MEMORANDUM

March 29, 1943

TO: Senator Harley M. Kilgore

FROM: Mr. Halley

The officials of the Curtiss-Wright Company will be at Senator Ferguson's office at 9:30 a.m. on Tuesday, March 30, for the purpose of stating to the Committee what they have learned and been able to accomplish with respect to the situation prevailing in Cincinnati.

The Army representatives will attend a hearing at Senator Ferguson's office at 11:00 a.m. on Tuesday, March 30, with reference to the same matter.

A drawing-room has been obtained for you and Senator Ferguson on the Chesapeake and Ohio Railroad leaving Washington at 6:01 Wednesday, March 31. Colonel Knowles will also be on this train, and he assures me that you will return from Aberdeen in time to make connections.

I will be in Cincinnati on Wednesday, March 31, and will make hotel reservations and have the hearing set.

Our hearings at Cincinnati will take place on April 1 and 2.

Arrangements are being made to leave Cincinnati the evening of April 2.

Attached hereto is a copy of a memorandum of facts setting forth the matter under investigation.

Rudolph Halley

MEMORANDUM

COPY

March 22, 1943.

To: MR. FULTON

From: MR. LATHROM

Subject: WRIGHT AERONAUTICAL ENGINE PLANT, LOCKLAND, OHIO.

As a result of complaints concerning the operation of the above plant, inquiry was made into the various charges which had been presented.

About twenty-five Army officers and civilian employees, largely Civil Service inspectors and supervisors, were questioned. These men represent approximately thirty per cent of the inspection and supervisory force maintained by the Army at this plant. Included were:

Major Will Bruchman, A.A.F. Resident Officer.
Ray W. Clark, A.A.F. Inspector in Charge.
Walter N. Huff, A.A.F. Supervisor, Third Shift.
James H. Baker, " " Second Shift.
John V. Batcher, " "
Charles P. Ginn, " "
W. W. Finlay, General Manager, Lockland Plant.
Major H. T. Shepherd, Chief, Miscellaneous Inspection, Cincinnati area.
Capt. Shepherd, Miscellaneous Inspection.

With the exception of Major Bruchman, Mr. Clark and Mr. Finlay, the men interviewed were unanimous and entirely consistent in the charges which they made. The statements of each were verified by the others in almost every case. Still further verification can be obtained from a few Company employees. In addition, it is indicated that at least half of the Army inspectors will support the charges already made. It should be said that there was no indication of any personal feeling against any individual such as sometimes is apparent in similar cases.

Major Bruchman, a Reserve Officer of the last war, and the

President of two Cincinnati breweries, seemed to be entirely unaware of what was going on at the plant. Mr. Clark was extremely worried and nervous, to an extent which would not be likely if things were as they should be. While he claimed to have no knowledge of anything improper being done in the plant, he intimated that he was being forced to not look too closely into the operation of the plant by orders from those in greater authority. Major Shepherd stated that Mr. Clark had told him that he would expose the whole situation, if it weren't for the fact that he was physically afraid to do so. Major Shepherd quoted him as saying that he wanted to continue to stay healthy.

Mr. Finlay took the attitude that there was no possibility of any such charges being true, but was very careful to bring out the point that the engines were subject to a tremendous amount of abuse by young pilots in combat.

Specific charges which were made were:

(1) That bad material and parts were constantly being accepted by the Company and certain Army supervisory personnel, and being sent out in finished engines.

(2) That no quality test had ever been made on an engine built in the plant. It was stated that several attempts had been made, but that engines had broken down in every case before the test was complete. The so-called quality test consists of running an engine approximately 150 hours on the test stands. Ordinarily, this is done before any engine is ever put out of a plant, and periodically for sampling purposes thereafter.

(3) That Company employees were acting under verbal instructions to pass questionable parts unless the Army caught them.

(4) That rejected parts were often substituted for good parts, and the records changed so it couldn't be discovered.

(5) That one of the Army supervisors had told other Army supervisors and inspectors not to look too closely at these parts because the engines only last six hours in combat anyway.

(6) That inspectors who are too conscientious and refused to take bad material were often transferred to departments where they could cause no "trouble" or entirely out of the plant.

(7) That Mr. Clark, who is Inspector in the Lockland Plant, is dominated by Charles Bond located at the Patterson Plant of the Wright Company, in charge of inspection in all Wright Plants.

(8) That the use of technical equipment, such as profiling machines for the measurement of gears have been denied to the Army personnel.

(9) That all rejection stamps of any sort have been taken from the Army inspectors so that it is impossible to mark rejected material in any way.

(10) That acceptance tags are signed in advance by the thousands, and that spare parts are accepted which the Army inspectors never see.

(11) That when defective parts are found, instead of being

mutilated or returned to the vendor as they should be, they are, by one subterfuge or another, put back into circulation with good parts so that in all probability they will ultimately get by Army inspectors.

(12) That in many cases, material was subsequently purchased which had been rejected by Company inspectors or engineers.

(13) That it was not unusual for specifications to be temporarily relaxed, until a number of bad parts were used, then specifications were tightened.

The situation at the plant represents an almost perfect setup for any Company which is more interested in profit and production than in quality. The plant has a so-called A rating from the Army which means that the Army, to all practical purposes does no inspection whatever. They act under such a setup only to check the inspection of the Company. In each department, from the Receiving Department to the Shipping Room, only a very small fraction of the material can be possibly inspected by the small force of Army inspectors in the plant.

At no point in the manufacturing of the engine does the Army perform anything other than visual inspection. Needless to say, it is extremely difficult to discover small faults by visual inspection only.

The only partially effective inspection that is made by the Army is made after the so-called "green run" of the engine. After the engine is built up and assembled, it is put on the test stand where it is run for three hours. Then it is disassembled, cleaned and laid out on tables for inspection by the Company and then, theoretically,

the Army. If no part appears defective, the engine is reassembled and run for another 1½ hours after which it is accepted as a satisfactory engine if no failures occur. Where a major part fails, the part must be replaced and the engine run again on a so-called penalty run, after which that replaced part is examined. This is circumvented in many cases by the use of so-called "kitty" parts, which are parts from another engine which has already been run. In the event that "kitty" parts are used, the engine does not get a penalty run. Inspectors cited times during which approximately 65% of their engines were being penalized because of the replacement of major parts after 3 hours running time.

As indicated above, it is extremely difficult for the Army inspectors to catch bad parts in the first place because of the restraints placed upon them. In addition to that difficulty, theyclaim that it is almost impossible to get any material definitely rejected when they do discover it. A great many instances were cited where material which had been rejected by the night shift was accepted by one of the assistant inspectors in charge on the day shift. Many other instances of substitutions and subterfuge in obtaining acceptance of parts and material were cited. In addition, when there is difficulty in meeting specifications on any part, specifications are often relaxed to fit the parts available.

These factors added together appear to make it almost certain that, if true, a substantial percentage of the engines produced are defective. In support of this is a statement from the Navy covering accidents resulting from engine failure up to March 15 in planes which use the engine produced at this plant. This statement is attached as Exhibit F.

It will be noted that 23 accidents have been reported due to engine failure. It is felt that chances are excellent that there are many more unreported from the battle areas and due to the fact that many accidents in which there are no survivors and which are listed as "Cause unknown", may well be from engines.

In addition to the planes which have actually crashed, it will be noted that the Navy has, by test and inspection, found 239 engines defective.

At the Headquarters of the Director of Flying Safety and Traffic Control, Army Air Forces, records of crashes of North American B-25 bombers from September 1942 through February 1943 were recently examined. All B-25's use engines manufactured at the subject plant.

During the six months period 117 B-25's were involved in accidents in the Continental United States. This figure includes accidents while taxiing on the field, planes that are hit by trucks on the ground, planes that are damaged by maintenance crews, etc. These trivial accidents represent an estimated 20% of all accidents.

The 117 cases, however, indicated the following:

23 accidents definitely involved engine failure.

9 accidents were of such nature that there was not definite evidence as to cause, but the weight of the evidence indicated engine failure.

5 accidents were of such nature that no definite determination of cause could be made but in which there was some reason to suspect engine failure

In summarizing the above, it is seen that of approximately 100 serious or potentially serious accidents, 37 definitely or possibly involved engine failures.

More information is being furnished on this matter as well

as information on engine failures which did not result in crashes.

The following are specific incidents related by the Army inspectors indicating that bad material has gone into the engines, and some of the subterfuge by which this is accomplished. It should be emphasized that these are not unusual instances but are, rather, everyday occurrences. Any one of the men in the plant can find several on any eight-hour shift:

(1) Attached hereto as Exhibit A is an instruction sheet covering the tolerance of certain gears, and a profile chart which together indicate a method of getting bad material into the engines. The gear in question, incidentally, is in our possession.

This particular gear is one of the main gears in the supercharger, and must carry a direct load of more than 90 horsepower. Its failure might destroy the engine completely, and would certainly cause it to lose power.

The instruction sheet ostensibly is for the purpose of correcting the amount of variations which would be allowed. The instruction sheet actually changed the method by which the variations in the gear are measured. It will be noted that the original instructions contained no mention of any point from which the measurement should be taken, whereas, the revised instructions specifically state that the measurement should be taken from pitch line to tip. The pitch line is a point approximately half way between the base and the tip of the tooth. The normal

procedure is to measure from the base to the tip rather than from the pitch line to the tip which results in the actual measurement of only one-half of the tooth.

The two profile charts represent the same teeth on the same gear. The upper is a profile taken from the pitch line and shows that the teeth are within two-ten thousandths of variation and consequently, according to the instructions, acceptable as "A" gears.

The lower chart represents a reading on this gear taken from the base and shows variation as much as seven-ten-thousandths which makes the gear unusable for any purpose other than scrap. In using a reading from the pitch line, however, this gear would appear to be perfectly good. While these instructions are counter-signed by Army representatives, it seems doubtful that their attention was ever called to the change in the method of measurement of the variations.

(2) For some time, there had been a great deal of difficulty with cylinders running red, that is, shooting red flame from the exhaust stacks, and with cylinders smoking. The normal procedure was to reject the engine until these conditions had been corrected. In December, the following notice was posted for the inspectors of the plant:

NOTICE

Effective Saturday, December 19, engines with cylinders running red, irregardless of the number, will be signed out forfinal acceptance and the cylinder will be inspected in the Packing Room. Make sure the cylinder numbers are recorded on the No. 1 inspection sheet.

Engines with up to anc including three cylinders smoking will also be signed out for final acceptance. If more than three cylinders are smoking, do not sign for the run.

As per - Ray W. Clark
Bell

Red and smoking cylinders may mean several things, but they do definitely indicate that the engine is not right. Nevertheless, these engines are accepted as satisfactory, without anything being done to correct the faults and the only further inspection they receive is in the Packing Room where an inspector takes a small light and looks into the cylinder through a spark plug hole. If there is any defect that he can see in the approximately 30% of the cylinder wall visible, he may reject it, otherwise it goes out. Numbers of several engines, and the dates of purchase with these faults have been furnished by the inspectors.

(3) On February 10, 1943, one of the inspectors rejected engine No. 74511-8 because after the test run a mutilated pin was found loose in the oil sump. This engine was accepted by one of the assistant inspectors in charge over the rejection of the inspector and without further examination of the engine.

(4) In October, 1942, an order was put through changing the design of a cylinder insert which is part of the connection through which gasoline is fed to the engine. Approximately 30,000 of the inserts were made before any were tested in an engine. When the first engines were built with these inserts, a substantial percentage were found to leak gasoline during test runs. When such conditions were found, new inserts were installed and the engine made to stand the penalty run. On October 20, 1943, orders were given that thereafter the leaking inserts would be replaced and accepted without penalty runs or further checks. This was continued until November 17th when approximately 30 engines were pulled out of the Shipping Room and put on the test stands. The results of these tests showed a substantial number still had leaking cylinders and the practice of accepting them without further test after replacement was discontinued. By a strange coincidence this occurred about the time that the previous supply of faulty inserts had been used up. There seems to be no need to comment on the obvious danger of gasoline leaking from the engine.

(5) On November 30, 1942, engine No. 180200-13 was rejected by the Air Force Inspector because one cylinder was throwing out excessive red flame. One of the Wright engineers instructed that six piston rings be replaced in the engine. The engine was accepted by the Army Supervisor on the day shift and the Company engineer's order destroyed by a Company

rejected as unusable. The stamped "S" at the bottom indicates that the Army Supervisor, named Selby, accepted them for use in engine regardless of the Company's decision.

Also attached are copies of some of the statements and material furnished by the Army inspectors. Also, there are two transcripts taken on the first visit to Cincinnati, one of which was somewhat garbled by the reporter.

Exhibit D is attached as an example of the thoroughness with which some of the inspection is done by the Company inspectors. You will note that the order is set up in the usual form except for the body of the description of the work to be done beginning with the fourth word.

Attached as Exhibit E is an instruction which was issued by the Wright Aeronautical Corporation on February 24, 1943. You will note that it is provided thereby that in the event a workman does not want his product inspected and the department inspector refuses to approve it the supervision of the Gear Inspection Department is authorized to do so. This would seemingly allow them to put out all the gears they wanted to without even company inspection.