where only one dining location is feasible, locating the dining table in the Living Room is not recommended.

Fig. 5.04

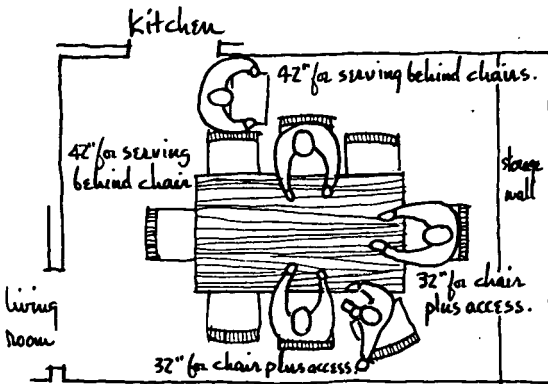


Minimum Clearances and Circulation
for Combined Living - Dining Areas

Fig. 5.05



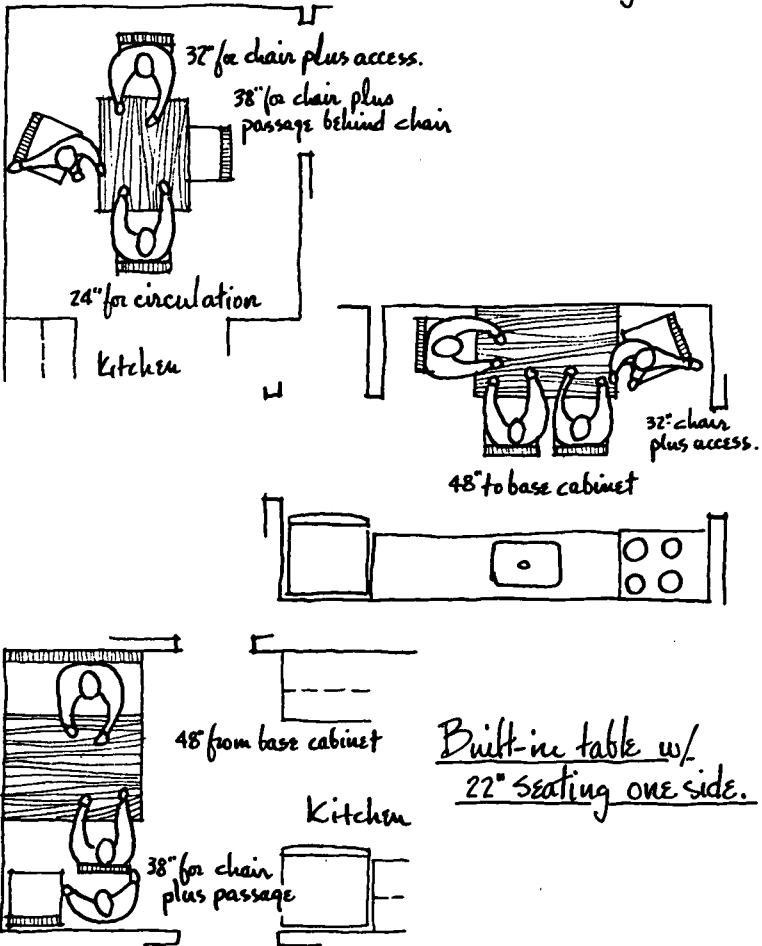
One end of table against wall



Serving from One End and One Side of Table

Minimum Clearances for Dining Areas

Fig. 5.06



Minimum Clearances for
Dining Area in Kitchen

530 WORK AREA

531 KITCHEN

1. General. The basic activities in the kitchen consist of food preparation, serving and clean up after the meal. The kitchen design shall permit efficient operation in the performance of these functions. In addition, storage space for staples, dinnerware and utensils shall be provided.
 2. Location. The kitchen shall be conveniently located near the dining area, living area and the utility area. The user should have easy access from the service entrance, or the only entrance if in an apartment. The kitchen shall provide direct access to the dining area.
 3. Space. The size of the kitchen shall be determined by the number of bedrooms provided in the living unit. Work centers for the following equipment, cabinets and space for their use shall be provided:
 - a. Range space with base and wall cabinet at one side for serving and storage of utensils and staples.
 - b. Sink and base cabinet with counter space on each side for clean up. Wall cabinets for storage of dinnerware.
 - c. Refrigerator space with counter space at latch side of the refrigerator door.
 - d. Mixing counter and base cabinet for electrical appliances and utensil storage. Wall cabinet for staple storage.
 4. Light and Ventilation. Artificial ceiling light shall be provided and ventilation shall be provided by natural or mechanical means.
 5. Fire Protection and Safety. Kitchen range shall meet the provisions of the following:
 - a. Gas ranges, AGA "Directory of Approved Appliances and Listed Accessories."
 - b. Electric ranges, U. L. "Electric Appliances and Utilization Equipment List."
-

c. Oil ranges, U. L. "Gas and Oil Equipment List".

GUIDES

G530 WORK AREA

G531 KITCHEN

G531-1 Work Centers

Table 5 - 1 shows recommended minimum space standards for kitchen work centers. The space to be provided are sized according to the number of bedrooms in the living unit.

G531-2 Height of Shelving and Counter Tops

- a. Maximum height of wall shelving - 74 inches. Height of counter tops should be 36 inches.
- b. Maximum clearance height between sink and wall cabinet- 24 inches; between base and wall cabinets - 15 inches clearance. See Figure 5.09 for other clearances.

G531-3 Recommended Minimum Edge Distance

Equipment should be placed to allow for efficient operating room between it and any adjacent corner cabinet. At least 9" from the edge of the sink and range and 16" at the side of the refrigerator is recommended. Figure 5,07

G531-4 Circulation Space

A minimum of 40" should be provided between base cabinets or appliances opposite each other. This same minimum clearance applies when a wall, storage wall or work table is opposite a base cabinet.

G531-5 Traffic

In the kitchen traffic should be limited to kitchen work only, such as supply and serving traffic. Serving circulation to the dining area should be without any cross traffic.

GUIDES

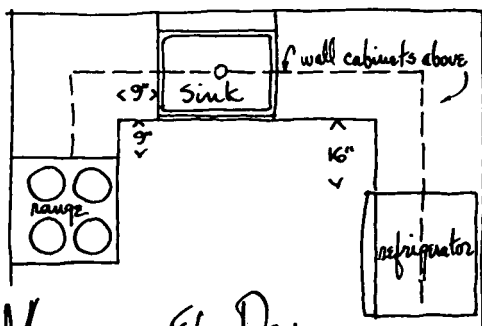
TABLE 5-1

MINIMUM FRONTAGES FOR WORK CENTERS

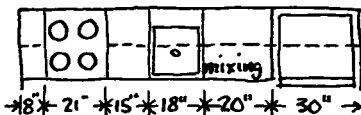
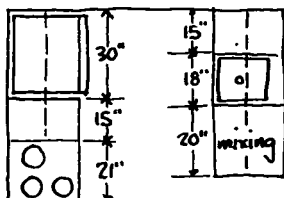
WORK CENTERS (1)(2)(3)(5)	KITCHENETTE		KITCHEN		
	ZERO (4) BEDROOM	ONE BEDROOM	TWO BEDROOMS	THREE BEDROOMS	FOUR OR MORE BEDROOMS
<u>SINK</u> counter and base cab. at each side	18" 15"	24" 18"	24" 20"	24" 24"	36" 30"
<u>RANGE</u> counter and base cab. at one side	21" 15"	21" 18"	24" 20"	30" 24"	30" 30"
<u>REFRIGERATOR</u> (space) counter at latch side	30" 15"	30" 15"	36" 15"	36" 15"	36" 18"
<u>MIXING</u> (base and wall cabinet)	20"	30"	36"	36"	42"

- (1) Work centers may be combined; the kitchenette multiple-use space should at least equal the largest frontage of any one of the work centers being combined; the kitchen multiple-use space should at least equal the largest frontage of any one of the work centers being combined plus 6 inches.
- (2) Provide a drawer at each base cabinet.
- (3) Frontage may continue around a corner, except a space less than 12" should not be counted.
- (4) A 72" compact kitchen with 72" wall cabinet may be substituted.
- (5) The frontages are based on typical cabinets. Base cabinet approximately 24 inches deep x 36 inches in height with one shelf and a drawer. Wall cabinet approximately 12 inches deep x 30 inches in height with two adjustable shelves.

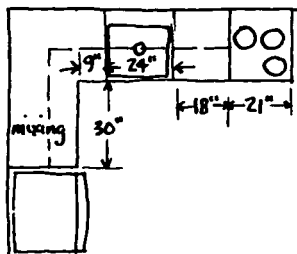
Fig. 5.07



Minimum Edge Distances



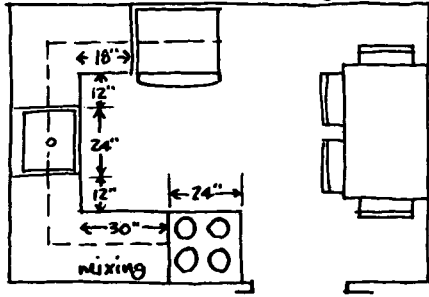
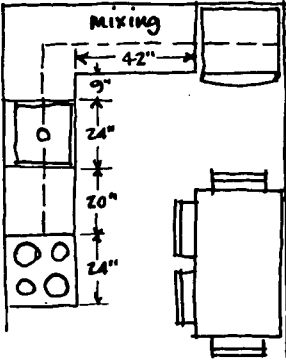
Zero-Bedroom
Kitchenettes



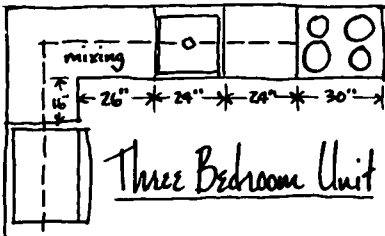
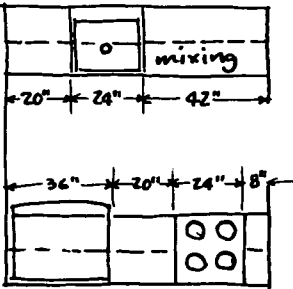
One Bedroom
Kitchenette

Minimum Frontages and Edge Distances - Kitchens

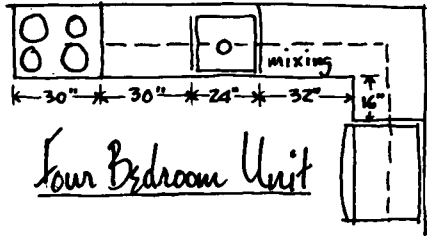
Fig. 5.08



Two Bedroom
Living-Unit Kitchens



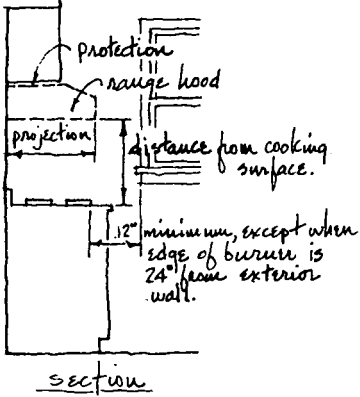
Three Bedroom Unit



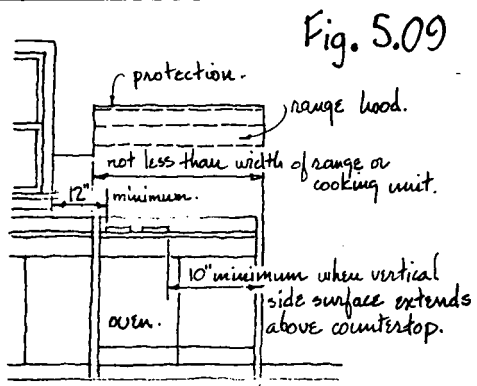
Four Bedroom Unit

Minimum Frontages for Various Kitchens

GUIDES

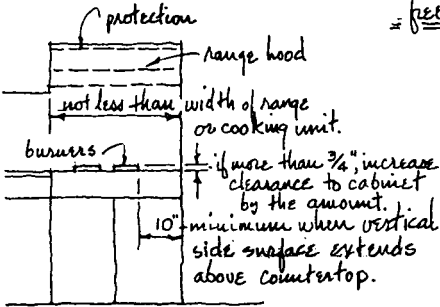


section



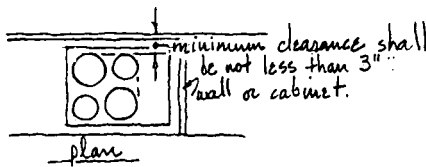
elevation

freestanding range



elevation

built-in cooking unit



plan

Notes

- o 2'-6" minimum clearance between top of range and bottom of unprotected wood or metal cabinet.
- o 2'-0" minimum clearance when bottom of wood or metal cabinet is protected.
- o Cabinet protection should be provided where necessary, of fire-resistant material.
- o distance from cooking surface to bottom of hood should not be less than than the maximum projection of hood from the wall - for freestanding or built-in units.
- o clearances should not be less than listed UL or AGA clearances.

Clearances at Cooking Units & Ranges

532 LAUNDRY

1. General. Where central laundry facilities are not provided, each living unit shall contain at least a laundry tray, or a combination sink and tray fixture, or the installation of water and waste piping and space for a clothes-washing machine.
2. Light and Ventilation. Artificial light shall be provided. Clothes dryers, where provided, shall be adequately vented.

GUIDES

G532 LAUNDRY

G532-1 Location. The laundry facility may be located in the kitchen or family room but its location in a utility room or bathroom is preferable in order to provide more noise control and improved sanitation.

G532-2 Laundry Space Allowances

- 1 - laundry tray, 24" frontage x 20"
- 1 - combination sink and tray, 42" frontage x 21"
- 1 - clothes washer, 30" frontage x 30"
- 1 - clothes dryer, 30" frontage x 30"

540 BEDROOMS

1. Each dwelling unit shall have space(s) allocated to sleeping and such related activities as dressing and personal care, and study or reading. Sufficient space shall also be provided for clothes storage and housekeeping in the bedroom areas.
2. Although the required area in a Primary Bedroom varies depending upon the given room layout, adequate space shall be provided to permit comfortable use of essential furniture and circulation as follows:

- 2 - twin beds (3'-3" x 6'-10")
- 1 - dresser (1'-6" x 4'-4")
- 1 - chair (1'-6" x 1'-6")
- 1 - crib (2'-6" x 4'-6")
- *1 - table (1'-6" x 2'-6") for sewing or other work.

A Secondary Double-Occupancy Bedroom shall have space to facilitate circulation and accommodate the following sized furniture:

- 2 - twin beds (3'-3" x 6'-10") or 1-double bed (4'-6" x 6'-10")
- 1 or *2 dresser (1'-6" x 3'-6")
- 1 - chair (1'-6" x 1'-6")
- 1 - desk (1'-8" x 3'-6") or storage chest for toys.

A Secondary Single-Occupancy Bedroom shall have space to facilitate circulation and accommodate the following sized furniture:

- 1 - twin bed (3'-3" x 6'-10")
- 1 - dresser (1'-6" x 3'-6")
- 1 - chair (1'-6" x 1'-6")
- *1 - desk (1'-8" x 3'-6")

3. Dormitory type (extra large) sleeping spaces to serve 3 or 4 persons may be provided in living units containing at least three other bedrooms. The design and area shall accommodate the required number of beds (not bunks) and other necessary furniture and have appropriate closet space.

*Desirable Additional Furniture

-
4. Each bedroom shall have proper provisions for natural light and ventilation.
 5. Visual and auditory privacy is needed in all bedrooms.¹
 6. Safety provisions regarding a second means of egress shall be in accordance with the latest edition of the National Fire Protection Association, No. 101, "Life Safety Code".

GUIDES

G540 BEDROOMS

G540-1 Clearances

- a. For reasonable access to, and use of, the bedroom furniture and equipment, the following minimum clearances should be observed:
 - 42" at one side or foot of bed, for dressing
 - 12" clearance for least used side of double bed or pair of twin beds. The least used side of a single bed may be placed against wall.
 - 6" clearance from side of bed to side of dresser or chest.
 - 36" clearance in front of dresser, closet or chest of drawers.
 - 24" clearance for major circulation path (door to closet, etc.)
 - 22" clearance on one side of twin bed
- b. It should not be necessary to move double beds in order to make them up.
- c. Bedrooms should be of sufficient size to permit an alternate arrangement of furniture if at all possible.

¹Reference: "A Guide to Airborne, Impact and Structure Borne Noise Control in Multifamily Dwellings", National Bureau of Standards, September, 1967

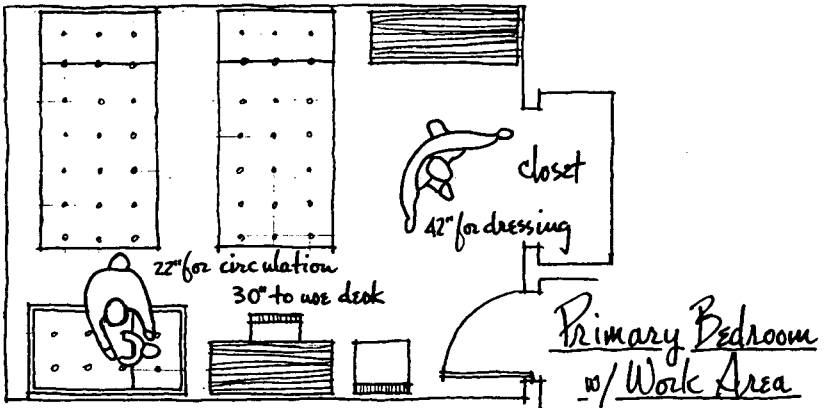
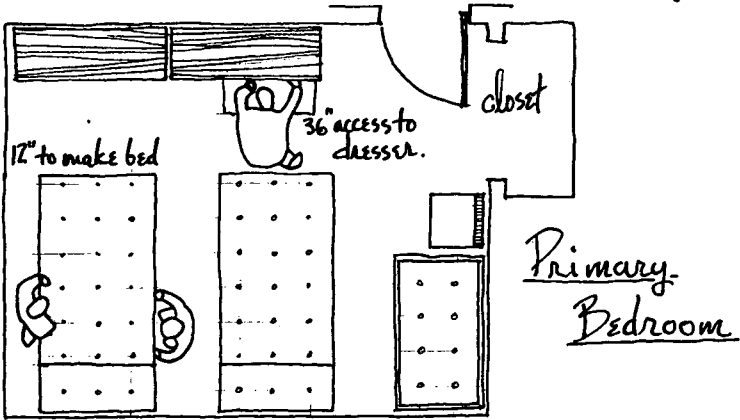
GUIDES

- d. Primary Bedrooms should have at least one uninterrupted wall space of at least 10 ft. There should also be space provided for private working or resting separate from dressing spaces.

G540-2 Location

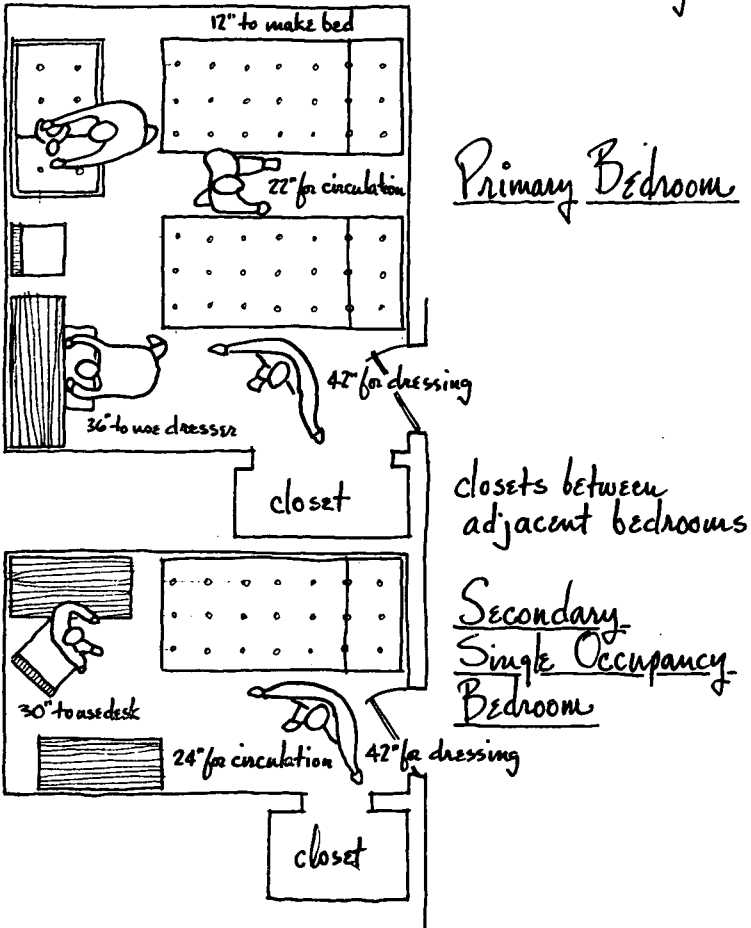
- a. The bedroom or sleeping area of the living unit should be located away from the living and working areas for privacy.
- b. In the analysis of the bedroom area, there should be a regard for the make-up of the family. With pre-school children, it is convenient if the master bedroom is located close to children's bedrooms. With teenage children, separation of the master bedroom from other bedrooms wherever possible to reduce noise is desirable.
- c. The location of doors, windows and closets should be planned to allow the best placement of the bed and other furniture.
- d. Placement of the closet so it is next to the door into the bedroom, minimizes the use of wall space.

Fig. 5.10



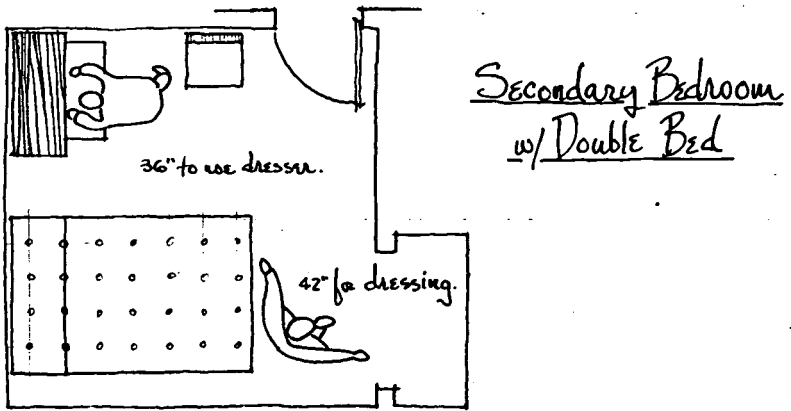
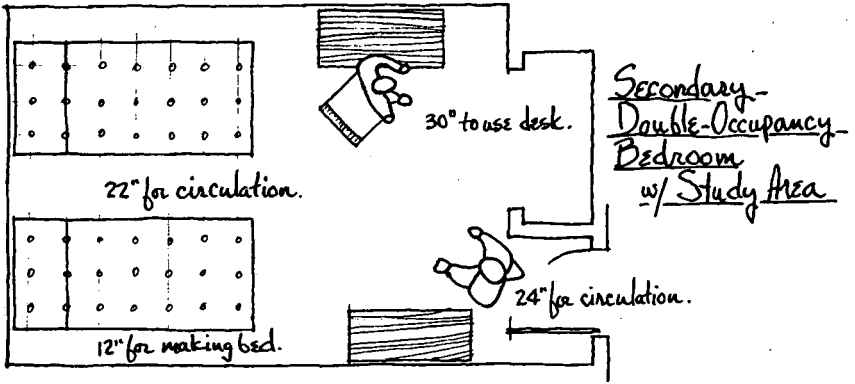
Minimum Clearances in Primary Bedrooms

Fig. 5.11



Minimum Clearances in Primary and Secondary Bedrooms

Fig. 5.12



Minimum Clearances in Secondary Bedrooms

550 BATHS

1. Each dwelling unit shall have a bathroom with enough area to accommodate a lavatory, a water closet and a bathtub or shower. Arrangement for fixtures shall provide for comfortable use of each fixture and permit at least a 90 degree door swing unless sliding doors are used.
2. The room arrangements shown in Table 5-2 are not acceptable:

TABLE 5-2

Only access from	to	through
a. Habitable room ¹	Bathroom	Bedroom
b. Habitable room ²	Habitable room	Bathroom
c. Bedroom	Bathroom	Another Bedroom
d. Bedroom	Bathroom	Habitable room

¹Except in 1-Bedroom living unit with assured marketability.
²A required bathroom shall not open directly into a kitchen.

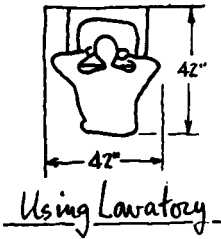
GUIDES

G550 BATHS

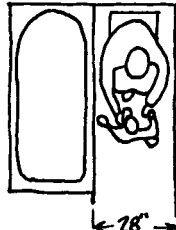
- G550-1 The bathroom should be convenient to the bedroom zone, and accessible from the living and work areas.
- G550-2 Linen storage should be accessible from the bathroom, but not located within the bathroom.
- G550-3 Each complete bathroom should be provided with the following:
- a. Grab-bar and soap dish at bathtub
 - b. Toilet paper holder at watercloset
 - c. Soap dish at lavatory (may be integral with lavatory)
 - d. Towel bar
 - e. Mirror and medicine cabinet or equivalent enclosed shelf space.
 - f. In all cases where shower head is installed, provide a shower rod or shower door.
- G550-4 Each half-bath should be provided with Items b. c. d. and e. as listed in G550-3

GUIDES

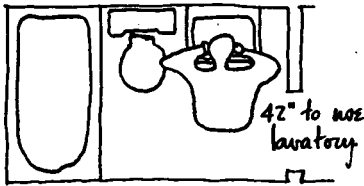
Fig. 5.13



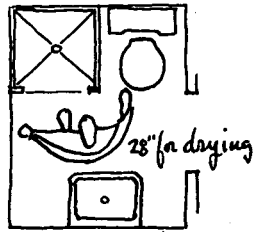
Using Lavatory



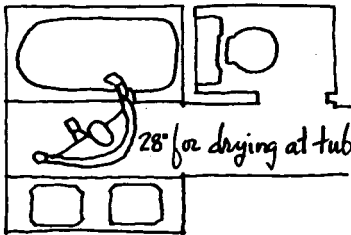
Drying Child at Tub



Bath with Tub



Bath with Shower

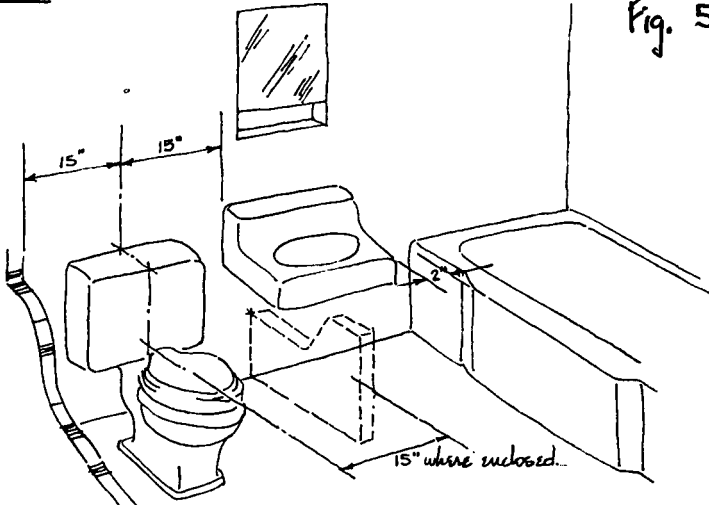


Bath with Water Closet
in Separate Compartment

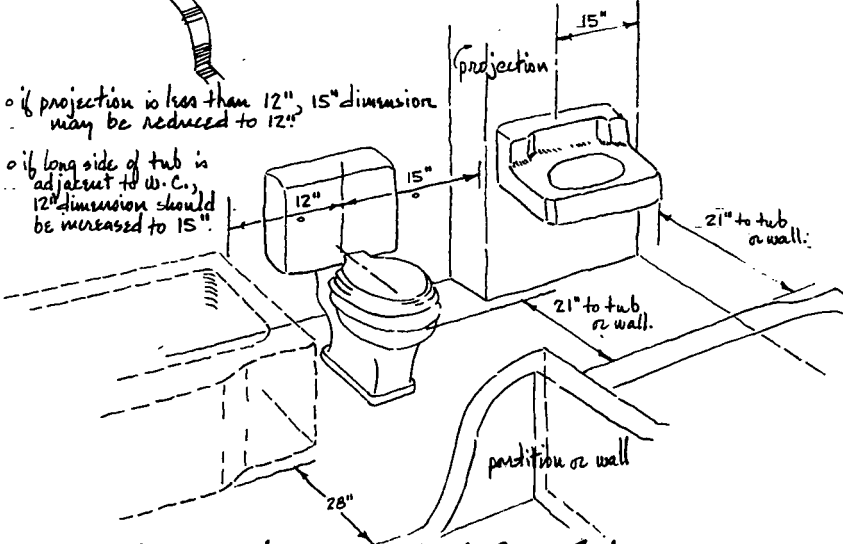
Minimum Clearances for Bathrooms

GUIDES

Fig. 5.14



- o if projection is less than 12", 15" dimension may be reduced to 12"
- o if long side of tub is adjacent to w.c., 12" dimension should be increased to 15"



Minimum Clearances at Bath Room Fixtures

560 CLOSETS AND STORAGE

1. Sufficient closets and storage space shall be provided for living and housekeeping within each living unit. All closets and storage spaces shall be appropriately located in relation to their principal uses.
2. Bedroom Closets. Each bedroom shall have at least one closet for clothes hanging and storage which meets or exceeds the following:
 - Depth - 2 ft., clear
 - Length - (Primary Bedroom) - 5 linear ft., clear
 - (Double Secondary Bedroom) - 5 linear ft., clear
 - (Single Secondary Bedroom) - 3 linear ft., clear
 Each bedroom closet shall have a shelf and hanging pole.
3. Coat Closet. Each living unit shall have an appropriately sized coat closet near the entrance of the unit.
4. Linen Closet. Provide a suitable linen closet for each living unit which is accessible to the bedroom area. Shelves shall be provided but drawers may be substituted for a portion of the shelf space.
5. General Storage. Useable general storage space shall be provided for each living unit in at least the following amounts:
 - a. Storage located entirely within the living unit
 - OBR and 1 BR = 80 cu. ft.
 - 2 BR = 112 cu. ft.
 - 3 BR = 144 cu. ft.
 - 4 BR = 176 cu. ft.
 - b. Where at least a minimum of one-third of the storage space is located within the unit, provide the following total storage:
 - OBR and 1 BR = 120 cu. ft.
 - 2 BR = 168 cu. ft.
 - 3 BR = 216 cu. ft.
 - 4 BR = 264 cu. ft.

Interior general storage may be located in bedroom or coat closets when these closets are larger than the required space as shown in 560, 2 and 3.

GUIDES

G560 CLOSETS AND STORAGE

G560-1 Location

- a. In bedrooms, the placement of the closet so that it is next to the door into the bedroom minimizes the use of valuable wall space for furniture.
- b. Closets should be used between bedrooms and the living-working zones, and between individual bedrooms wherever possible, to enhance privacy.

G560-2 Clearances and Sizes

- a. Adequate floor space should be provided in front of closet openings to permit easy access.
- b. Walk-in closets should have a minimum of 1'-6" in front of the clothes, and 1'-8" between two racks of clothes.
- c. If a closet is 2'-0" deep, only 6" of the rod that is concealed by the door jamb on each side of the door should be considered accessible. If provision is made for 6" clearance in front of the clothes up to 12" of rod concealed by the jamb is accessible.
- d. If a hookstrip for clothes hanging is to be provided in addition to the shelf and pole, the space should have a clear depth of 2'-6".
- e. Hanging pole length may be determined by the allowances for the following minimums:
 - 3" per hanger for men's suits
 - 2" per hanger for women's clothing
 - 4" per hanger for heavy coats.

GUIDESG560-3 Ventilation

Provision should be made for ventilating clothes and storage spaces.

G560-4 Broom Closet

General storage space should be provided for the location of cleaning equipment. It does not have to be a separate closet.

G560-5 Coat Closet

The coat closet size for living units with as many as 2 bedrooms should be at least 3 feet in length and 2 feet deep, and appropriately increased for larger units.

G560-6 In basementless single family and duplex houses, at least 50 cu. ft. per bedroom of external enclosed storage area should be provided for articles and equipment used outdoors.

570 SUPPORT FACILITIES

571 DOORS AND WINDOWS

1. Doorway openings shall be provided which are adequate in size to admit furniture and equipment to all rooms and other spaces.
2. Provide a door for each entrance to a living unit or house, and within the living unit or house for each opening to a bedroom, bathroom and toilet compartment.
3. Provide natural light and ventilation in each habitable room of a house or living unit, except for the kitchen and small alcoves in at least the following amounts:

Glass area per room - 10 percent of floor area.

Natural ventilation per room - 5 percent of floor area.

Properly designed mechanical ventilation is acceptable instead of natural, and shall be provided for interior Kitchens and Baths.

GUIDESG570 SUPPORT FACILITIES

G571 DOORS AND WINDOWS

G571-1 Doors to and Within Living Units or Houses.

The following door sizes should be considered minimum for the locations shown.

<u>LOCATION</u>	<u>WIDTH</u>	<u>HEIGHT</u>
a. Entrance to Living Unit	3'-0"	6'-8"
b. Service to Living Unit	2'-6"	6'-8"
c. Habitable Room	2'-6"	6'-8"
d. Bathrooms, Toilet Compartments	2'-0"	6'-8"
e. Closets; other than Linen or Broom, or Folding Doors for Wardrobe Closets	2'-0"	6'-6"
f. Folding or Sliding Doors (Within Living Unit)	Unobstructed opening not less than specified in c, d, and e.	

GUIDES

Exterior doors should have a keyed lock, and in addition security type locking devices wherever warranted by unsafe environmental conditions. Doors to bathrooms or toilet compartments should have a privacy lock.

G571-2 Windows

- a. An alcove adjoining a habitable room should be separately lighted and ventilated; otherwise it is considered a part of the room.
- b. If any part of a room is more than 20 feet from a direct source of natural light, the required glass area should be increased from 10 percent to not less than 15 percent of the floor area. If the source of natural light is at right angles to any part of a room and the distance more than 10 feet, the required glass area should be not less than 15 percent of the total floor area.
- c. If windows of a room open on a covered and unenclosed porch or balcony, the depth of which exceeds 4 feet, the glass area should be increased 2 percent from the basic 10 percent for each foot of depth over 4 feet up to a total of 20 percent.
- d. Where windows or doors of a room open on to a glass enclosed porch or balcony, the glass area of these windows should be not less than 20 percent of the floor area of the room. The required ventilating area for the room and porch should be based upon that provided in the porch openings. The ventilating area of the openings in the exterior wall should be not less than that required for the room itself.
- e. The head or top of windows should be at least 6'-8" above the finished floor.

G572 PRIVATE STAIRWAYS

Private stairways should be designed and constructed to meet the requirements of public stairways except for the following items:

GUIDES

- a. Main Stairs. Width clear of handrail - 2 feet-8 inches; Headroom - 6 feet-8 inches; Riser height - $8\frac{1}{4}$ inches; Run - 9 inches plus nosing; Winders - acceptable provided the run at a point 18 inches from converging end is not less than the run of the straight portion of the stair.
- b. Service Stairs. Width clear of handrail - 2 feet 6 inches; Headroom 6 feet-4 inches; Riser height - $8\frac{1}{4}$ inches; Run - 9 inches plus nosing for either open or closed; Winders - (same as for main stairs) Landing - not less than 2 feet - 6 inches square.

G573 BASEMENTSG573-1 General

Houses which have basements usually have more storage and general purpose space. There is usually space for children's play, minor carpentry, household repairs, and storage space for all types of articles having indoor and outdoor seasonal uses.

Houses without basements should have what may be called a "basement-equivalent" above grade. This space may be located on the main floor or in an attic. It is not necessary for the size of such a space to approach that of a basement. However, this "basement equivalent" should be large enough to provide for the family activities mentioned above. The location of such a space adjacent to the kitchen provides the advantage of being able to supervise children's play. The service entrance to the house often is located here and provides a convenient mud room in bad weather.

G573-2 Light and Ventilation

Where habitable rooms are located in a basement space, the light and ventilation requirements for habitable rooms should apply. Combustion air is necessary for heating equipment located in enclosed spaces.

574 BALCONIES AND PORCHES

Private balconies or porches for living units in design, detail, and materials used shall be appropriate to the building for which they will be a part. They shall have direct connection to the living unit and shall be for the sole use of their occupants. Where balconies or porches join those of other apartments, an effective division shall be provided for security and privacy.

GUIDES

G574 BALCONIES AND PORCHES

Open or enclosed balconies or porches attached to noncombustible construction should be constructed of noncombustible materials. Balconies or porches of combustible materials, either open or enclosed, may be used with exterior protected and wood frame construction but not higher than three stories above grade.

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