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EG&G
Energy Measurements Group

SUMMARY REPORT

AERIAL RADIOLOGICAL SURVEY

NIAGARA FALLS AREA

NIAGARA FALLS, NEW YORK

DATE OF SURVEY: SEPTEMBER 1979

APPROVED FOR DISTRIBUTION:

T. P. Stuart, EG&G, Inc.

Herbert F. Hahn, Department of Energy

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WITH THE UNITED STATES DEPARTMENT OF ENERGY

The Aerial Measurements System (AMS), operated by EG&G, Inc. for the United States Department of Energy, was used during November 1978 to conduct an exploratory aerial radiological survey in the greater Niagara Falls area. The purpose of that survey was to identify locations having concentrations of terrestrial radioactivity not typical of the radiation background in the area. A Beechcraft King Air A-100 aircraft was flown at an altitude of 500 feet and speed of 250 feet per second (170 miles per hour) along parallel flight lines spaced 0.25 miles apart. The results of that survey revealed 14 locations requiring additional measurements in order to define the extent and magnitude of the radiation anomalies.

A follow-up survey was conducted during September 1979 using the more sensitive capability provided by the AMS helicopter system. This system was flown at an altitude of 300 feet and speed of 100 feet per second (70 miles per hour) along closely spaced flight lines (approximately 300 feet apart). The areas surveyed with the helicopter system are outlined in Figure 1. Each area contains one or more locations identified by the earlier survey as having atypical concentrations of naturally occurring radioactive materials.

The results of the helicopter survey are presented in Figures 2 and 3 as radiation distributions in each area surveyed. The results of the

measurements taken over Grand Island and the industrial area along the Niagara River are not presented in the figures. The inferred exposure rates from the Grand Island measurements were all typical of natural background in the area. The maximum exposure rates inferred from the data taken over the industrial area along the Niagara River were 11-12 microroentgens per hour.[1]

In all but one of the areas with elevated radiation levels shown in Figures 2 and 3, bismuth-214, a daughter of radium-226, was identified as the major contributor to the higher exposure rates. In one area, along Pine Avenue in the vicinity of Niagara Falls International Airport, thallium-208 and actinium-228, daughters of thorium-232, were identified as the major contributors to the elevated exposure rates. This one area is identified in Figure 2.

The airborne detection system measures the average radiation level over an area of several acres. Localized sources, therefore, will yield individual ground based readings which exceed this average. This averaging effect also produces concentric contour lines surrounding localized sources of radiation. For example, the radiation pattern over the thorium-232 source might be caused by this effect rather than being due to an actual distribution of source material. Ground measurements are required at the locations identified by the aerial survey in order to determine the absolute exposure rates and to identify the source of the radioactive material.

1. Results of detailed ground-based radiological surveys in this area have been reported previously (DOE/EV-0005/2, January 1977).

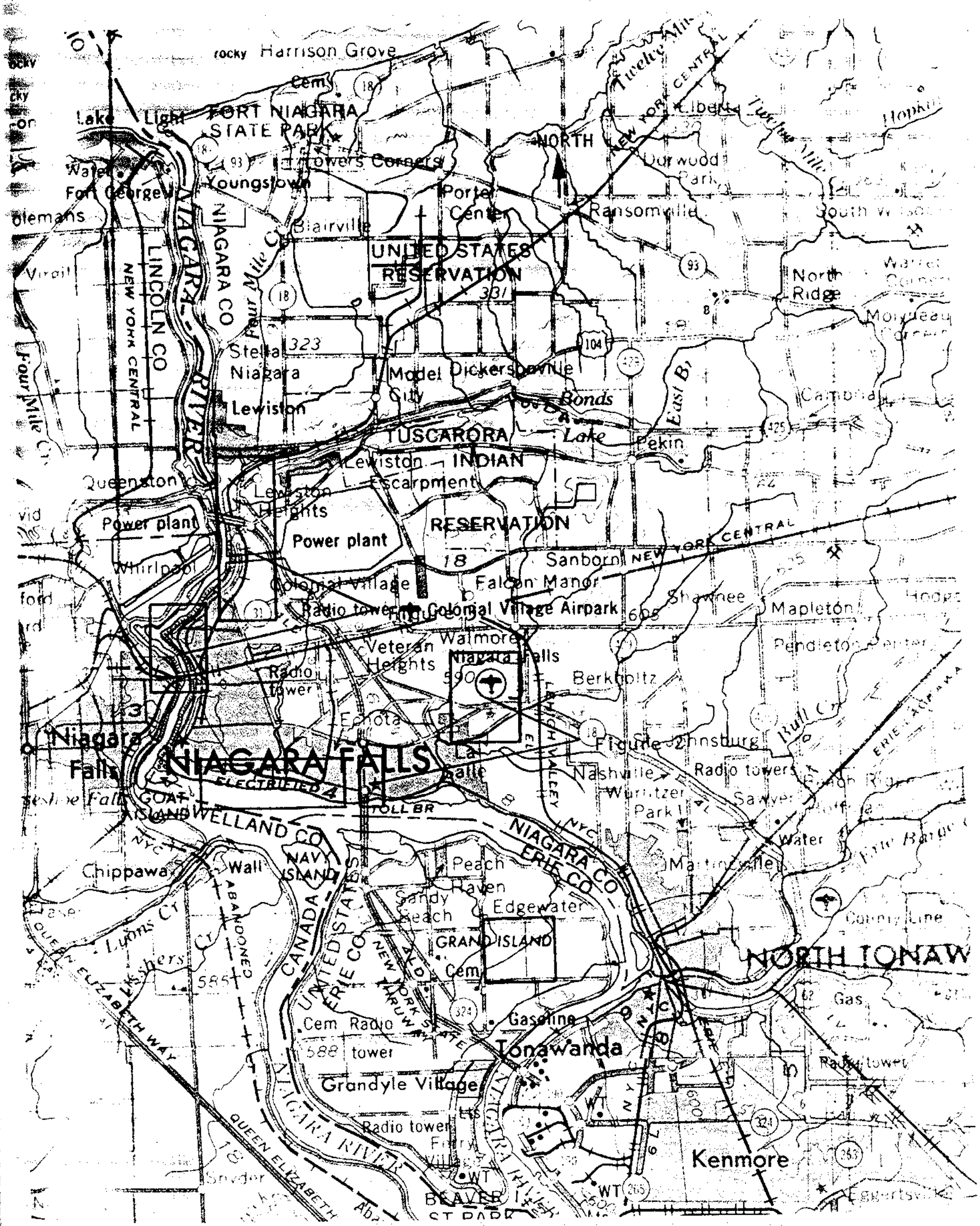
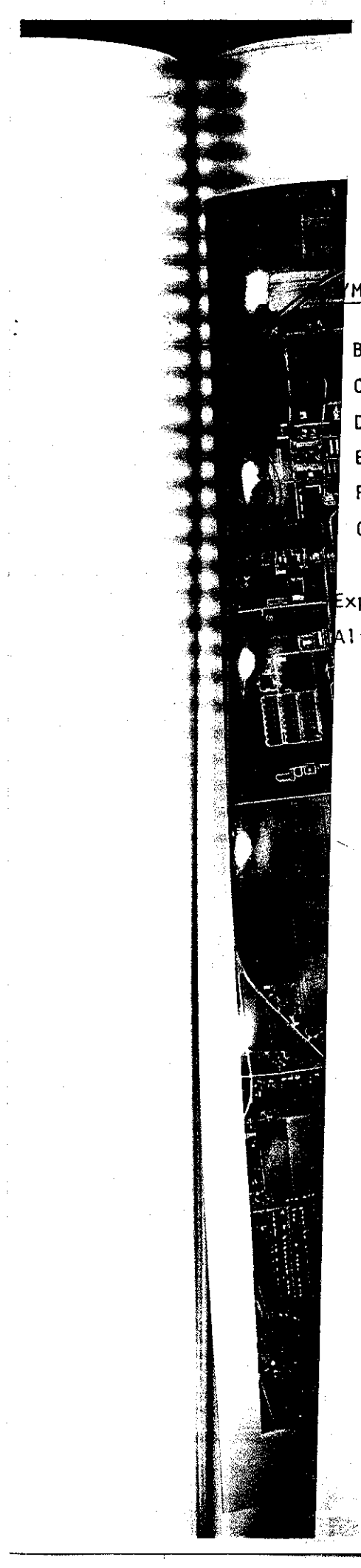


Figure 1: Areas surveyed with the H500 Helicopter



SYMBOL	EXPOSURE RATE (microR/hr)
B	10.0 - 11.0
C	11.0 - 12.0
D	12.0 - 15.0
E	15.0 - 20.0
F	20.0 - 30.0
G	30.0 - 50.0

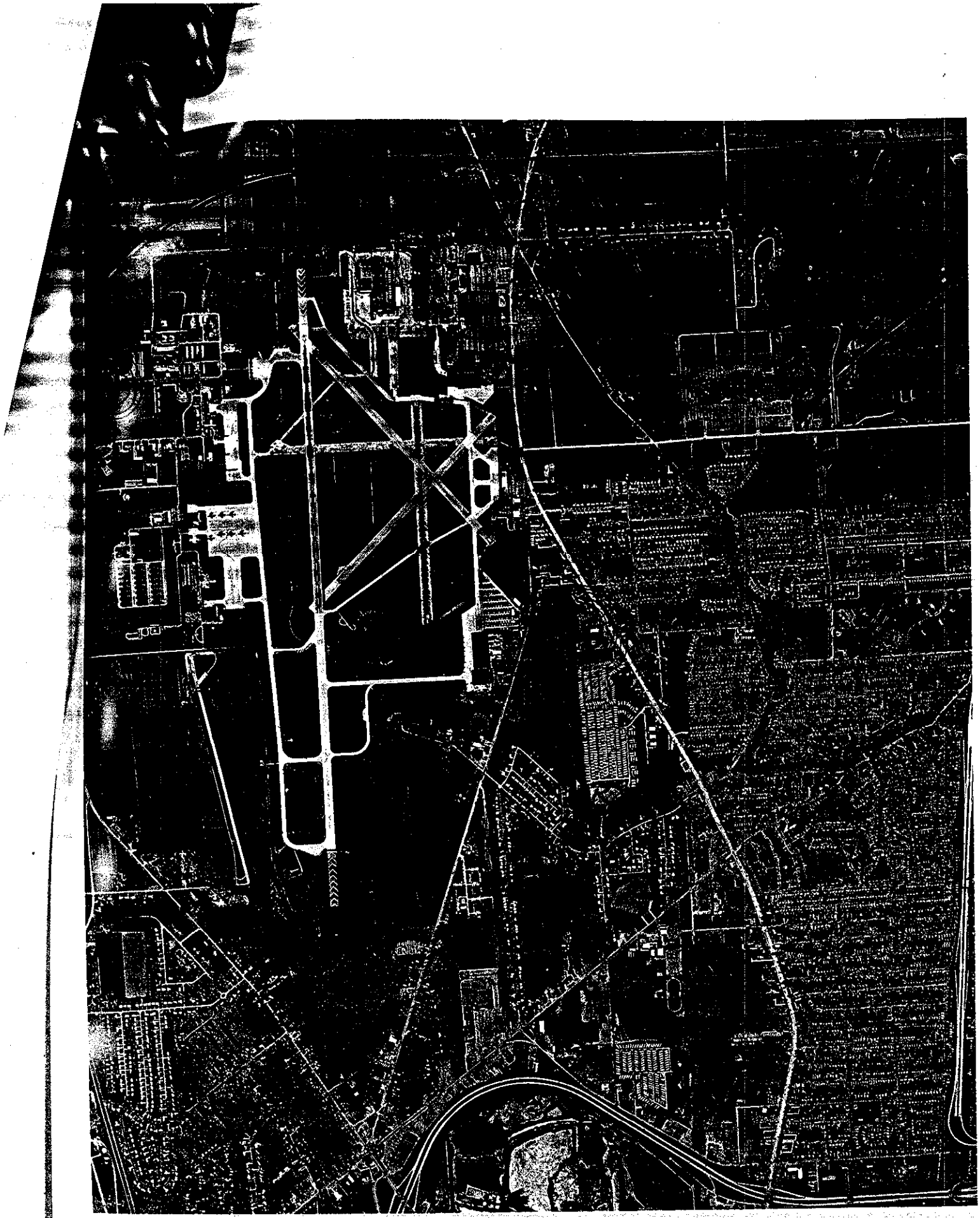
Exposure rates typical of background in the area = 8-10 microR/hr

Altitude = 300 feet

NORTH

TH-232

Figure 2: Area Near Niagara Falls International Airport



NORTH

SYMBOL	EXPOSURE RATE (microR/hr)
B	9.0 - 10.0
C	10.0 - 11.0
D	11.0 - 12.0
E	12.0 - 14.0
F	14.0 - 17.0
G	17.0 - 25.0

Exposure rates typical of background in the area = 7-10 microR/hr

Altitude = 300 feet

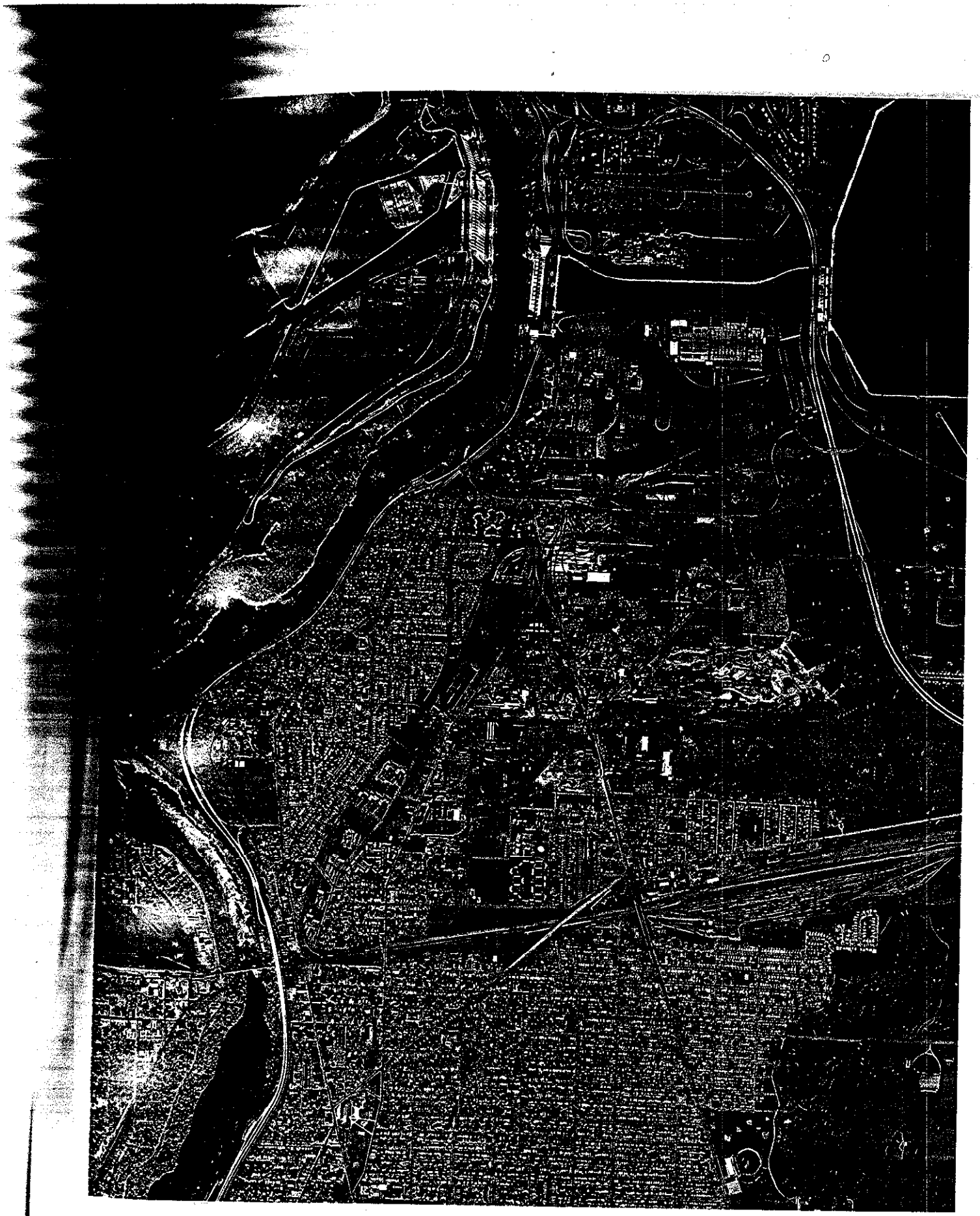
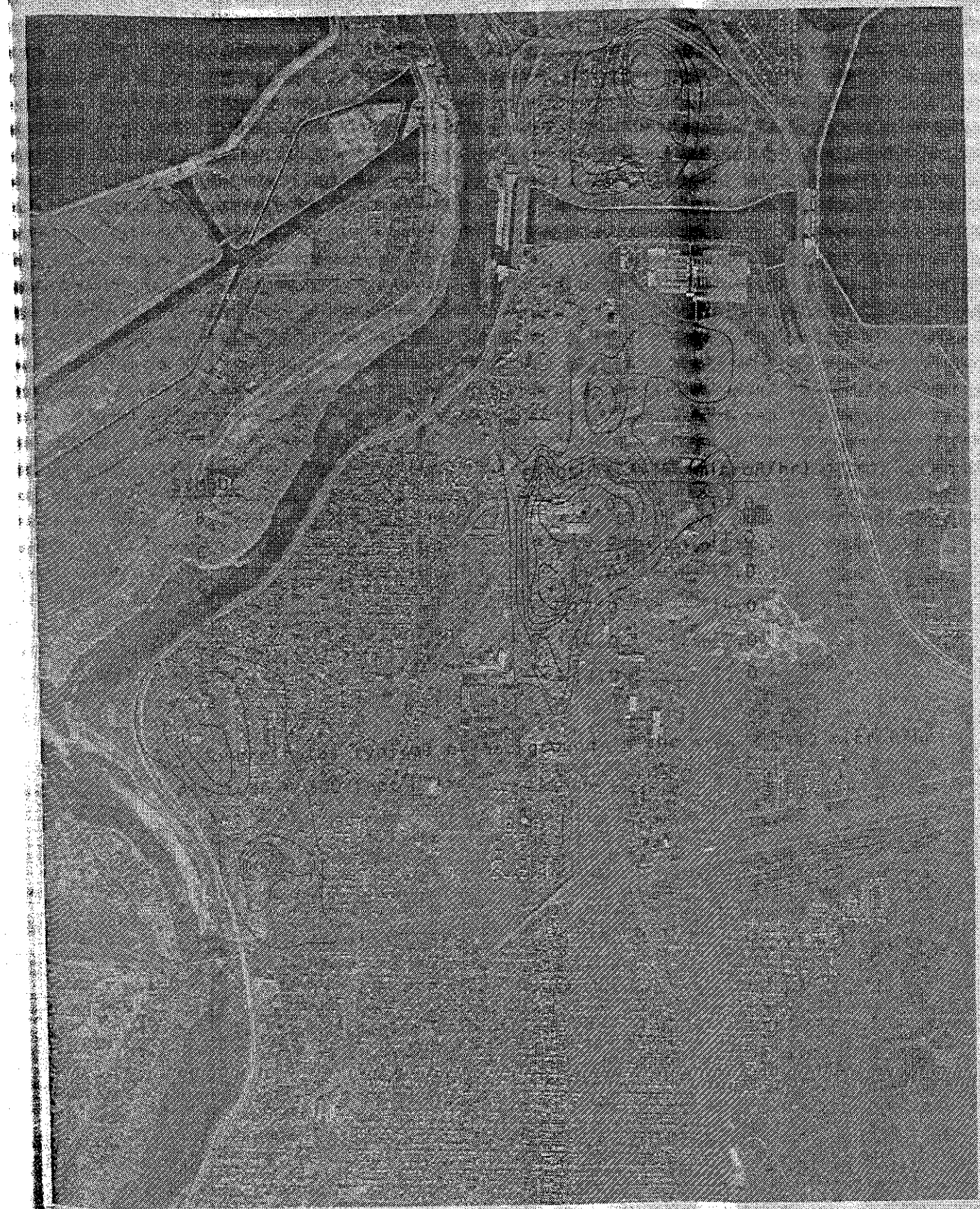



Figure 3: Area near power plant reservoir