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ADVECTION OF RADIOACTIVE DUST OVER NORWAY AFTER THE WINDSCALE
ACCIDENT IN ENGLAND OCTOBER 1957

U. D. K.

by

Per B Storebö

vk
✓ anal.

FORSVARETS FORSKNINGSINSTITUTT
Norwegian Defence Research Establishment
Postbox 1084 Oslo
Norway

ADVECTION OF RADIOACTIVE DUST OVER NORWAY AFTER THE WINDSCALE
ACCIDENT IN ENGLAND OCTOBER 1957

In the first part of October 1957 a reactor at Windscale caught fire and radioactive matter escaped. Airborne radioactivity increased in Norway between October 15 and 20, and the weather situation between October 10 and 20 was examined in order to see if the increased radioactivity could be due to the Windscale accident.

The official report on the accident indicates that radioactive material might have escaped between 0540 GMT October 10 and 1200 GMT October 11, most material probably escaping between 1200 GMT October 10 and 1000 GMT October 11.

On the attached map an attempt has been made to sketch air trajectories from Windscale during the critical period. Weather conditions were comparatively stable, and most radioactive material was probably confined to the lower air layers at first. Ground level weather maps (analysed at the Norwegian Meteorological Institute, Oslo) have therefore been used for computation.

Five specific starting times at Windscale have been chosen: October 10 at 1200 and 1800 GMT and October 11 at 0000, 0600 and 1200 GMT. The main feature of the weather situation was a centre of high pressure moving from the west over Southern England and spreading out over Central Europe.

The contaminated air seems to be caught by the high. Air passing Windscale during the morning of October 10 flowed fairly far eastward before being caught by the high after three days, while air passing in the evening was stopped over Germany after two days. All air passing Windscale October 11 seems to have been caught at once.

An attempt has been made to follow the air passing Windscale at 0600 and 1200 GMT on October 11 up till October 17. Small changes in the high produced twisting paths over Southern England and the North sea, indicating mixing of radioactivity within most of the

area covered by the high. During this period fission products from the accident seem to have been measured at many places in Northern Europe.

A centre of low pressure moving towards the British Isles from the west, initiated a SW-ly wind field over England and the North Sea during the evening of October 14. This wind field grew successively all over the Scandinavian Peninsula and forced the lower air layers in the former high to move NNE. Radioactivity should then have reached Southern Norway on October 15 and 16 and Northern Norway on October 16 and 17.

The highest 24-hour or 48-hour measurements in Norway were made at following times:

At Sola, Kjeller and Finse between 0900 GMT October 15 and 0900 GMT October 16, Bergen between 0900 GMT October 15 and 0900 GMT October 17, Gardermoen between 0900 GMT October 16 and 0900 GMT October 17, and Værnes and Tromsø between 0900 GMT October 17 and 0900 GMT October 18.

These measurements agree with the calculated trajectory.

The activity levels measured decreased in the following sequence: Sola, Bergen, Værnes, Gardermoen, Kjeller, Finse, Tromsø. On request the air filters were sent to Harwell for analysis.

Radioactive isotopes thought to be due to the Windscale accident were found in filters from Sola and Gardermoen. Filters from Bergen and Kjeller were not analyzed and measurements of the other filters were inconclusive.

The measurements seem to indicate that the radioactive material was mainly restricted to the lower air-layers (height of the Finse-station is 1250 m) and reached Norway at the southern part of the west coast and spread out northwards.

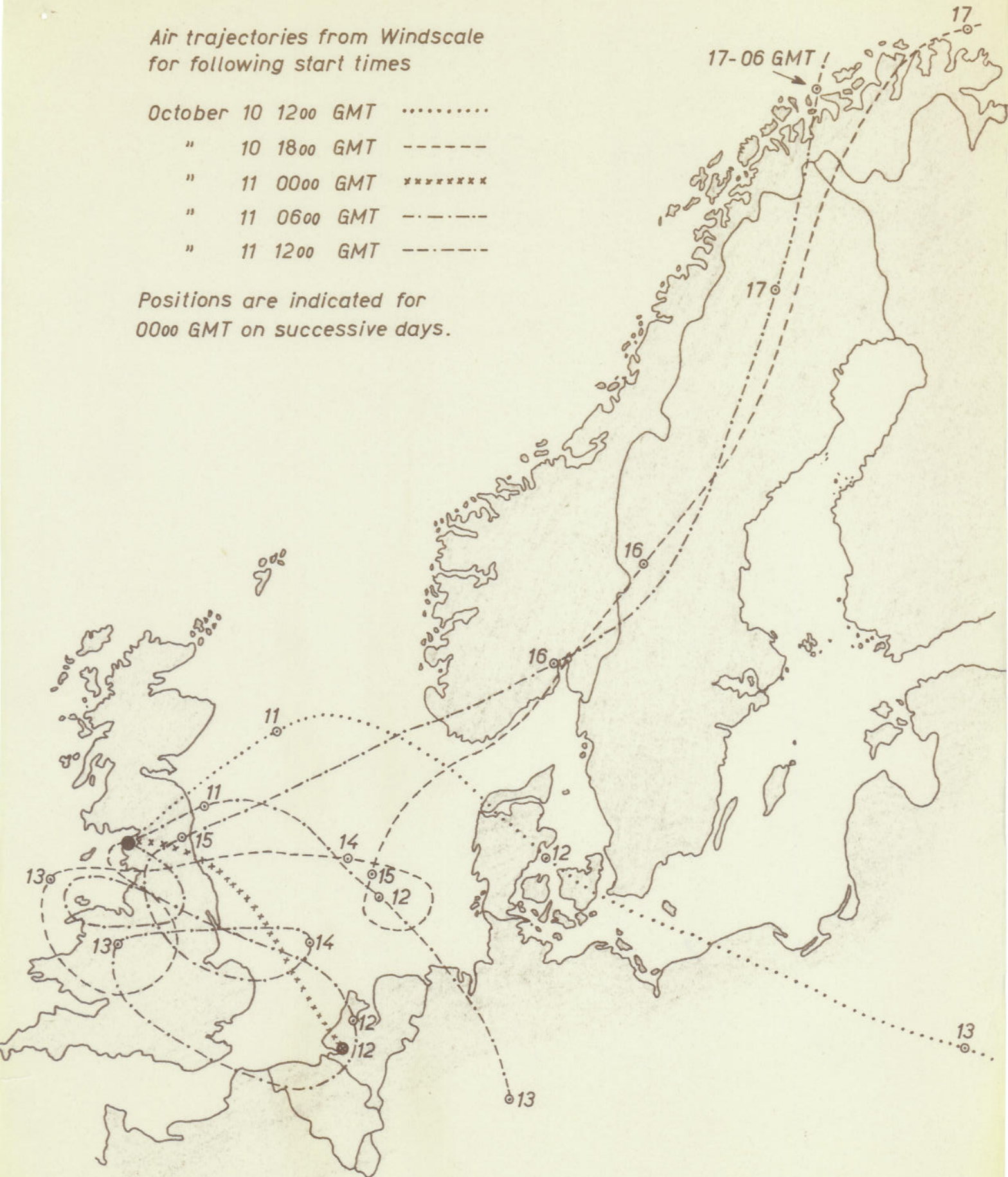
The agreement between calculated and measured times of arrival of radioactive material does not mean that no radioactive material entered higher air layers during the accident.

The wind field at 3000 meters was examined showing a fairly strong wind towards ENE. Any activity ascending into this current would rapidly be carried away, and might have been brought down again far away, where only thorough examination would reveal its origin.

Air trajectories from Windscale
for following start times

October 10	1200	GMT
"	10	1800	-----
"	11	0000	*****
"	11	0600	-.-.-.-
"	11	1200	-.-.-.-

Positions are indicated for
0000 GMT on successive days.



Scale 1: 10 000 000