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PHOTOGRAPHIC INTELLIGENCE MEMORANDUM

25X1A [redacted]

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25X1A [redacted]

This memorandum reports the completion of Division participation

25X1A in Project 70.219 [redacted] undertaken in response to a request

25X1A from [redacted] of SR/10/DD/P. The project was concerned with spectrographic analysis of smoke in an attempt to determine the types of industrial processes involved in industrial plants.

Two methods of investigation were considered. The first of these would consist of an attempt to produce a "key" to smokes using color photography. This key would permit the identification of industrial activities through comparative spectrographic analysis. The second possible solution lay in the modification of spectrographic analysis techniques to suit the limited space practical for covert collection.

Conversations with personnel of TSS/AFD indicate that there has been considerable work done by various sources in the field of colored photographic keys. None of these efforts to date have had any marked success due to the widely varying color renditions of color emulsions under differing light conditions. The second of the possible solutions to the problem seemed to offer the most hope for successful technique. It was proposed that a device be constructed that would approximate a conventional camera in size and configuration. Such a device would include two optical trains utilizing a lens and prism arrangement with shutters. One train would record, on a spectrographic emulsion,

the spectro display of the ambient light (skylight); the second optical train would record the spectrographic signature of the unidentified smoke. A comparative study of the two spectrographic films would then identify the chemical gains or losses in the smoke.

Consultation between personnel of this office and spectrographic specialists in the Bureau of Standards indicated that any attempt at a spectrographic solution to the requirements would need such massive equipment as to negate its clandestine use. The proposal as indicated above would not have inherent in it sufficient intensity of light to permit a sharply defined spectrographic image.

The use of color film in conjunction with a color "key" to industrial smokes is the only approach that still offers hope of success. The problems to such an approach are many. The variations in color rendition between different color emulsions, the varying response of color films to differing light temperatures, and the relatively narrow spectral band that will yield data, all present serious problems in the development of a suitable technique.

25X1A [redacted] TSS/APD, has been briefed on the results of the investigations undertaken by this office and has provided advice on methods of investigation. TSS/APD now is ready to continue research on the problem, through means of an external research project, if the requester so desires. The Division plans no further effort on the problem and considers the project closed.

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