TOFTOY STATEMENT TO SENATE INVESTIGATION COMMITTEE

Dev. of the Nike System

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Narrative Report of General H. N. Toftoy - Informal interview with Mr. Robert E. Dunne, Assistant Counsel of the Senate Permanent Investigating Sub-committee, in the presence of Mr. P. K. Schaeppi.

1. Mr. Dunne opened the interview by expressing an interest in the early development of the NIKE System and specifically asked who the other firm was that was under consideration along with Western Electric Company for the NIKE Project. General Toftoy then briefly outlined the steps leading to the development of the NIKE System, including that the original study contract amounting to $200,000 was placed with Western Electric Company in January 1945 and was jointly sponsored by the Army and Air Force. General Toftoy, to his knowledge, knew of no other firm that was seriously considered; Western Electric Company was picked because of their long and outstanding experience in fire control for anti-aircraft guns, and also because of their broad experience in radar work - both elements of which would be the heart of a new anti-aircraft guided missile system. It was indicated that Western Electric Company Management was not too enthusiastic about entering the guided missile field and did not wish to be considered a war industry. Nevertheless, the Army convinced Western Electric Company that they should assume this responsibility.

2. By June 1945, General Toftoy had been reassigned from Europe to OCO and made Chief of Rocket Development Branch, R&D Division, OCO, just in time to hear the Western Electric presentation on their study contract. The Air Force expressed no interest, so the Army then proceeded with a three-year contract with Western Electric in the amount of approximately $4.9 million for the research and development for the NIKE System.

3. It was pointed out that in the early days, few, if any, reputable, qualified firms were interested in undertaking a guided missile program - they had to be talked into it. As late as 1952, when General Toftoy asked industry to undertake the production of REDSTONE's, many present space-minded firms, including Ford, refused to consider it at that time.

4. The philosophy of the prime contractor being responsible for the "whole ball of wax" was explained in the light of pioneering guided missiles and called attention to the fact that there was no guided missile industry, no precedent, no knowledge of problems associated with the environment of supersonic flight.

5. It was indicated that in the early years funding for missile programs was entirely inadequate and the General was under the impression that industry often carried on certain phases of the work with their own funds when Government funds were inadequate.

6. As an example of early consideration for breakout, the story of the NIKE Booster was outlined; namely, original concept, a cluster of seven or eight solid propellant rockets because no larger ones were available at that time. By September 1946, the first NIKE's were launched - a cluster of four aerojet rockets which had been developed in the meantime was used. Since this cluster developed technical problems, Ordnance discovered a suitable Navy solid propellant rocket at Allegheny Ballistic Laboratory which would serve the purpose as a single unit. The Navy agreed to Army's use and this became the NIKE-AJAX Booster and later four of these units provided the boosters for the NIKE-HERCULES. This booster became GFE in the first procurement. This also illustrates the rapid technological progress made in the missile field in the early years.

7. In connection with subcontracting, General Toftoy stated that Western Electric came to him during the organizational period in 1945 and asked his advice as to whether to set-up their own aerodynamic and airframe group or to subcontract for the missile itself. Western Electric was told that they should be responsible for their own organization; in other words, it was Toftoy's philosophy to hold the prime contractor responsible for the management of their project and that Ordnance was not going to tell the contractor how to run his business - that Ordnance stood ready to assist in every way possible to make such decisions, technical and otherwise, as was necessary, and that Ordnance did not hold to the contractor getting in a position where the blame would come back through some incident where they could say you told us to do this. Nevertheless, since advice had been asked, Western Electric was told by Toftoy that if it were he, he would go out and hire the best experienced team available. This they did and selected Douglas.

8. It was emphasized that we were operating in a new field which required great technological progress, that the unknown at this time was bothersome and for this reason it was extremely important that the very closest supervision and coordination be made by every element of the system. I was one of the strongest advocates for keeping all elements of the integrated and "closed loop" system under the prime contractor, responsible both for research and development and for production. Several cases were cited where even the Project Engineers had made serious mistakes which appeared minor but caused the loss of many test missiles. Therefore, one of the policies insisted on, was a test flight of every change no matter how minor it appeared or how well it worked on a bench in a laboratory.

This of course, applies to the complex weapon systems such as NIKE, up through development and production until a system becomes fully stabilized. This point, however, was not reached in NIKE because in the course of development and early production, improvements were continually being made and then the NIKE-HERCULES became a replacement for NIKE-AJAX which, although it was larger and faster, more maneuverable, and carried greater fire power, still contained many parts in common with NIKE-AJAX. As a matter of fact, some of the sites contained both HERCULES and AJAX Missiles fielded with the same ground equipment.

9. The above was pointed out as a step in the development of the "Family of Missiles," and a great savings resulted to the Government therefrom. Billions of dollars more would have been spent if some other contractor had developed a HERCULES which was not compatible with AJAX. Further, the NIKE-ZEUS is a continuation of this same "growth factor" inherent in the original NIKE concept and which again was based on experience and technologies developed in the NIKE Program.

10. An example of a fairly early breakout on a less complex system was the HONEST JOHN, the larger solid propellant free rocket. After initial production for the developer, Douglas, a second source was established, Emerson Electric Company.

11. Dunne asked General Toftoy about the 1957 plan on breakout of launching and handling equipment. He was informed that General Toftoy felt that the time had come when this might well be done, that engineering changes on the missile had been reduced to the point where launchers were quite stabilized, and in his opinion, could be removed from the "closed loop" concept. At this point, Mr. Dunne exclaimed that this statement was worth the price of the trip! The conversation continued with the question asked why Ordnance did not contract directly with Consolidated Western instead of going through Douglas which appeared a half-way measure. Mr. Schaeppi answered this by stating that Consolidated Western had no engineering staff or services which could incorporate technical or engineering changes to the design. Therefore, it was necessary to retain the Douglas engineering supervision for this job. Mr. Dunne then asked why Douglas' engineering effort could not be procured as a separate service.

12. Mr. Dunne asked what part the Germans played in the NIKE Program. The answer was none at all other than the fact that they had established the usefulness of missiles in warfare. He was also interested in knowing a little more about the history of the Paper Clip Project which was outlined briefly.

13. Mr. Dunne was also informed that the entire atmosphere in the pioneering days was one of difficult technical problems, tremendous progress, and a burning devotion to one's work to the point of personnel undergoing extreme hardships, such as living under primitive desert conditions - a great esprit de corps and a sense of cooperation between those involved in Ordnance-Science-Industry ensued. It was often a "give and take" proposition and resulted in consideration for each other's wishes which would not normally be the case in more routine research and development and procurement activities. So when Douglas expressed objection to providing services of the type suggested, Ordnance did not force them to, but Ordnance did negotiate a lower fee.