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September 11, 1950

FINAL DETERMINATION**DECLASSIFICATION CONFIRMED**

To: C. C. Gamertsfelder

From: F. E. Adley

BY JP DeLoach DATE 5-5-81BY JL Jordan DATE 5-6-81OUTLINE OF PROGRAM FOR TESTING AIR-SUPPLIED
FACE MASKS USED IN P-10 ATMOSPHERES

In accordance with your request I am submitting an outline for a program for testing the air-supplied face masks currently being used as protection against P-10 atmospheres. The test procedures which follow are intended to determine circumstances under which the mask ceases to offer protection to the wearer. To keep the scope of the test program to a minimum and also to facilitate interpretation of the findings in the light of P-10 atmospheres, the test conditions chosen were those which would be most unfavorable for the mask from a protection standpoint.

Test I

The greatest possibility for the protection of a face mask breaking down, assuming a satisfactory face seal, is to have insufficient fresh air supplied into the mask, which, under the proper conditions will permit contaminated atmospheres to leak into the mask. Test I is intended to investigate this factor.

The testing arrangement is to mount a face mask on a model head which is then placed in a small chamber containing an atmosphere of He, CO, one of the halogens or some other suitable gas which can be handled safely and detected with relatively good sensitivity. The contaminated atmosphere should be controlled and maintained at a constant concentration.

During the test, air will be sampled continuously from inside the mask. The quantity of air removed for sampling purposes will be supplemented by the removal of additional air to make the total removed simulate that withdrawn by a wearer at maximum inspiratory flow rate. The fresh air introduced into the mask will be slightly in excess of that recommended by the manufacturer and will be reduced gradually until it is determined at what flow contamination first appears inside the mask. The fresh air supply will then be reduced further, to obtain a curve of air supply rate vs contaminant concentration.

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Two runs should be made under Test I. The first should be made with a tight fit between the mask and the face and a second with a relatively loose fit to determine the importance of this factor.

Test II

Another potential mode of entry of contamination entering the mask is through the exhalation valve. With the mask mounted in a contaminated atmosphere similar to that in Test I, air will be supplied to the mask at rates producing various rates of flow out of the exhalation valve. Sampling of mask air will be carried out continuously during the test.

Test III

With data from Tests I and II as a guide, the model head and mask should be placed in an atmosphere containing P-10 contamination, possibly in a production area, and similar tests conducted to determine the breakdown of the mask under various conditions of the rate of fresh air supply and if necessary, the face fit.

Prior to the P-10 tests, air should be sampled from the manifold lines which conduct fresh air to the masks to ensure that uncontaminated air is being used.

Measurements should also be made to determine the normal rate of flow of fresh air into each of the masks currently used in the P-10 production zone.

Frank E. Adley

Group Head, Industrial Hygiene
H.I. Development Division

FE Adley:bls

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