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FACILITIES FOR WAR PRODUCTION

5 February 1953

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Mr. Rodger Joseph Emmert, Executive in Charge, Facilities and Processes Activities of General Motors, was born in Piqua, Ohio, 15 January 1894. He was graduated in 1916 from Case School of Applied Science in Cleveland, Ohio, with a B.S. degree in electrical engineering. Mr. Emmert began his career in July 1916, as a member of the engineering staff of the Westinghouse Electric and Manufacturing Company in East Pittsburgh, Pennsylvania. The following year he entered the military service, serving two years as a computer in ordnance design for the U. S. Navy in Washington, D. C. In 1919 he joined General Motors as an electrical engineer with the Remy Electric Division in Detroit and in 1921 was made process engineer of the Manufacturing Division. In September 1927 Mr. Emmert was sent to Dayton, Ohio, as factory manager of the Delco Division of Delco-Remy Corporation, and in two years was promoted to president and general manager of that company, now a division of General Motors. In 1930 he was transferred to the presidency of General Motors Radio Corporation and in 1932 became factory manager of the Yellow Truck and Coach Manufacturing Corporation, now the GMC Truck and Coach Division of General Motors. He continued in that post until named to his present position in September 1948. Mr. Emmert is a member of the Society of Automotive Engineers.

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COLONEL DIEHL: General Greeley and gentlemen: The United States has embarked upon a long-range preparedness program which is unique in its history. The first objective of this program is to provide weapons and equipment for a larger military force in being than ever before in its peacetime history. The second goal, which to my mind is even more important, is to develop a strong industrial system, capable of quickly providing weapons and equipment for our military forces and those of our allies, should full-scale war be forced upon us.

It is now believed by many experts in this field that it is safer and cheaper to stockpile facilities than to maintain large stocks of military hardware. This capacity is much less likely to become obsolescent.

Our speaker for today holds a top facilities planning post in a company which operated the largest number of publicly financed war production facilities during World War II and which today is our largest producer of military end items. He is also a member of the National Industrial Reserve Review Committee of the Munitions Board.

I take great pleasure in presenting Mr. Rodger J. Emmert, Executive in Charge of Facilities and Processes Activities of General Motors, who will speak to us on the subject of "Facilities for War Production."

MR. EMMERT: General Greeley, Colonel Diehl, and members of the Industrial College of the Armed Forces: I am very pleased to have this invitation to talk to you today. When Commander English called me on the telephone and asked me to talk to you about facilities for war production, there was an extra heavy fog outside and it was raining. I thought afterward that some of the fog perhaps got in my office, as I couldn't quickly think up reasons why I shouldn't accept this assignment. Nevertheless, I am very pleased to talk to you about a problem that I think is important, one that concerns all of us, one that I think is of national importance, and something that we ought to be talking about at the present time.

The problem is one of retaining and preserving the government-owned facilities in the plants of private industry now being used for the production of military items, and what to do with these facilities when supply contracts for these various military items have been completed.

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You gentlemen have been associated for a long time with problems of national defense and the armed services. I, on the other hand, graduated as an electrical engineer and have worked most of my life on industrial problems--problems of product design, manufacturing, and management--in a civilian capacity. Nevertheless, our problems have frequently overlapped.

It seems to me that we have been in some kind of a war or conflict ever since I got out of college; and, really, I haven't been able to disassociate myself, so to speak, entirely from military problems for any length of time.

I was studying in college in 1914 when World War I broke out. I had just taken a job with Westinghouse when our country got into that war. I got into it too. We have been either at war or in a rather confused, unsettled period ever since.

Each time we attained what seemed to be victory, we decided that the war was over and probably would be forever; and we, to a large extent, threw away our weapons and our facilities for producing weapons. But in the periods that followed we always had difficulty readjusting ourselves to a peacetime economy.

Following World War II we were unable to get back to what we considered normal before the war. Politicians started experimenting with various types of socialism. Engineers made us dissatisfied with the old things by designing new ones. Industry made great strides in reducing costs by developing improved methods of manufacturing. Our scientists made us sort of dizzy by giving us more information about the nature of the atom, how it is constructed, and about the energy relationships involved.

In reality we have been in a state of war, depression, or emergency for the last 40 years. The war that started back in 1914 is still going on. I would like for you to keep that thought in mind, because I want to come back to it later.

After spending all my early years in product engineering, I became interested in production problems and left the engineering department to enter the factory. Here, too, in our production system we have seen a tremendous development. We have learned that tools are exceedingly important in the manufacture of any product. I refer not only to machine tools, but to the special tools required for a particular part--the cutting tools, and the hoists and conveyors for doing the heavy work which at one time was done by backbreaking effort. Now we substitute horsepower for manpower in the production of things that people want. To say it another way, we have learned how to increase our productivity; and by this I mean the ability of an individual to produce more of the things we want with the same, or even a lesser, amount of physical effort.

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This development has been the largest contributing factor to the increase in our standard of living. It is a concept that seems to be little understood by the majority of people in the world at large, and even in our own country. It is considerably different from increasing the production of goods by putting more people at the task. We do not increase our standard of living by simply utilizing more people to produce goods with the same old methods and tools. We increase the amount of things that you and I and the rest of the people want by increasing the ability of individuals to produce more with the same effort and in the same period of time. The time element is exceedingly important and might be used in the same definition of productivity by stating that it is the ability of the individual to produce more in a unit period of time.

In the automobile industry we have learned to increase our productivity to the extent that we are producing finer and better automobiles at a cost which enables substantially everybody in this country to own a car. In the process we have built better plants, have acquired more efficient machinery, have learned how to design better tools, and have utilized electrical power to do our work. And I might add that the science of good industrial management has also played a very important part in making this improvement.

Three times within my own memory, when our country faced an emergency, the armed forces have turned to the automobile industry, and to the metal-cutting and fabricating industries, to produce the weapons needed for the defense of our country and for the successful prosecution of the war. Therefore, it is exceedingly important that members of the armed forces understand the fundamentals involved in our productive system, and particularly the means by which we have improved the productivity of our people.

This is the second idea that I particularly wish you would note and keep in mind: the continual striving to produce a better product and the tremendous effort being exerted to reduce the cost of the product by increasing the productivity of the individual. In time of war, much of our manpower is called into the services, and the working force available for industry is correspondingly reduced. Yet the demand for production is greatly increased. A large output of war materiel can be achieved only by a high order of productivity, accomplished by the design of weapons for low-cost production by the use of readily available material, by the use of high-production equipment most suitable for the purpose, and by efficient management.

At the start of World War II, the automobile industry put aside the manufacture of automobiles and jumped into the manufacture of military items. Our managers and manufacturing people knew very little about the weapons that they were called upon to make and, therefore,

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had to study the drawings, specifications, and every detail of the weapon before much action could be taken. In many cases finished drawings were not even available and it became necessary to put engineers on the job of revising the drawings and putting them into shape so that our production engineers and factory people could use them. Naturally, industry investigated the processes used in government arsenals, and initially adopted substantially these same methods. Machinery, tools, and equipment were hurriedly purchased; and a tremendous amount of physical effort was put into the job of producing these weapons in the shortest possible time.

It quickly became apparent that the parts were not designed to permit large-quantity production; and it was necessary to put our engineers to the task of devising changes in design, materials, and methods of manufacture, to enable the contractor to produce the end item at schedule rates with the number of workmen available. It took a long time to learn how to make these weapons and to make them in quantity.

Then, at the end of World War II, when we seemed to have won the war and thought we would never have another, we substantially scrapped our military tools and facilities in privately owned plants and went back to the production of civilian goods. However, to our dismay, the fear of war has again developed in a relatively short term of years; and we are again forced into the cycle of producing war material.

With the start of the Korean action, industry was immediately faced with a huge volume of new rules and regulations. A Controlled Materials Plan was quickly resurrected and put into effect. The automobile industry was told how many automobiles it could produce and material procurement was restricted accordingly. The industry was quickly faced with the problem of what to do with its employees; should it reduce hours, work fewer days, or lay off people? We are very touchy about laying off our employees, because in a period such as this the chances are that we are not going to get them back again. How soon could we get orders for military items and provide the tools to keep our people busy, and what did the armed forces need most?

Large manufacturers chose the more intricate and difficult end items because they had the organization to do a big job. Most of these large items were not ready for production, for one thing; and the rates of production requested were, at least in the light of our present knowledge, far too large. Obviously, they were based on the possibility of all-out war in a short time. In many cases we were asked to build up sufficient facilities to produce the projected schedule in a 40-hour work week so that should an all-out emergency occur, we could produce a larger volume by working two or more shifts.

The program was to establish a broad base of facilities to meet any emergency. Unfortunately, the requirements of the total program now

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seem to have been set up far too high and beyond the ability of the country to achieve. Industry was unable to secure the machinery required and still is striving to get that needed to complete the projected base. While we are still building up facilities, our schedules of production are being cut and orders are being stretched out. Also, industry is still being requested to submit proposals for the establishment of additional facilities, when it is known that present facilities for producing the identical item are not being used to full capacity. Many people consider this a big waste of money, but recognize that they may not be in a very good position to know.

Obviously, what was most desirable at the beginning of the Korean conflict was a plan of facilities and procurement which, although very large, was still within the capacity of the country to produce. Such a plan should have contained a definite statement of the end items needed, the number of each to be held in reserve, and the rates of production in the months following M-day. Such a plan is still needed and, after being initially set up, should be constantly revised to adjust it to changed conditions.

My efforts have been directed toward a plan for retaining and preserving the facilities we have now built up at such a great cost, and preserving them in such a manner as to insure having them always available for use in the shortest reasonable time consistent with cost. Any such program applies to one situation much more appropriately than to others. Considerable judgment will have to be used in applying the policies established for any plan for this purpose. Contracts for the procurement of large and small items of every conceivable nature have been developed by our contracting officers in the services in cooperation with management. They have come up with contracts for all these facilities and for all these end products. With similar cooperative effort utilized in the formulation of contracts for the retention of facilities, many conditions not now known, which will apply to individual cases, could readily be worked out and worked out satisfactorily.

The suggestions I am about to make apply to the production of end items and less to the fabrication of primary materials, such as steel, chemicals, copper, and aluminum. They include the light M-41 tank; the CD-500 and 850 transmissions for tanks; 90-mm. guns; the Allison J-33, J-35, and T-40 jet engines; the Sapphire J-65 jet engine, being made by Buick with the assistance of many of our other divisions; ammunition, such as the 75-, 90-, and 105-mm. shells; 3.5 and 4.5 inch rockets; military vehicles, such as the 2½-ton truck and the 6 x 6 GMC truck; electronic and electrical-mechanical devices, such as radio receivers and transmitters, bomb sights, bombing navigational computers and fire-control systems; range finders; Diesel engines; and complete airplanes. I have listed all these groups to give you an idea of the scope of the products we are making and also to point out that we have had experience with a great many varied types of equipment.

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Since the start of the Korean action, the Government has invested about 2.5 billion dollars in machinery and equipment. Of this amount approximately half of it has been placed in plants of private industry and the other half in plants in the military reserve. There is no problem in keeping facilities in plants in the military reserve, because the Government owns all of them. But in those plants owned by private industry there is a real problem.

We are suggesting that in privately owned plants manufacturing military items similar to those I have just mentioned, the government-owned facilities presently being used should, after the supply contracts have been completed, be retained in the form of a package and under the manufacturer's cognizance, so that they will be available at any time and on short notice for use again in case of an emergency and for the production of the same or similar items to those now being produced.

Where new buildings are being erected by private industry, it is suggested that the plans be made large enough that space will be available in these new plants for the storage of government-owned facilities when they are no longer needed for the production of military items. In those cases where additional manufacturing floor space has not been erected and government machinery was set up in space which was formerly used for and subsequently may be needed for commercial production, we suggest that the government-owned facilities be stored in buildings on the site which are least suitable for manufacturing purposes; and, if no such buildings are available on the property, that warehouse space be leased by the contractor or that warehouse-type buildings be erected on the contractor's property for such storage.

Of course, this is practical only if the program can continue over a reasonably long period of time. Therefore, it appears necessary to have changes in the present law or the passage of a new law which would permit the Defense Department and the military services to enter into long-time contracts with the contractor for such storage, and the appropriation of sufficient funds to reimburse the contractor for the costs involved.

I happen to be on a civilian advisory committee, as Colonel Diehl mentioned to you, known as the National Industrial Reserve Review Committee, which was established by law to advise the Government regarding the retention or sale of surplus plants after World War II and to advise regarding the maintenance of these plants. When the Korean action started, these problems were immediately solved, because practically all of the surplus plants were put back into operation for the production of military items.

However, this has given the committee an opportunity to look objectively at the mistakes of the past and to consider what should be

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done in the future. Our experience over the past 40 years has taught us that we are in continual danger of an emergency and that therefore we should consider how this country, on a continuing basis, can keep prepared to defend itself. This country simply cannot afford to build up facilities for the production of military items, produce these items for a few years, and then discard and destroy these facilities at the end of that period. The amounts of money involved, as well as the physical effort on such a basis, is more than this country can stand.

Moreover, the billions of dollars worth of machinery, tools, and facilities our Government has acquired constitutes a vast military asset. It may even be more valuable than the end items that have been produced on it and held in reserve for actual combat. The reserved end items are not only tremendously costly, but can and probably will become obsolete in a relatively short time. On the other hand, production facilities become obsolete at a much slower rate, and the cost of keeping them up to date is relatively small.

We must devise a national plan for retaining these production facilities in such a manner that we can utilize them again with a minimum of confusion in case of an emergency and with considerable saving in the time required to attain initial production of the end item. It must be a plan that is both practical, so far as the defense of our country is concerned, and one that will involve a cost that our economy can stand.

When the subject was first proposed to the committee, there seemed to be little appreciation on the part of the military representatives that the broad base we were then building was anything but permanent. I pointed out that our supply contracts require the Government to give us instructions as to where to ship production facilities 90 days after completion of shipments on the supply contracts and that, further, we had one more condition; that is, if the Government wishes us to do so, we will enter an agreement to retain these facilities for another six months at government expense. But even nine months is a very short time to develop, explain, and have accepted a plan which is national in scope and will require the appropriation of money by the Congress. The initial objections dealt mostly with cost. The opinion of those present varied all the way from a cost of a few tens of millions of dollars per year for retaining these facilities in the hands of the contractor to a billion dollars.

In order to develop the economics of the problem, the Munitions Board has asked about 20 contractors to study this proposal and develop estimates of the costs of such a proposal or plan. At the same time, the Board requested the three military services to submit lists of key privately owned plants which were essential to a defense program. The data submitted indicate that there are about 916 key privately owned plants with Government-owned machinery and equipment in them. These are about equally divided between the three services.

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Under Army cognizance there are 113 plants having government equipment valued at over a million dollars, and the total is 656 million dollars; and 185 plants with equipment valued at less than a million dollars, with a total of 30 million dollars. The Navy has 73 plants with government-owned equipment of over a million dollars, and the total of those facilities is 491 million dollars. It has 188 plants with equipment valued at less than a million dollars, and the total is 45 million dollars. The Air Force has 147 plants with equipment over a million dollars, totaling 993 million dollars; and 210 plants with equipment under a million dollars, with a total of 85 million dollars. In total we have 333 privately owned plants having equipment of the Government valued at over a million dollars, with a total of 2.139 billion dollars. 583 plants with equipment of less than a million dollars, totaling only 160 million dollars. I have those data summarized in the tabulation on the following page.

From the bottom line of that tabulation you can see that it was found in these 22 studies as a weighted average that for the annual storage of these facilities, these plants estimated the cost would be 1 percent of the value of that equipment or of the amount of money the Government had invested in this equipment. For maintenance, that is, keeping these facilities in condition, the estimate was .2 of one percent. The cost of preparing these facilities for storage and moving them into storage on the site of the contractor would be 3.7 percent. Preparation for shipment to a government warehouse was estimated at 4.8 percent. The cost per square foot of storage space was estimated at \$1.25 per year. They estimated that on the average the facilities could be stored in one-third of the space now occupied.

Applying these percentages to 2 billion dollars, approximately the value of the government-owned facilities in the key plants of private industry, we get the following estimates of cost for various phases of the layaway program:

Annual storage	\$20,000,000
Annual maintenance	4,000,000
Preparation for long-term storage and removal to storage	74,000,000

That would mean, then, that the cost for the first year, assuming all of the facilities were put in storage in one year--that wouldn't actually happen--would be 98 million dollars; and the cost each year thereafter would be 24 million dollars.

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DATA ON INDUSTRY COST STUDY

Percent per government dollar invested

<u>Plant</u>	<u>Annual storage</u>	<u>Main-tenance</u>	<u>Long term layaway & removal</u>	<u>Preparation for shipment govt. warehouse</u>	<u>Cost per sq. ft. storage</u>	<u>Ratio storage space to working space</u>
A	1.5	.10	2.1	7.2	1.47	47
B	1.4	.13	1.1	2.8	1.99	20
C	.5	.56	4.1	6.9	.67	30
D	2.7	1.36	5.9	4.5	1.50	18
E	2.0		1.4	3.2	2.04	50
F		.09	3.1	4.5		18
G	2.6	.64	4.2	8.1	1.20	37
H	1.0	.82	5.9	16.3	.95	13
I	2.6	.22	1.5		1.54	47
J	.8	.05	3.1	4.2	.60	55
K	1.5	.07	8.9	4.1	2.25	25
L	.2	.38	1.7	2.2	1.00	15
M	1.8	.25	1.6	2.4	2.12	27
N	.6	.51	3.3	5.8	.75	55
O	2.6	.35	2.8	4.9	1.15	22
<hr/>						
Weighted average (15 plants A to O)	1.8	.15	2.1	3.6	1.66	32
<hr/>						
P	.5		6.3	6.6	.85	17
Q	.6		6.0	6.3	.70	37
R	.5		4.9	4.9	1.03	30
S	.2	.25	4.9	7.3	.92	10
T	.4	.12	4.6	7.3	.90	38
U	.3	.10	4.2	6.0	.90	30
V	.2	.33	6.0	6.0	.22	60
<hr/>						
Weighted average (7 plants P to V)	.4		5.3	5.8	0.71	31
<hr/>						
Weighted average (22 plants)	1.	.2	3.7	4.8	1.25	33

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If industry is directed to ship the facilities to government warehouses, it must prepare it for extended storage according to government specifications. These require that machinery be dismantled in many cases, and cleaned; gears, shafts, and bearings flushed with rust-inhibiting oils or preservatives; packed, skidded, and loaded on freight cars. The cost of doing this is very high. The average of the estimates from these 22 plants was 4.8 percent of the invested dollars. The large facilities estimated this at near 6 percent, which appears to be the better estimate to use.

The savings to be realized by shoving the machinery to one side or to a warehouse on the site compared to the cost of preparation and shipment to government warehouses would pay for the rent on the site for approximately five years. Remember that the figure I have quoted does not include the cost of freight and unloading into the government warehouse. Remember too that the value of many facilities, such as furnaces and plating equipment, is practically all lost when the equipment is moved.

These data are based on quick estimates in 22 plants, large and small. I think the estimates for preparation for storage and removal to storage at the site are a little bit high, and the estimates for storage and maintenance perhaps a little low. However, even if the cost should prove to be twice as high as here indicated, it would still be very low considering the objective of national defense to be achieved.

The Advisory Committee, after its meeting last Tuesday, formulated a "Statement of Policy," which it suggests be used by the services to guide their contracting officers in making decisions relative to such a plan for the retention and preservation of productive facilities. While I do not have a copy of the final draft, the principles will be stated about as follows:

1. Whenever practicable, government-owned machinery and equipment in private plants should be kept together as package units, so it could be put back into operation with considerable saving in time. Normally, package units will be those in which (a) the item and the machinery for its production are of key importance over the next five years to the military program, (b) the production management agrees to cooperate with the Government during the period of suspended mobilization and is willing to produce the item or a similar item again in case of recurring mobilization, and (c) the company has a good record for both the quality, quantity, and cost of its military production.

2. The military departments should discuss with the company management the practicability of developing the contractor's plant, containing government machinery and equipment, into a dual-purpose plant which can function effectively and economically in either peacetime or wartime.

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The recommendations of the contractor should be sought on the best plan to maintain in stand-by the government equipment in his plant to insure the maximum saving of time in getting it back into production in case of emergency at minimum cost to the Government.

3. Wherever practicable, the government-owned machinery and equipment should be stored in a minimum space in the same building in which it is used. If this is not feasible or economical, action should be taken, if possible, to lease or buy or construct near-by space for warehousing the package equipment.

4. Wherever practicable, nonseverable equipment, such as heat-treating or plating equipment or furnaces, should be left in place.

5. In plants where the decision has been made to retain the machinery and equipment as package units, no machinery or equipment may be disassociated from package or declared surplus and disposed of without very careful consideration of the effect this will have on the entire mobilization program, and certainly with the knowledge of the contractor so that he can take action to replace the equipment if necessary.

6. Military departments will discuss with private contractors the practicability of retaining facilities under the contractor's cognizance at the time new procurement and facilities contracts are being negotiated.

We find from these surveys that management is well aware of the problem of national defense and desires to cooperate in such a program. From a purely commercial point of view this would not ordinarily be desirable. Therefore, it seems important to develop a national program at this time, when the need for continuing defense is apparent to everyone; and when many of the problems, as well as the cost of preparing these facilities for military production, are fresh in the minds of everyone.

At the risk of repeating my former remarks, I emphasize that such a program as is here contemplated cannot be formulated and put into effect in a short time. If we wait until supply contracts are completed, it may be too late to formulate and get into effect a program before the Government would be forced to accept machinery and equipment from their contractors; and the great productive capacity which we are now building up might be partially or almost completely lost. The problem is an urgent one.

There is another very important reason for retaining the facilities for military production in the hands of the contractor that is making the end item or principal component. It concerns the development and improvement of our present weapons and the development of new weapons. To accomplish this, it is highly desirable that the contractor employ competent engineering talent continuously on the problem of developing improvements and eliminating weaknesses.

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There has been an almost total lack of coordination between research and development personnel and the contractor who has to make the product. We think that in many cases the contractor should be authorized to set up a minimum number of machine tools for the purpose of manufacturing, at regular intervals, small quantities of improved end items for test and evaluation. This we generally call a pilot line. There are many advantages to such a program, and I would like to list some of them which would do the following:

1. Develop more effective weapons.
2. Enable private industry to keep informed regarding the changes in weapons, the obsolescence of old ones, and the development of new ones.
3. Reduce the time required to attain initial and scheduled production of weapons in case of an emergency.
4. Enable the contractor to know exactly what he is to produce and how to do it.
5. Enable the contractor to develop better production processes, tools, and machinery to produce the weapons. This contemplates that the Government will supply funds for the purchase of new machine tools and special tools throughout the life of the contract.
6. Reduce the cost of the weapons by the use of materials in ample supply, less costly materials, lesser amounts of raw materials, and materials better suited to the weapon.
7. Enable the contractor when developing improved designs to get these designs in shape for quantity production by the employment of engineering personnel on a continuing project basis.
8. Provide the using services of the armed forces with new models for use, test, and evaluation in field maneuvers; to determine the worth of changes made; and to suggest other improvements to be developed.
9. Insure the retention of a certain amount of "know-how" within the manufacturing establishment.
10. Enable the contractor and the contracting officer to know more accurately the costs involved in a supply contract for quantity production of the weapon; and the cost of facilities, tools, and equipment for their production. This would lessen the problems of both in formulating a contract.
11. The over-all planning of the Joint Chiefs of Staff and the Defense Department could be facilitated by the use of data developed in pilot line operation.

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12. The machine-tool industry would be kept in healthier condition if funds were provided for the purchase and construction of machinery and tools better suited to the manufacture of the product, or needed for the manufacture of modified and newly designed parts. The time element involved in the production of machinery is greatly increased by the time required to design tools and fixtures to go on the machine tool, and to design changes in the machine tool to make it suitable for machining the parts assigned to it. The time required to produce machine tools would be considerably reduced in times of national emergency if the engineering work had already been done for pilot line operation.

The plan formulated should be sufficiently flexible to permit application to individual cases. It should not be assumed that the suggested plan is all-inclusive and that no equipment would be shipped to government warehouses. Undoubtedly, this would be the practical thing to do in many cases.

I urge that the exceptions that can be thought up be not allowed to obscure the merits of the ideas suggested. I wish to emphasize again that the problem is timely and exceedingly important.

Gentlemen, I hope you will give this problem your consideration and the plan your support, and that you will help in getting something done about it. We must generate discussion among those in power and authority, to the end that a program will be formulated, laws will be passed, and appropriations made, in the interest of a continuing sound plan of national defense.

QUESTION: I am especially interested in your proposal to set up pilot lines for the production of some of these weapons. Could you give me an idea of what the cost would be for some of these contracts for prototype lines, where they would actually go into the production of a few items for evaluation? Perhaps you could give it for a few selected items, such as the 2½-ton truck.

MR. EMMERT: I happen to know it for two of our plants, and the cost is not terrifically high. You are asking about the cost of setting up pilot lines in some of these facilities. The cost of establishing such a line is not much larger than the cost of actually moving the machinery to storage. It would take a little more floor space. There would be maybe 20 or 25 percent more floor space involved. But the total floor space is only one percent of the value of these facilities; so 20 percent additional floor space would be a very small additional cost.

Now, the cost of making these end items would come in a supply contract. It wouldn't enter into the cost of layaway in storage. That would be another contract. The supply contract would be for making a certain quantity of end items. It could be handled as a separate contract.

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I haven't any good figures about the unit cost of the end items. The cost would undoubtedly go up. It would increase. The actual cost of machining the parts would not be much larger; but, of course, you would have supervision, inspection, maintenance, tooling, and other items that would come in. So I would estimate, just as an offhand guess without checking up, that it might cost twice as much per unit on the pilot line.

COMMENT: I don't have much rank, but I have the title of "King of the Roll-up." So when you talk about facilities being lost by being moved to government warehouses, you are talking my language.

I want to ask my compatriots in the audience: Have you ever watched how they handle government machines when they roll up a plant? Have you ever watched what gentle treatment they give them, how beautifully they handle them getting them to the railroad yard?

You tell your committee that we are speaking your language. I find that at least 10 percent of the most beautiful machinery is wrecked in a move. I think that in keeping it on the site you will be paying the rent for 20 years.

MR. EMMERT: Thank you. Sometimes it doesn't hurt to make an understatement. I said you could pay the rent for five years. I could have stated it much more strongly. Twenty years is more like it. I made some estimates on the information that we got together just of the difference in value of equipment on the site as set up in the contractor's plant and the value of that equipment after it was loaded on the freight car. That difference would readily pay for the rental and storage of this equipment for 20 years.

We had figures in these studies of what you might call equipment that could not be moved without loss, and that is a very high percentage of the total. On furnaces and heat-treating equipment and all that sort of thing, it is practically all lost when it is moved. That loss would readily pay for the storage of these facilities for many years.

I think that in such a contract with a private contractor he would agree in many cases to leave the furnaces and such things stay in place, and he would work his commercial production around them.

QUESTION: What do you think our national policy should be as regards the leasing of machine tools to private contractors to maintain their productivity?

MR. EMMERT: You are bringing up a very controversial subject, one that I avoided purposely. But, since you bring it up, perhaps we could discuss it a little.

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I think the feeling of the people with whom I am associated is that we are opposed to the leasing of government-owned facilities, with certain exceptions. We think we would be accused of formulating a plan at government expense for the carrying on of civilian production at a profit to ourselves; and that that would in itself perhaps defeat the purpose of it. So, rather than have that point come up in Congress and other places, we would prefer not to lease any government equipment.

There are some exceptions, which I think could be worked out, and which I think will be recognized by most people as practical. In the case of very large presses, for instance, where the damage to those presses would be significant, they might perhaps be kept in better condition if they were operated. They are set up in places in our plants where they are not readily movable. Very often tremendous foundations have been built. The foundation is a very large part of the total cost. If you moved that equipment, there again you would lose a very large percentage of the invested money. Rather than industry purchasing additional equipment, which is very costly, and also because that press is right where we would probably want a press, it might be practicable and workable to lease that equipment. Other than that, we would be opposed to it.

I think it is infeasible to sell these facilities, in which the Government has invested such a large amount of money today. It amounts to 2.5 billion dollars since the start of the Korean action. In my opinion the Government should retain those facilities.

If the Government were to have a plan of selling the machine tools that it now owns, it certainly would work a big hardship on a large part of the machine-tool industry. We are all interested in retaining the productive capacity of that industry. We want to keep it active. We want to keep it vital and alive.

Part of my thinking has been to change machinery as new types are developed in these pilot lines, as the necessity for it is shown, and get better machinery and tools to make these items with less manpower. By so doing we would keep the machine-tool industry in a healthier condition. Selling the government-owned machine tools would certainly depress it.

COLONEL DIEHL: What percentage of industry do you believe would be willing to go along with this plan of maintaining stand-by plants?

MR. EMMERT: A little to my surprise actually, the managers I have talked with in our own corporation have all agreed that it is good and ought to be done. I believe that a very large percentage of them would go along if the Congress appropriated funds to reimburse the contractor for the cost involved.

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You can't expect a contractor in commercial production to assume this cost without reimbursement. But that reimbursement is relatively small for the retention of the huge assets which the Government owns.

I think a large percentage of industry would go along.

QUESTION: Would you care to comment on what are the principal differences between the plan that you have proposed and the plan that the Department of Defense had in effect before, or at least partially in effect, called the reserve plants program? We had reserve tools, we had pilot lines, we had educational orders. Most of it had to come out of an appropriation of about 100 million dollars a year, which obviously was not enough. Your proposal comes to somewhere between 300 and 400 million a year. Now, outside of the dollars, which is anybody's guess, would you highlight the chief differences between what we used to do and what you think we ought to do?

MR. EMMERT: I don't think that I am too well qualified to speak on just what we used to do, but I can try to cite a few cases that will illustrate my thinking.

In our Oldsmobile division, all the tools, machinery, and facilities for producing a certain end item were very carefully boxed and prepared for extended storage. A list of these facilities was prepared. It was all shipped to the government warehouse at one time, with the idea of keeping those facilities together in the government warehouse.

Just about a year ago our Oldsmobile division was required to produce that same item again. It was very much surprised to find out that the Government could no longer locate a very large percentage of those things. Some of the heavier machinery was located all right, but the tooling was pretty well lost. Cases had been scattered. Many of these containers had been broken open to find out what was inside, even though it was all labeled on the outside. To a large extent those tools were lost.

Now, what I propose is to keep those facilities under the cognizance-- I don't know whether that is the right word or not--of the contractor; so that he would be informed and have responsibility for keeping those facilities together as a package.

In our discussions of this some officers have said: "We couldn't do that to the Nth degree. We may have a very important program. Here are some of the machine tools that we need. Naturally we are going to take them for this high-priority job."

That would be all right, but I think the contractor should know it, so that he could take steps to replace the machine tool or whatever

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it was that was important to the production of his particular item. In that way I think he would be informed of what is going on. Most important of all, the time required to get into production on that item would be shortened.

Much depends on the nature of the item. If it is a simple item, perhaps it wouldn't make so much difference. But in some items I think it takes from 6 to 12 months to replace them, and perhaps even longer. It depends on how complex it is to produce, how long it takes to get it out on scheduled production.

QUESTION: Suppose this plant that you have was producing trucks, and you turned it over and started producing items for us. You put the tools off in a corner and you go back to producing trucks. Then we get into a partial mobilization, not all-out war; and we come to you and say, "We want you to stop making trucks and start making military items." You say, "Sorry. We are not interested." What happens then?

MR. EMMERT: Well, I think the contract for retaining these facilities must contain provisions that would take care of that situation.

I tried to point out this morning that there are so many various conditions that you can't foresee all of them. Our contracting officers have contracted with us for all these various types of items and made agreements with management on the production of them with the same degree of cooperation that we use. The details of preserving these facilities while getting back into production could be worked out, too.

QUESTION: What are the relative merits of this plan and Mr. Wilson's dual-purpose plant plan?

MR. EMMERT: From close association I think they are very much along the same line.

At the time he talked to the American Ordnance Association in Cincinnati--that was about a year and a half ago, I believe--we were then in the process of building plants. We had that ahead of us. His thought was: "While we are building them, let us make them a little larger. Let us provide space in these plants for storing government equipment right in the plant; just move it over to the side. We don't have to tear it apart, we don't have to wrap up the motors in hermetically sealed wrappings. We don't have to cover it with all these rustinhibiting oils and preservatives. All we have to do is move them to the side. Thereby we save a tremendous amount of money. Our men know what operations those machines were used on. They know the condition of the machines. If production is again necessary, we simply move them over and start right in producing with them."

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On the other hand, if that machinery was shipped to a government warehouse, the chances of getting the same machinery back are almost nil. We didn't get much of the same machinery we formerly used. We had to take any machines that we thought we could use for this operation. We didn't know the condition of those machines.

We have to start producing the end items at a certain date; so we can't take a chance on, first of all, disassembling the machine, checking the bearings and the shafts, trying to replace such parts as we can, and getting the machines in operating condition suitable for the job. That takes a lot of time. A lot of our machinery had to be rebuilt. We couldn't get it rebuilt. We had to do it right on the floor, which took a lot of time.

Now, the difference between his thinking and mine is very little. But he was talking a year or a year and a half ago, when we were building plants. I say, while we are doing these things, let us provide a place to put these facilities when we no longer need them. At the same time, if we should have an emergency again, we can shove the civilian machinery off to one side and have plenty of room to produce military items.

QUESTION: You speak as if you would not use a large proportion of your own machinery. Do you mean that in such an emergency you would not use your civilian machinery at all?

MR. EMMERT: No. I don't think we would use it to any large extent, for the reasons I have stated. I think we would have repercussions from Congress. Appropriating money would defeat the purpose of it.

There are some things, like furnaces and heavy equipment, that might just as well be used, because they would deteriorate anyway. I think that could be worked out in individual cases by the contracting officer right on the job, who knows what is involved.

COMMANDER ENGLISH: I think what the student meant was, if you had a contract for producing civilian trucks and you got a contract for some military counterpart, would you move all your tools off, or would you integrate your work and use some of your general-purpose tools to do both jobs?

MR. EMMERT: We are in a partial mobilization situation right now in our truck division of Pontiac. We are producing civilian trucks on a simple assembly line in one place, and in another place we are producing military trucks on another line. So we do not conflict with the military trucks. We have increased our production sufficiently to take care of both.

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COMMANDER ENGLISH: We are not thinking about where you have an assembly line already, but where you have to move your civilian facilities aside. That is what we were wondering about. Would you move all your machine tools aside?

MR. EMMERT: Are you thinking of the time element now, or how it would be accomplished?

COMMANDER ENGLISH: I was just wondering how you would work out the problem of saving critical machinery. If you had some general-purpose machinery that you could do both jobs with, wouldn't you use it to turn out crank shafts, for instance, for both trucks?

MR. EMMERT: It is a little difficult at least to get into any detailed thinking and tell you what we might do in a particular case. It would vary all over the lot. It is a little difficult to state it.

In most cases, if we had the machinery, we would use it for the production of the military items. When we went back to civilian production, we would use the same machinery. But the facilities that the Government purchases are usually special machinery of some kind that we could not use in our civilian production to a large extent.

For instance, the machinery for making the blade for the jet engine compressor is one of them. An enormous lot of machinery is involved in making those blades. It is entirely special to that particular blade and could be used for nothing else. The same with the large boring machine for making the big disc that holds those blades. We have nothing in our civilian production that requires these large boring lathes. So we have no need for them at all.

QUESTION: What interest do you have in the problem of the dispersal of facilities, and what are the basic cost factors involved?

MR. EMMERT: From a practical point of view, we think we are dispersed pretty well, where dispersal is necessary. I mean, as an over-all thing. There may be some cases that would be exceptions to that. Here we have plants all over the United States in many cities; and in most cases, where we have a number of plants in the same city, they are spread out over various parts of the city, usually in outlying areas of the city. We think that we have such dispersal right now.

That point has been discussed a great deal. There are a lot of angles that should be thought of when we talk of dispersal. For instance, should you build an airplane factory out in Arizona, in some place where it is far away from the coast and would be relatively free from bombing by an enemy? That might be a logical thought until you proceed a little bit further. Then you find that you don't have any workmen out in Arizona

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to man the plant. You don't have any housing out there for people to move into. So you can't get people to move out there. Even if you put up houses, you don't have any sewer system. You don't have gas, power, water, and all those things. So that the cost of setting up facilities in isolated areas is tremendous.

We think that the cardinal advantage in the dual-purpose thinking is that we would build plants for the production of military items close to our present plants, preferably on the same lot of ground. When we do that, we need build only the production facilities for those items. We have our offices, we have our personnel department, we have our parking lots and roads. We have our engineering department and our maintenance department--all those things. Therefore the cost of providing facilities for the production of military items, if you can put up the building on the property of the contractor or close thereto, is so low that it greatly reduces the problem of getting into production.

QUESTION: Your plan makes so much logic that I wonder why it hasn't been put into effect already. Will you discuss some of the factors that have prevented it from being put into effect?

MR. EMMERT: One of the first opposing factors I ran into when I discussed this was the statement by some people that the cost would be excessive. That is why we went to these different plants and determined actual estimates on the cost of doing this in those particular plants. We did it only to show that the cost is reasonable, that the plan is economical.

Another argument against this plan is: "The Government has a lot of warehouses. Why should we build other warehouses? Why should the contractor build a warehouse to hold these facilities when we already have warehouses? You can't sell that idea, because it would cost us too much."

Well, I think when you analyze and determine the cost over a number of years, you can readily convince anyone that the plan we propose is an economical thing to do.

If we had known that these facilities should be dispersed, we wouldn't have built at the same place or next to it. In our experience it just doesn't work out. You men in the military services know that you are assigned to one place for six months or a year, and then you move on and somebody else comes in. You go by rank. Some higher officer comes in and says, "We want this machinery." We say, "It was agreed that this was to stay here." He says, "You do this and that." That takes place. There is no place in the armed services for preserving these facilities in government warehouses. We have had two experiences with that. I just hope we won't make the same mistake again.

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COMMANDER ENGLISH: On behalf of the college, I thank you, Mr. Emmert,
for a very interesting talk.

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