CONFIDENTIAL

UNITED STATES STRATEGIC BOMBING SURVEY

APO 413

Minutes of Meeting with Reichsminister

Albert Speer

Flensburg, 21 May 1945

C O N F I D E N T I A L

INTERVIEW WITH MINISTER SPEER, 21 MAY 1945

V-WEAPONS

Note: "Q" indicates the question asked by the interrogator, "Sp" the reply by Speer.

Sp. At first I'd like to make some comment on your attacks. I remember that once you made an attack on Zeitz which had much more effect than the other attacks. It happened about the same time as the first attacks on the hydrogenation plants. You must have used a different system, because, while we only need a few weeks to reconstruct the factories, the damage in this case was so great that we did not want to repair the damage at first. It might be of interest to you if you would check on what system was used.

Q. We still have a few questions about statistics. Could you give some information on the question of the reliability of the figures in general? The book partly refers back to 1938, but the impression is that the figures were fixed by many divisions to obtain a better time period.

Sp. The basic figures must always be true; only when they are total figures can you add something to them, but the basic figures must always correspond to the acceptance figures. Are there any doubts on the figures which I might explain?

Q. No, nothing in particular; that was just a general impression.

Sp. But it is different with the Air Force figures. The figures cannot give the right picture as the planes were not flown by the GAF during bad weather. They were not accepted then for practical purposes. They were counted in the production, because they had left the factory. Later as we had special tabulations which include the machines not flown in because of bad weather.

Q. That means that the figures should be correct because they have to check with the acceptance figures in the separate columns.

Sp. Yes, that's right.

Q. Another general question: How much work and materials were used and what was the relation or the effect on production of the large smokescreens which were placed in special regions, especially in the Ruhr.

Sp. The most troubling was the bottleneck sulfuric acid, which was a part of the smoke, screen. That was the most difficult. Otherwise it did not cause any amount of work to throw up a smoke screen. That was the work of the GAF. Not too many workers were employed in that. In the case of hydrogenation plants we threw up smokescreens with residues. Phenols were quite successful for that.

Q. As we said before today, we will discuss the V-weapons, and it would be best if you would give us a chronological development of the program, and it's strategic meaning.

Sp. The development of V-weapons was started with the A-4, the present V-2, in Peenamunde in 1934. The V-2 was a technical wonder weapon, but was much too large in it's technical demand in relation to it's effect on the target. Later on, the V-1 was added, which was developed in a short time. It was the intention to create in the V-1 a weapon which could be produced with very primitive means.

V-1 was the competition weapon of the GAF to the Army's V-2. Both have the disadvantage that they spread and therefore represent a waste of explosives. A large rocket was supposed to have been developed from the V-2, which could have traveled large distances. But those were theoretical considerations, which according to experts, could have been possible after some time, so that one could have bombarded America. It is not outside the sphere of technical developments to produce something like that after the basic technical difficulties have been overcome.

In the field of V-2 belongs an invention which had the code name "Waterfall", which was supposed to be used against bomber formations, and, steered from the ground, was to be sent into the flights. In one year this "Waterfall" development would have come out in large numbers.

Q. What size were these "Waterfall" in relation to V-1 and V-2?

Sp. V-2 was 10 m high and they were about 3-4 m high.

These waterfalls were to be steered at first on a beam and then were supposed to be brought near the plane by acoustic steering. We had even hoped to reach the bomber groups while they were still out of sight. The disadvantage of this invention was that it would have been tremendously expensive and that one needs a tremendous number of them on the ground to have them at the spot where the bombers are heading for.

We had another invention, so-called flak-rockets, of which the "waterfall" was one, but most primitive; i.e., one called "Enzian" which was being developed by Messerschmidt; and another one by Rheinmettal Borzig which resembled a primitive rocket.

All the other inventions have the disadvantage that they would have to be used visually. It was our intention to fill the war head with more than one set of explosives, which would then burst inside the bomber formation. Each small container would have been sufficient to destroy a wing, for example.

As a preliminary step we were using the 8.8 AA shrapnel shell which showed good results. Outside of V-1 and V-2 we had two more developments, though these were in the field of artillery--guns suitable only for firing from the channel coast, from Cape Gris Nez. because of their limited range. An interesting development, the gun had a long barrel which did not have to be very strong, was (zusammangeflanscht) and had explosives chambers at regular intervals. Here the projectile got its first propelling force and then, by means of electric contact which was regulated very accurately for one-thousandth of a second, its speed was raised by several ignitions until it reached 2000 m/sec.

That was a very primitive method which had been tried out at first. The trials showed that such a principle might be employed successfully. As far as I know, the barrel, in order to shoot against London, had to have a length of 80 to 100 m or more. Such gun emplacements had already been constructed at Cape Gris Nez.

V-4 was an elongation of a normal artillery piece which we had, having a barrel without rifling, and with a so-called arrow projectile, which also represented a new development. We will have to talk about arrow projectiles at a later date because that is a special matter.

I only want to say now that the arrow projectile is a development by Roechling. The projectile is normal, with four stabilizers folded down at the end. After it leaves the barrel the wings then spread. The barrel is not rifled but smooth. By that the projectile gets its necessary steadiness. That gives us the opportunity to lengthen the barrel. By this length a tremendous penetrating power could be achieved. These projectiles were able to penetrate the rock ceiling of the Maginot Line, about 30 m of rock.

The tests had been carried out. That was a development intended for Gibralter. It was already finished during the war. Because it represents such a simple principle it was never used because we were afraid that the enemy might possibly get more use from it because it could be copied easily.

Q. How many projectiles could be fired from one barrel?

Sp. I cannot tell because the strain of the barrel would be less because it wasn't rifled.

Q. Was it built on the ordinary principles of projectiles?

Sp. Yes, the improvements were in the field of ballistics.

Q. When was the attack on Gibralter planned and where was it supposed to be?

Sp. It was considered as soon as we had gone through France. It would have been started from Spain. The inventor of that was Dr. Koenders in Wetzlar.

Q. Did you have any difficulties in convincing the Army of those new inventions?

Sp. These were developments which had been carried out by the Army already when I took over my office. Anyway the Wehrmacht worked in close cooperation with the factories on all these questions. We only helped along when difficulties appeared.

Q. Was there a definite competition between the GAF and the Army in regard to V-Weapons?

Sp. Yes, and that was the reason that the GAF developed the V-1 as they were afraid that the Army would be the only one to reach London.

Q. Were there any other V-Weapons or similar weapons at hand?

Sp. We also developed an AA rocket for larger distances which was used several times. There were several sets of rockets (powder-rockets). When the first set had burned out, it was dropped automatically and the next one then started. That was something which was intended for AA rockets but was first developed for long range projectiles--also for London. I didnt think much of that invention because there would probably be a little push while changing the sets of rockets, which would have changed the direction. This rocket was not steered but was fired ballistically

Concluding on V-weapons, it should be said that the V-2 is a development which could be very important for any future war. And especially for a country like yours which is much more ahead in the field of radar than we are. I believe that it will be possible in some future time to form a better target pattern by improvements in its electrical steering. Then the V-2 is doubtlessly a weapon with which to hit marshalling yards and other medium sized targets at long distances. It should be especially suitable for production because no other weapon will be needed.

Q. Could you tell us something about the "Heavy Water" in Norway?

Sp. Just like you in America, our scientists have been busy studying the smashing of the atom. You are more advanced in America; you have the large cyclotrons. I have supported it during my tenure and have built several smaller cyclotrons, one of which is in Heidelberg. According to my opinion we were far behind your men in America.

Q. Is it true that the "Heavy Water" in Norway was a part of those developments which was to be used later on as a source of energy?

Sp. We never got past the first laboratory tests and even these are not ready for discussion yet.

Q. How large was this Norwegian project measured in labor and energy?

Sp. I dont know that. By the way, that was not a new development but an already existing installation for the production of "Heavy Water".

Q. Was the destruction by air attack complete?

Sp. I believe so.

Q. Now we come to the question of the strategic goal of the V-weapons. Was that the substitution for the heavy bomber force against England, or something apart from that?

Sp. There are two opinions on that. One believed that the V-weapons would have a decisive effect on London. Only London could be the target anyway, because the hits were so widely separated that any other smaller city could not be attacked effectively. The deviation for the London distance was about 5km for the V-1 and 2-3 km for the V-2.

One could never compare the effects of V-1 and V-2 to a British attack on a center of a German city because of the heavy effects of the British attacks - the large tonnage dropped in a short time on a small target, the resulting fires - all of which cause much more damage. While in the case of V-2, even with occasional hits far apart, even with the same amount of explosives, the same effect would never have been reached.

Q. The development of V weapons, especially V-1, took up a significant part of your total production. Was its goal a preparation for a German invasion of England, or to stop your own preparations for invasion?

Sp. Neither one. Its purpose was to counter the British night attacks with something similar, without the expensive bombers and practically without losses. The main reason was therefore a psychological one for the benefit of the German people.

The effect of the V weapons on London was also overestimated. We expected it to make the British population tired of the war, for now and then we received reports that their morale wasn't as high as before. We expected more of a political reaction to the weapon.

Q. What would have been the normal development of the weapon if the launching sites had not been subjected to air attacks? How many would you have been able to fire daily?

Sp. You bombed the cement emplacements which permitted the launching anyway. These cement sites were prepared to launch the entire production. V-2's were to be produced at the rate of 20-30 units daily, 600-900 monthly, and we planned to fire about 80-100 V-2's daily. You also attacked the installations for V-2's.

Q. What was its explosive composition?

Sp. Approximately the effect of a 210mm artillery piece.

Q. Did the first large attack on Peenemunde in August 1944 limit or delay the executions of these plans, considering that so many scientists were killed there?

Sp. Only one of the foremost collaborators of the Braun was killed. We had tremendous luck in so far you completely destroyed the living quarters, however, you did not do any damage to a large laboratory hanger close by. Besides, at that time the development was already completed and we were already preparing for production. This was done at other locations. The V-1 was developed at Fieseler, Kassel.

Q. What was the significance of the large concrete construction of Watten?

Sp. These are probably concrete construction for V-2. V-2 required larger installations for preparation, like the filling with oxygen, testing of instruments, storage - in short everything to keep V-2 in shape. V-1

is mounted much quicker, is put on tracks and fired. V-2 as you know went straight up.

Q. In 1944 you made 23000 V-1 and 4000 V-2. Could you give us a picture of the pressure this production exerted on metal and explosives production?

Sp. The pressure on explosives did not amount to much. V-1 carried 500 to 600 kg of explosives, that is about 10000 tons for the whole year. That's no object. V-2 used about 800 to 900 kg, that doesn't mean much in terms of explosives. At the same time we didn't have to produce bombs (air force) anymore. A difficulty existed in the procurement of sheet metal for V-2 and V-1. They had to be collected from various other programs. I don't know anymore in detail from what programs, but it was very difficult to get these highgrade steel sheets.

Q. You mentioned that the V-1 was a competitive program to the Luftwaffe. Did that also entail a material pressure on the Luftwaffe program, or did you mean that remark only in a strategic sense?

Sp. The Luftwaffe was mad about the Army going in for such large distances. They said: "The Army starts to fly——". The V program did not hit fighter production in any way. Because in the fighter program the difficulties were for instance to get aluminium sheets, whereas it was steel sheets for V-1.

Q. What was the relative cost of each type of projectile?

Sp. I don't recall that exactly, but the difference was tremendous. V-2 cost approximately 20 times as much as V-1. The cost is very difficult to figure out for new production processes because there isn't a real mass production and the value factor cannot be calculated as yet. One V-2 used to cost one million marks in the beginning. I believe it then went down to 250,000 to 300,000 marks, but I don't want to quote any figures that I do not know exactly.

Q. Could you give us an approximate indication as to the labor that worked on V weapons during the past part of 1944?

Sp. About 70000 to 80000 people worked on V-2, that is very much in preportion to the figures of 600 projectiles produced per month.

Q. As far as we know the explosive consists largely of H_2O.

Sp. No. Normal Hexogen - explosive.

Q. How about the propellent?

Sp. To my knowledge it was Hydrogen and Oxygen.

Q. Did these exert a pressure on the Chemical industry?

Sp. It was difficult to procure the necessary amount of Oxygen, because I already had difficulties to get oxygen for industrial purposes. I found reasons against the expansion of this program. The bottleneck here was the electro-industry on one side, and oxygen on the other.

Q. We know that one of the most typical features of all V-programs is the fact that they required high temperature, high pressure etc. That means that they required high-grade steel. How would the load on steel have been in the case of a planned expansion of the program?

Sp. I had refused to produce more than 600 a month. Originally 900 were planned. I had also refused to carry out an initial expansion of the anti-aircraft rocket. Isaid that when the anti-aircraft rocket comes, V-2 will have to step back and its capacity used for the anti-aircraft rocket, because it was too great a luxury for me. I could have made about 5 to 6 Fighters with the same man power as the V-2 took, which would have been better from my point of view. It is a technical experience to see such a rocket, piloted by a ray from below, going into the air, electrically directed. That is technically the most advanced thing one can imagine.

Q. Didn't about half of the projectiles explode before they got away?

Sp. There was the danger that the projectile would not take off straight. Then one could observe the steering, how the projectile was always brought back into the right direction again.

Q. Do you have figures about how high the losses were at the launching?

Sp. Kammler must be able to tell you exactly about this. As far as I know, a projectile came back 10 or 12 times. But then there is none left in the neighborhood, except the command tank with the two people who guide the projectile. It happened that the fusing of the explosive charge did not immediately take effect, but only a few minutes later, so that this last service crew also could get away. The worst thing was when the projectile could not be brought into the right direction, coming down approximately 30 kilometers from the launching site.

Q. Do you assume in your estimate that the production of the V-weapon injured English production more than German?

Sp. More than German. I have often said that. For one thing because the dispersal was so great that no real effect could be obtained. I considered the nerves of the Englishmen to be so good that they would stick it out anyway. And your victories came first. A victorious nation could not be impressed by that. I believe however, that the development of the V-2 will definitely be the most important factor for war in later times. At the present time it did not come to full effectiveness. It can be launched from a ship, from every street. They do not need a previously prepared launching site and in the course of time their striking accuracy will be just as great as with bombing.

Q. In conclusion, can you tell us who the greatest believers in this program were, who was most interested in it, and who expected the best results?

Sp. It happened that the development of the V-2 had been sponsored for so long by the Army that it was a matter of honor with the Army to bring it to conclusion. The V-2 was therefore protected with particular love by the Army Armament Office (Heereswaffenamt), and it was in contrast to all other items that the Army got a special quota in order that nothing could happen to it. One could almost have gotten the impression that we did not have any other special interest. The V-1 was, begun in competition with the Luftwaffe. Iwas surprised at the propaganda effect, which the V-1 called forth and that there was such a stir about it. I was really the vanquished, for I had always said that it would have no effect at all on the enemy, and then there came rather excited reports. Further details must be learned from Field Marshal Milch, who promoted this with the overall aircraft people (Ueberelluftreugmeister). The V-2 was supported by the former Lt. General Fromm and General Leeb. The interest of the Fuehrer was first awakened several months previously by a lecture at Headquarters. Until then he did not expect so much from it. He was instructed about the V-2 by Braun and Dornberger. The developer of the V-1 was named Lusser.

Q. Was the Ministry of Propaganda interested?

Sp. Yes, Dr. Goebbels had written an article about the wonder weapon and discredited me very much with it, since everybody looked to me for speedy delivery of this wonder weapon. Then in a speech I told the propaganda leaders that I expected no military effect from these weapons. Only a moral effect could be expected from them. I understood nothing about that their minister would probably understand better. This propaganda concerning the effect of the wonder weapon was taken to the troops through the grape-vines. That was personally unpleasant to me, because nothing new could happen and anyway I considered it false because it was my opionion that the fighting power of the troops was not strengthened by it, but weakened instead.

Q. You have already given your opinion about the question of the big area attacks on the cities which were carried out by the RAF. You say that it exercised a decisive pressure on the total economy. It would be of value to us, if you could give us some testimony about the type of the consequent damage and how you measured the damage production.

Sp. The first heavy attack was that against Hamburg. The attack against Hamburg caused me great concern that our production might be strongly handicapped by a speedy continuation of similar attacks. Losses in Hamburg were very heavy then, the greatest we had ever suffered through air attack, mostly because of burning houses. The population was extraordinarily depressed. Loss of production in some places seemed to be very heavy. After this attack I went to the Fuehrer to tell him that it would be a great shock to armament production if we were to get about 6 or 8 such attacks against big cities. The effect of this attack consisted less in actual damage than in shock, and it may have been the mistake of all attacks before and after Hamburg that they conditioned us systematically for air attack. That can be said as well for all previous attacks which were being increased as for the attack; against Hamburg which never re-occured that severely. Hamburg remained a special case for a long time.

Later on I had an opportunity to witness the effects of numerous night attacks on Berlin for the period from about June, July 1943 untile February 1944. Those, though they had always considerable effect, speedily hardened the population They did not mind air attacks very much any longer.
The effects of industry were indirect only in that labor first remained absent for a few days in these plants not directly hit. But one must say that the German worker possesses an extraordinary resistance and up to the end, and in spite of air attacks, returned to the plants and worked again. I for my part had always to underline that we owe our achievements almost exclusively to our German Workers. Attacks against towns or city centers can only make sense if the nations do not have the necessary resistance.

Q: You gave us a picture of your general impression of the attacks against Hamburg, and Berlin, but you must understand that it is difficult for us to establish a scale which would enable us to figure out the production loss caused by this type of attacks. Could you describe us what effect these attacks had upon the housing problems, loss oflabor because of transportation difficulties, loss of means of transportation, energy, communications in the town, general administration Gas, water, and of course the whole impossibility to exercise government control.

Sp: Of course one must say that the night attacks had a great importance and caused us great worries, I don't want to create a wrong picture, but a speedy end of a war can't be achieved in such a manner as long as the population remains in order. The single effects were rather important. The loss of living quarters in most bombed towns was terrific mostly because of area fires and not through the effect of bombs. The repercussions on production became indirectly important. Maybe one could say that in every heavily bombed town production decreased to 50% during the first 8 - 14 days.
We can give you exact information about the effects of aerial attacks because we illustrated the resumption of production after heavy air attacks by means of electricity consumption charts. This on the presumption that we were able to supply more currents that was demanded. This again shows how much time the resumption of production took. One can practically find out from these charts how much production was lost during what time. These charts should be with the Reichs distributor or with Schulze-Fielitz. They are the best illustrations of night attacks. The same was true after an attack against Hamburg - in so far as I can remember - first the demands for electricity amounting only to 20% increased rapidly within 3 or 4 days to 60% while it took 14 days to return to normal demands. Anyhow the worries which we anticipated after the first heavy attack against Hamburg did not materialize, 6 to 8 weeks later we were again working at almost full capacity and afterwards the Hamburgers worked almost better than before.

Q. What kind of production suffers most under such an air attack? For instance was it the smaller machine plants or workshops for semi-finished goods, enterprises within the town itself or those located on the perimeter?

Sp. If the attack touched the town and was not specifically aimed at the plants, all

industries suffered losses on the average, because labor, at first, did not show up for work. The effects of these attacks were mainly those created by loss of labor. We were ready to issue food ration cards in the plants in order to get the labor back there. Often it took a week before all reassembled again. The labor situation was aggravated because municipal transportation systems, mainly streetcars, did not function at full capacity, and many cars were destroyed resulting in rerouting of lines and effecting the demands of labor in the long run. To a great extent, the semi-finished products industry is located outside of towns, forges, ball bearings etc., inside the town are more handicraft enterprises of 50 men. I never succeeded in incorporating those predominantly handicraft enterprises into the armament production industry. They manufactured mostly consumers goods and some items for the Army, canteen items, cooking utensils etc., no that generally these attacks were not yet felt in the armament output. Exceptions are Berlin and Hamburg where for instance the great AEG work is located in the center of the city of Berlin. But in medium sized towns - not industrial towns - such as Weimar and Erfurt etc., no damage can result from night attacks.

Q. Did the destruction of communications, and consequently the temporary collapse of local government, have long lasting effects upon your organs of armament control?

Sp. No, this was not the case. In our towns the administration is very decentralized. In every part of town there are police districts and most other municipal offices have local branches. The issuing of food ration cards did not create complications. That was immediately improvised. In addition to that we had training for the air attacks. They started small, and we were able to find counter measures to solve somewhat the problems of food supply, clothing etc. In case of a sudden resumption of the mass attacks of the 1943 kind, this would not have been possible. But because we had accumulated experience in 1940, it was possible to face the music. The organization of the party with its detailed structure was a great help during air attacks.

Q. Here is a general question: During an air attack the Fliessband was destroyed at the Humboldt-Klockner works. Because of the lack of communications it was not possible to get another Fliessband from Berlin. We further saw in other reports that very often it was even impossible to get in touch with other offices. Couriers had to be dispatched with important messages and some of them did not come back. What was the general effect of all this?

Sp. That had a dual effect: Those outside said, "Thank God the Berlin boys can't reach us any longer," and on the other side were shocked that production continued so well without our care. It interfered considerably, of course when communications were interrupted, it was among the worst things.

Q. Did this situation especially arise only after large scale attacks, as those against Hamburg, Berlin etc., or how do you explain it?

Sp. Yes as a consequence of air attacks against towns. That is where communications were hit, through either cable leads with long distance wires or post offices directly etc. Also after the air attacks against Berlin during February 1943

we were almost completely cut off from tele-communications.

Q. When did those communication difficulties become so grave in general, without special regard for bomb damage, that they had a decisive influence on general economy?

Sp. About in fall 1944, approximately at the same time as transportation complications.

Q. Could you give us more detailed information about the following: You said that the situation became very difficult for armaments, too. Could you tell us which branches were concerned and which not?

Sp. That is impossible to distinguish, we did not have separate statistics. That is a huge topic; for instance, the lack of coal was so important that other effects of air attacks which otherwise would have been felt were overshadowed. I therefore can only start out from the greatest effect, and that was coal.

Q. A special question - what was the effect of attacks on raw and basic material and their necessary administration?

Sp. This question was settled beforehand, i.e. before the attack. The firms had already received their coupons. We were no longer able to take that into account. We had a certain amount of so-called frozen contingency certificates and an estimated figure of certificates with firms which could not be issued because the firms were damaged by air attacks. At the next allocation the firm which was undergoing reconstruction could not be considered. We therefore thought that they were producing. If they had let us say 30% of their allocation left over because these could not be used up as a result of air raid damage they still received their full quote unless the Hauptausschuss discovered the real situation. But usually we could not trust the firms too much. In reality the certificates were frozen as they could not be used up because of air attack damage.

Every few months we called in all certificates which exceeded certain amounts and made a general clean up. But we could not consider individual firms. When you see the daily reports of air raid damages you will find that it listed almost daily 40 to 50 damaged firms, that could not be taken into consideration, and those certificates were called in later.

Q. Did ever conflicts arise between you and Sauckel and the Labor front in questions of labor protection, for instance, that labor should be given more time to rebuild their homes or was there no friction.

Sp. There was no friction. Only once I had a proposition. I intended to declare all workers in the Ruhr area as soldiers, to house them in barracks and to give them the same privileges as soldiers. The Fuehrer agreed with my plan. However I did not realize it because the Labor front refused it. Otherwise

there were no differences on these questions between us, for the labor front supported my attempts to get the worker to the place of work.

I would like to say one more word about bombs.

The industry was more afraid of the British bomb mixtures. The mixture mainly consists of incendiary, explosive and heavy mine. This caused more damage than the American attack which usually threw only bombs of a single calibre.

Q. One more little deviation. During our discussion this morning Mr. Seldte took the point of view that the relatively minor use of women for armament a question of individual classes were anchored in the old line of thoughts children, kitchen, church. What do you think about that?

Sp. Since I started my job, I have always sternly demanded that more women go to work than was the case before. Statistics of WWI show that their contribution then was by far greater. It is correct, Sauckel and the party protected the women, and said that they must not be used for labor to the same extent. One was of the opinion that the use of women on a large scale would have badly influenced the morale of women, and that therefore it could not be done. In general the war was not taken seriously enough at home, almost up to its end, i.e. up to fall 1944. Also the unconditional belief in victory - even with the Gauleiters - has something to do with it. They were too optimistic. Here our Reichs propaganda fired back. Nobody thought that we could lose the victory. The words of Churchill - "blood, sweat, and tears" - would have been the right slogan for us, too. Instead of that, we only had "Our victory is assured." Because of this mentality no Gauleiter wanted to make any personal sacrifices. It almost happened, against my protestations in 1943, that of the Ukrainian country girls, 200,000 entered households as maids instead of drawing maids from households into armament.

I always used the comparison, an enterprise which does not work successfully has to check the relation between productive and unproductive hours and must try to keep the number of unproductive hours as low as possible.

In our national economy we had too many unproductive hours.

Nobody undertook anything to reduce those unproductive hours.

Q. We would like to once more talk over the question of labor employment. Had total mobilization been introduced in Germany would you have changed over to multiple shift work.

Sp. In 1944 I lost many workers when they were inducted as soldiers, so that the percentage of foreign workers became rather high. Therefore, I would have been thankful for every German labor unit, even women, because inside of the

enterprises even the problem of understanding existed as there was no more common language. The new industry of the Luftwaffe suffered especially. Firms like Krupp, Essen, have always their stock of old workers who can't be called up any longer. There the situation is much easier. As far as I am concerned, my reason to have total war at home was that I wanted to mobilize German labor. Besides that, I would have been able to produce more had I had more labor. For certain enterprises this would have led to a second shift. A surplus of labor would have permitted a rapid switch from one program to another in case of urgent demands. In case of air raids which necessitated a switch over, the new enterprise had no labor. I would have had great advantages had I had more labor in the enterprises. One can't answer the question of the second shift in such a general manner. What are you getting at?

Q. In our American opinion the two and three shift system during busy times represents the most favorable one of all high production. Therefore, we are astonished to see that Germany made so little use of it.

Sp. That was what enervated me when I read British and American newspapers and pictures, and saw where, for instance, women built planes. One of the memoranda where I demanded the same concerns only this topic. The German workers too did not understand it. The workers were disturbed because women could stay at home, while the men had to put in overtime. That made the German as mad as it made me. But this was here a question of interior politics and I did not get my proposals through.

Here at home we had only a few responsible people who wanted to take part in the war with their own sacrifices. All of them wanted to continue an easy life. If one demands things of the people one can only do it by starting at the head. If the minister or Gauleiter starts to send his maid away, he can demand the same of those further down. If he keeps her, one again arrives at compromises, and nothing happens.

Energy

Q. How was the whole capacity expressed in any measure of quantity, and what were the respective shares of water and coal?

Sp. The by far greater part is steam, therefore coal, 60 - 70% coal. But I can't give you any further figures.

Q. Up to what degree was the whole power industry concentrated in major individual plants, what percentage was in how many works?

Sp. We do not have giant power plants as you.

Q. The Goldenberg power plant is one of the greatest?

Sp. We consider it of medium size. For the waterworks it would be the Walchensee plant. But it is practically only a small one.

The overall picture of our energy economy is such that we have to take into account many small and medium sized installations.

Q. How elastic was your energy economy in order to enable you to continue distribution in case one of the big plants was destroyed?

Sp. I think that apart from England, Germany had the best completed connection economy. The advantage of our energy economy was that we were able to compensate for any loss which occurred at any place. We could, for instance, make good the losses which were frequently suffered in the Ruhr area by channelling current in that direction, until the end when demands for current were too small, of course.

This is based upon the fact that in Germany - contrary to what is the case in America - distances are not very great, and that the industry is equally distributed over the whole territory. Line losses are small so that it does not represent any problem to transport current from the power works in the Alps. While your distribution of current is organized by districts, we can transport energy from the Alps to the North.

Q. To what degree had this grid of lines been conceived from the point of view of the war economy?

Sp. Without war economy. The reason for it is that our energy economy had been largely completed by private capital, and over a long period of time, i.e. one constructed medium sized power plants at various points and those plants had to be supplemented by others to supply all the current needed by industry. In order to make fullest use of the production one had to build connections so that the current could be sold wherever it was needed most. Therefore you can see that Germany did not plan this intricate grid for reasons of war economy, but that it really grew all by itself. If you regard the structure of, for instance, the Rheinische Elektrisitaetswerke, you will see how the individual plants grew during 20 - 30 years only according to additional needs of the Ruhr areas. First the works in the Ruhr area were based on coal, then plants in the Alps - in the Silvretta - and finally one constructed in the Murr valley plant in the Black Forest, were added. As you see, something new was added from year to year. Without that a definite basis existed from the beginning on. As time passed on one simply added another plant. They were for instance interested in becoming connected with the power plants of Bavaria, which partly were owned by them, so that, if there was not enough in the Silvretta, they could make use of the rainfalls in the Bavarian mountains. For all these reasons, there developed the grid which existed before the war.

Q. Do you have any idea about the break down of consumption? Which groups of industry consumed most of the current?

Sp. There were exact files at the Reich energy distributer.

Q. In case of a considerable loss of energy which industries would have been primarly affected with curtailment and did you take these decisions?

Sp. For this purpose there existed the Reich distributor. It was divided into 6 to 7 district distributors; those had switch off rosters which had been established beforehand. The district distributors knew therefore whenever the first, second or third class had to be cut off which enterprises were still authorized to use current. The rosters were revised every few months. The great consumers Aluminium, Electro steel and Chemistry had special treatment with regard to cutting off of their power supply. We had almost no lack of current except during the winter months. Then we usually reduced Aluminium production rather drastically but left electro-steel at almost full capacity. Production of carbide, which needs a lot of current, we often reduced. Those were planned reductions which were not necassitated by air raids but because of general demands upon the energy economy. To control these demands we had to do it.

Q. In your opinion, was the general energy situation a limiting factor for the enlargement plans of the whole German industry?

Sp. We had enlarged industry further than we could supply it with current during the winter months; it was therefore already beyond the capacity of the energy economy. We made good for that by requiring aggregates which have an especially high consumption of current, as for example furnaces for gears, to work mainly at night. This was done to use the difference between day and night. We tried to reduce the maximum consumption and not to supply the whole demand during the whole day. We would have enough, if we had only the complication that during the night there were not enough demands while overcharges occurred during the morning and evening hours.

Q. Did you experience technical collapse and complications because of over-charging?

Sp. We had one grid collapse. And collapse means this: if too much current is consumed the phases decrease and arrive at a point where no more current can be supplied. It took a few days to repair the grid. This collapse occured during fall 1944 in the Hannover-Braunschweig area because some plants did not stick to the switch off roster. There was a Gauleiter there who said, "No switching off in my district". He had no idea about what he was doing. The system of the switching off rosters combined with the telephonic information to the main works always functioned excellantly. Even in case of raids and sudden needs to switch off we avoided grid collapses. One disadvantage was that smaller plants could not be included in the switch off. The switching off was only possible by telephonic message because it had to be done very rapidly. During the winter we had to proceed to an average of 20-30% of switching off. In case it was planned to enlarge the energy industry, which factor could have been the limiting one, turbines, cable, coal or what?

Sp. We had a special bottle neck with transformer since an attack against the transformer plant of Siemens at Nuernberg had destroyed the latter and the

corresponding AEG plant in Berlin was eliminated. It increased the already existing bottle neck in the way of an enlargement of industry. Transformers were the worst bottle neck which we had. The building of turbines could keep pace with industrial requirements. With retardments of 2-3 months we could have succeeded to continue the construction of a million Kilowatts per year. That we could do. Coal can't be considered as a bottle neck if one produces coal oneself. To use coal directly where it was found did not create any difficulties for us, even then. I never heard that cables represented a bottle neck. Without air raids we probably would have reached 1½ million Kilowatt.

Q. What was the direct effect of the attack against Siemensstadt?

Sp. Several times the bombs came close, but with Siemensstadt we always had incredible luck. Despite the many raids we never had a collapse of production, but this was an exceptional case. This because Siemens has high concrete buildings which can only be totally destroyed with heavy bombs. With medium or small calibres it sometimes happened that if the bombs hit the top a few upper floors were destroyed and we could continue to work downstairs. Concrete buildings are generally very good as air raid protection.

Q. What is the importance of Norvegian power plants for the German economy?

There is no direct importance for the German economy because there was no possibility to transfer to Germany. Almost for the whole time we had an excess of current in Norway and therefore we shifted certain productions there, as Ferosilicates and Electro steel, in order to make use of the current.

Furthermore it was scheduled to produce aluminium there, but this was a project of phantasy. Koppenberg took charge of it's execution. The plans had not considered that bauxite and clay are necessary which would have had to be transported to Norway. That plan could never have worked.

Q. How much energy did you import from Switzerland?

Sp. We received a bit but no important quantities.

Q. In the Ruhr area it struck us that there are many reserve plants, kind of emergency plants. This should give some clues as to the vulnerability of industrial plants?

Sp. I think that you are mistaken, those were not emergency plants. Especially in the Ruhr area every great enterprise like Krupp, Edelstahlwerke Krefeld etc, tried to build their own power plants as they are located on coal and able to produce their own current cheaper than REW sells it. Only during the war did we connect these private power plants with REW to be protected against a possible crisis. But before this these enterprises did not buy current. There is hardly a country in the world that would have an electro economy as

dispused as Germany's. This was so because everywhere electricity became a state or private monopoly. In Germany everybody was permitted to generate his own current and that up to the very end. This explains why every work tried to become independent. Further more state current is more expensive. Until the nomination of Dr. Todt there existed no office in Germany that planned energy and had authority to issue orders.

Oberst Gilkrest

Did this net of connections require a distributer? Was the distribution up to the end in Berlin or did it get relocated outside Berlin because of air raids?

Sp. A priority there was about 6 district distributers who had to keep in touch with each other, for instance the one in the Ruhr with the one for the South to Silvrette etc. The Reich distributor took only general measures and was the liaison man with us.

Q. If this distribution was divided by energy districts without personally having established an allocation, who took the decision if a transfer from North to South was to be effected?

Sp. The districts were greater than you assume. Probably Bavaria, for instance, included the old power works in Austria. Further there were almost always the same customers. If two neighboring districts had needs of current it was all done exclusively by telephone via their own high tension lines. We often tried to figure out what amount of current loss could become dangerous for us. Already a total loss of 40% of all works would have constituted an immense danger. At a loss of 60% we would have had a total collapse of the whole Reich net. In our case it is so that the individual consumers who can't be controlled can not be shut off either. We had to rely on switching off discipline. It was voluntary if those concerned consumed current or not. We could only shut off the great plants. The volunteers usually won't do it or only so late that the grid has already collapsed.

Q. Is the repair of power plants after air raids a long run problem or can it be done relatively speedily?

Sp. At the Goldenberg power plant it took very long. It depends on where the bombs hit. One can say that the pilots always overestimated the effects of their attacks. They always reported twice as many bombs to achieve what they reported on the basis of aerial photos. One - two turbines could work again within about 4 - 6 weeks. This was only 1/8, but the rest took 4 months because there were already too many repairs in that industry. As long as we had the grid it did not matter which plant was repaired first. The orders were therfore simply attached. When attacking power plants one has to attack them totally and drop a multiple of the bomb load that the pilots think would suffice to destroy. Then an elimination of 4 - 6 months is assured.

The most radical measure would be to attack the energy economy. But to be undertaken successfully, it must be concentrated upon with maximum vigor.

Q. We never concentrated very much upon attacks against power plants but you probably had some ideas what should be done for their protection i.e. passiv. defense?

Sp. There were no plans for that. We only took very primitive measures and erected walls as protection against shatter effects. Everything else would have cost too much and we could not afford any more constructions. The only thing we placed beneath concrete was the power plant at the nickel mine at Petsamo. If one constructs new plants and put them under concrete it does not make too much additional trouble. This of course is different in the USA where you have a very concentrated power economy and a number of great plants. Those can be built in concrete. With us this was not possible. We had hundreds of plants of the same dimensions and one did not know where to start.