

Thyroid Absorbed Dose Assessment for Rongelap and Utirik Residents

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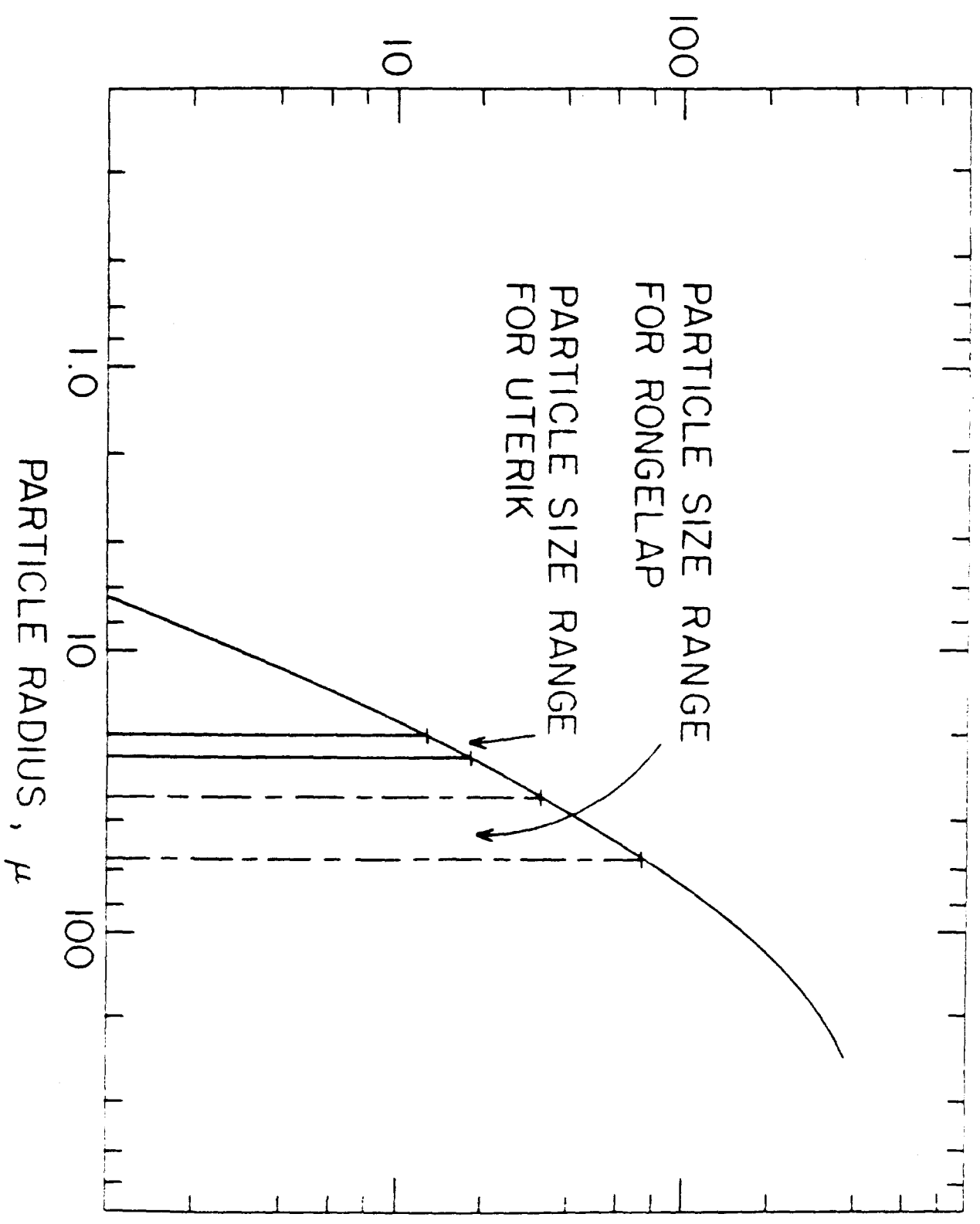
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Brookhaven National Laboratory
and Yale University

ABSTRACT

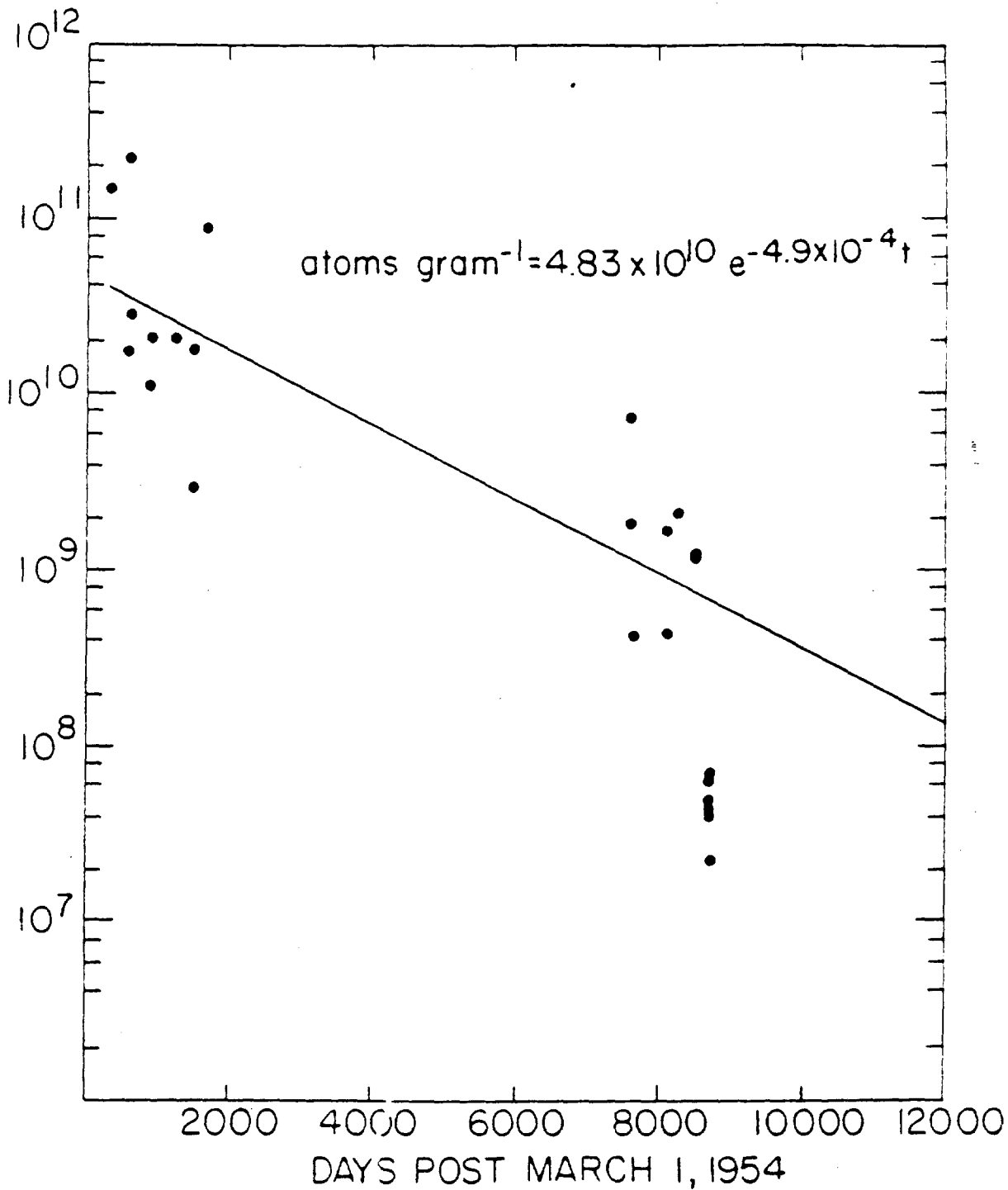
The internal thyroid absorbed dose from Castle Bravo fallout affecting Rongelap and Utirik Atolls, Marshall Islands, is reassessed using independent approaches encompassing 1) the single pooled urine radiochemical analysis of March 1954 and current uptake, retention and excretion models, 2) airborne concentrations and areal activities of the iodine isotopes derived from historic soil samples and, 3) airborne concentrations and areal activities of the iodine isotopes derived from weather data obtained during the thermonuclear test experiment at Bikini Atoll and current fallout deposition models. Factors such as solubility of iodine isotopes, the possible contribution from neutron induced activity, the impact of thyroid seekers other than iodine isotopes on dose, and confidence levels for values of derived quantities such as airborne activity concentrations are also considered. Additionally, these thyroid absorbed dose estimates are compared to the incidence of thyroid nodules reported for the accidentally exposed people.

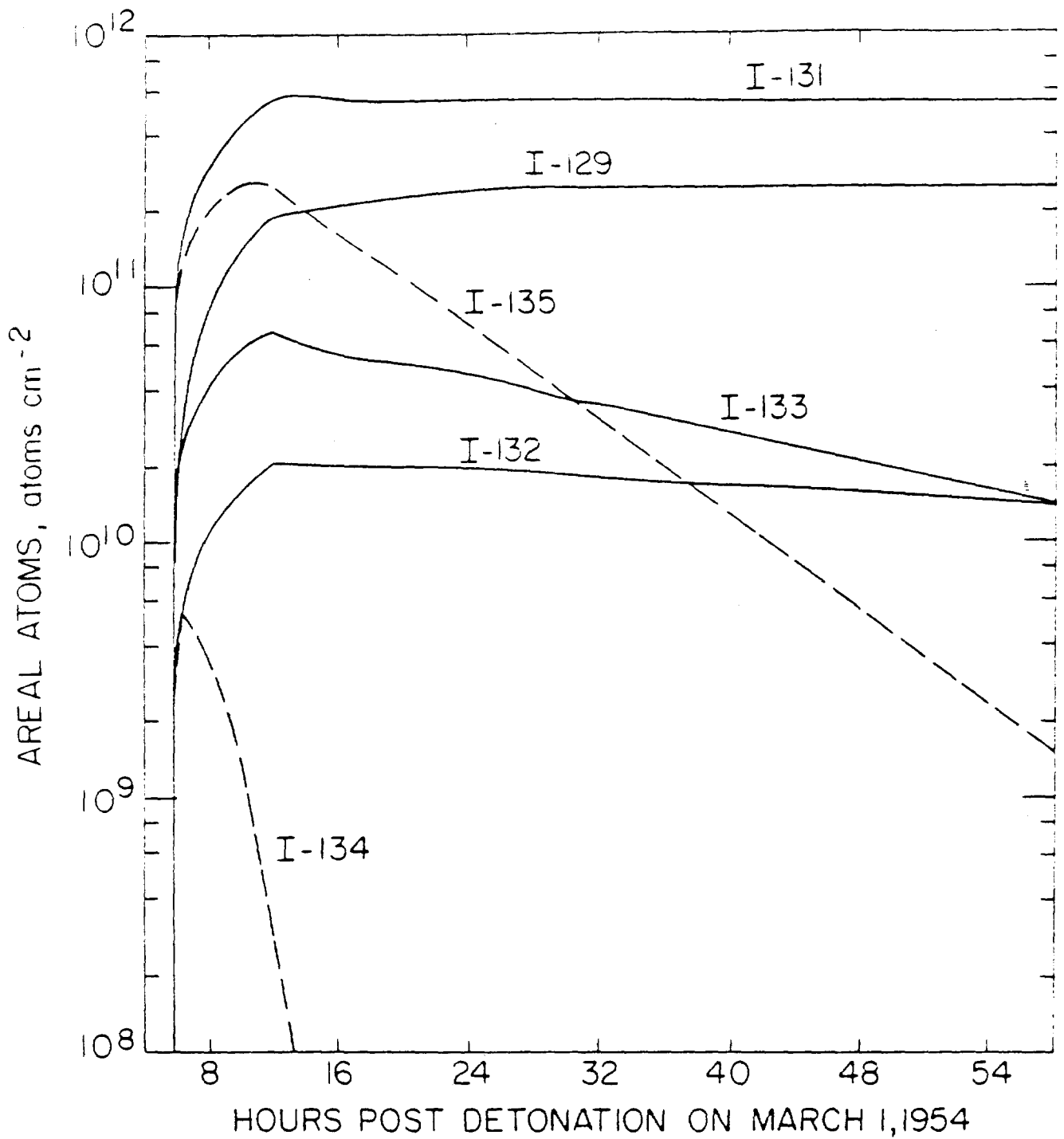
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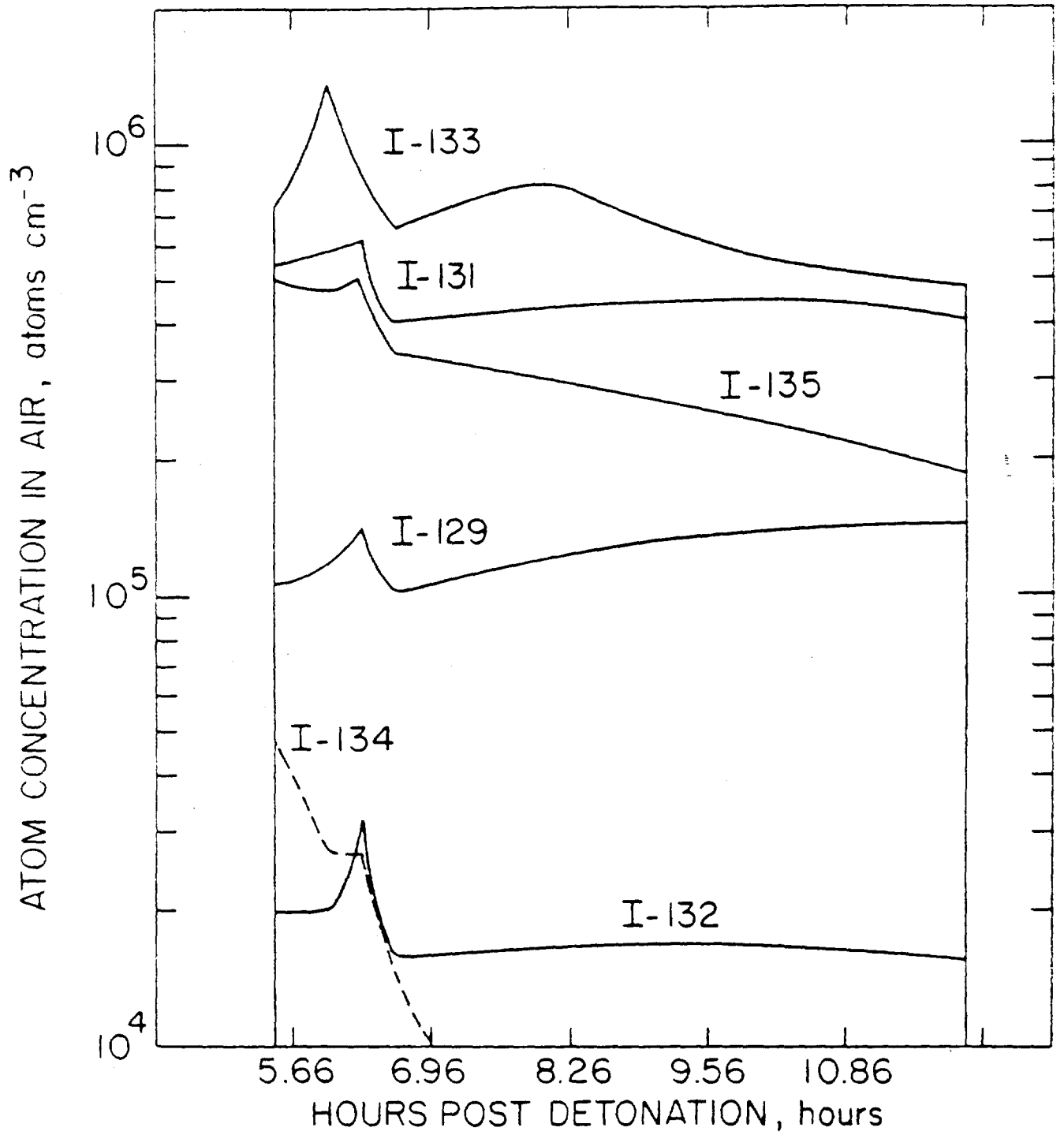
DEPOSITION VELOCITY, cm^{-1}

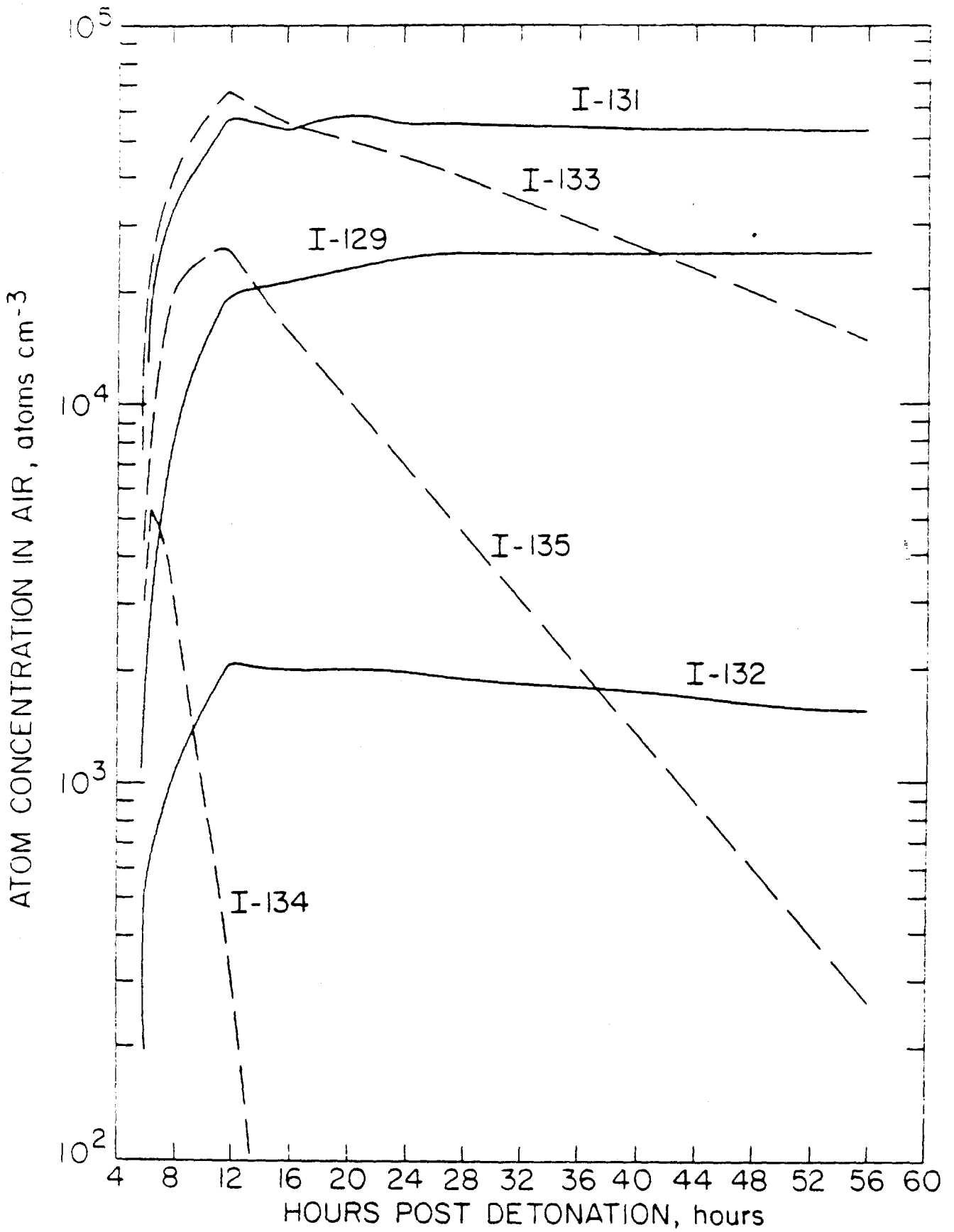


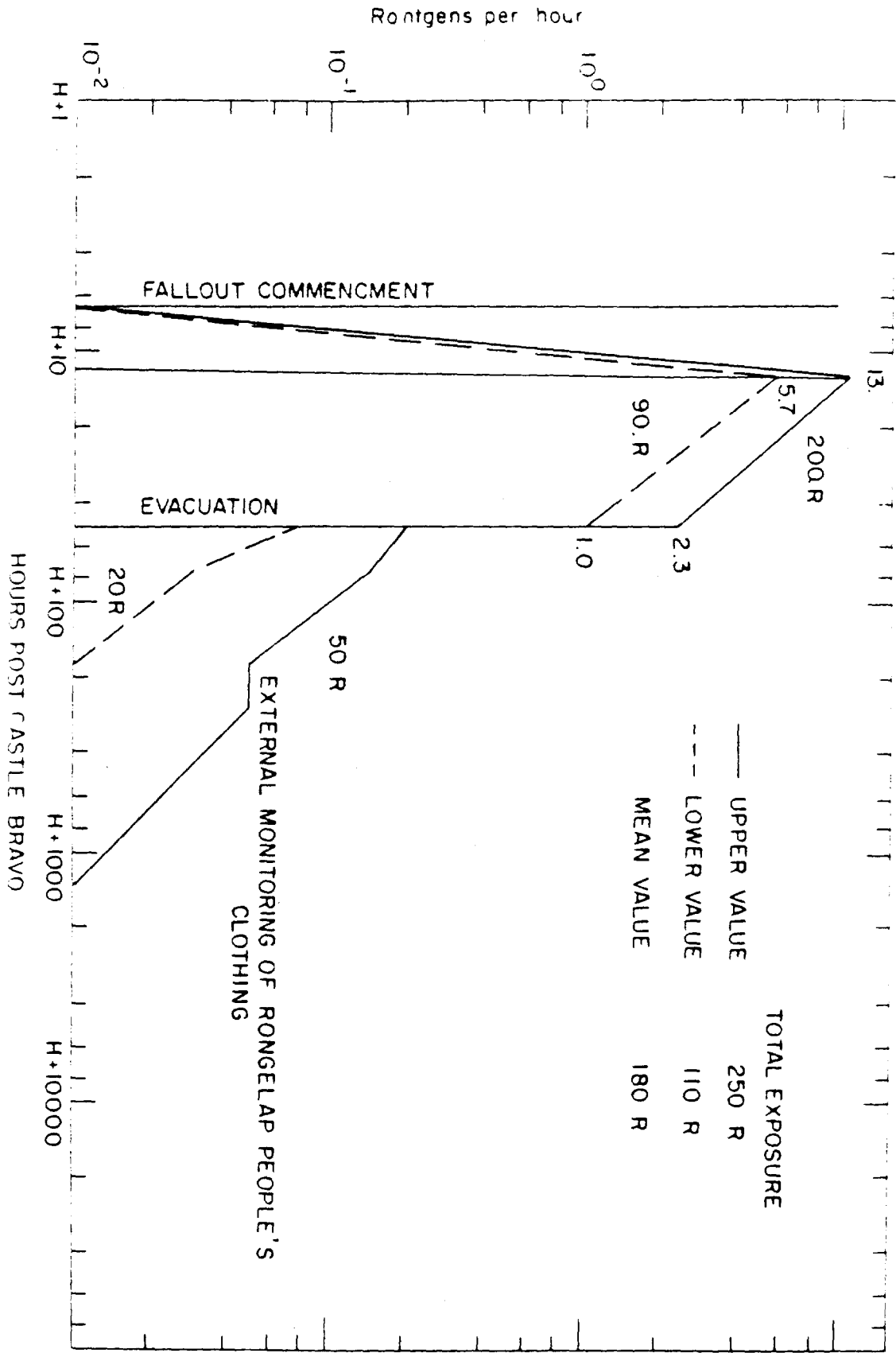
I-129 ATOMS PER GRAM OF SOIL

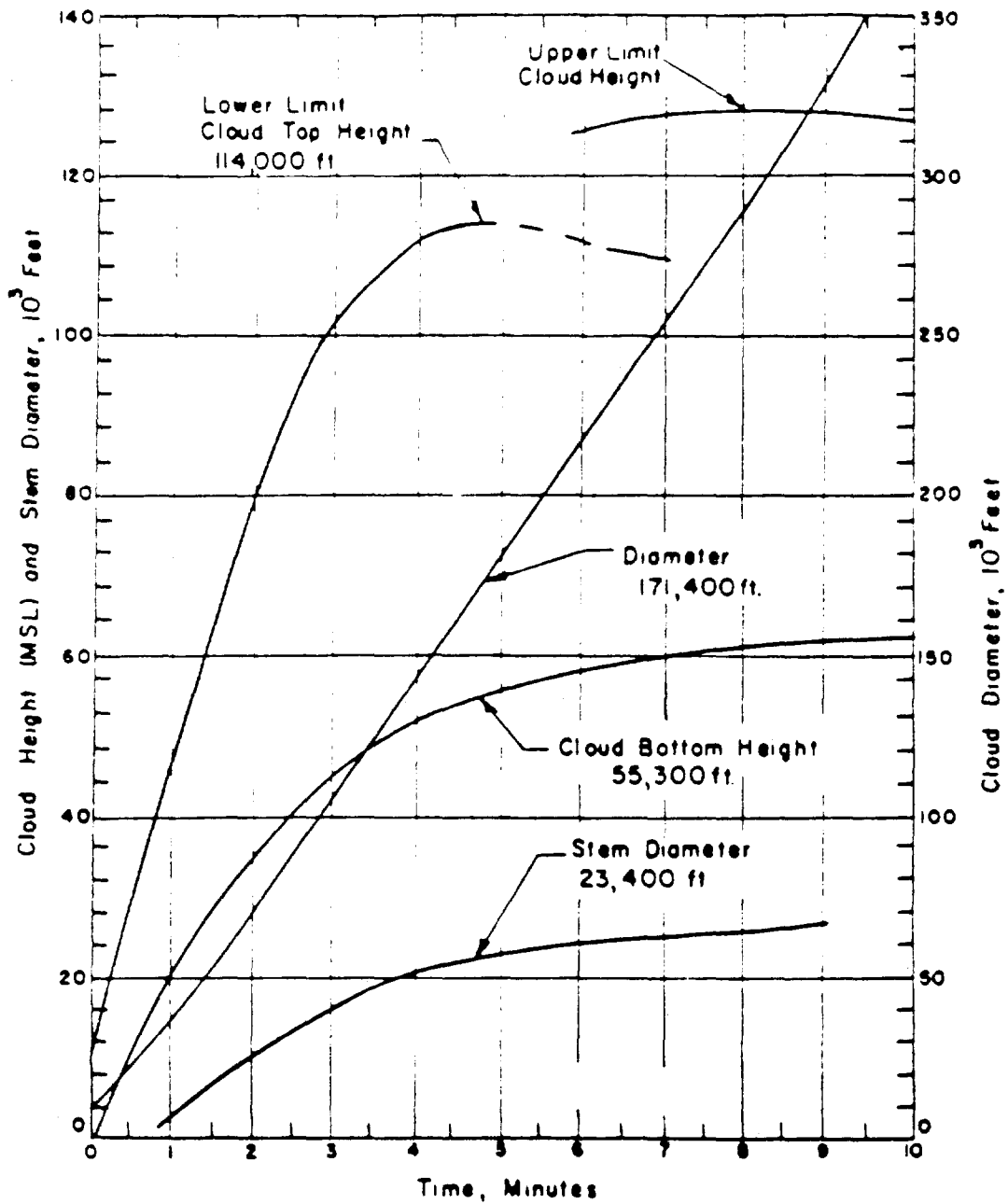




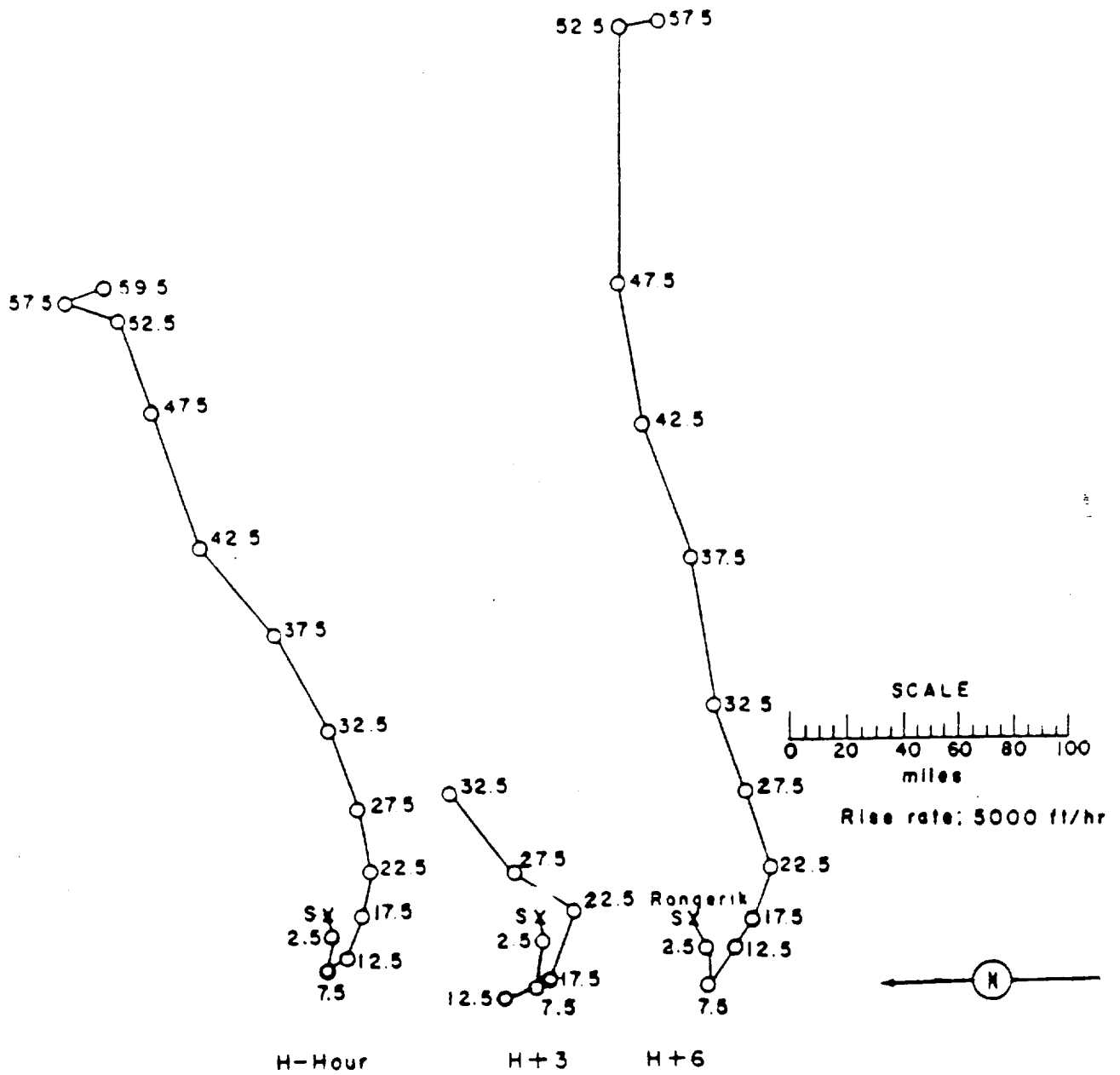




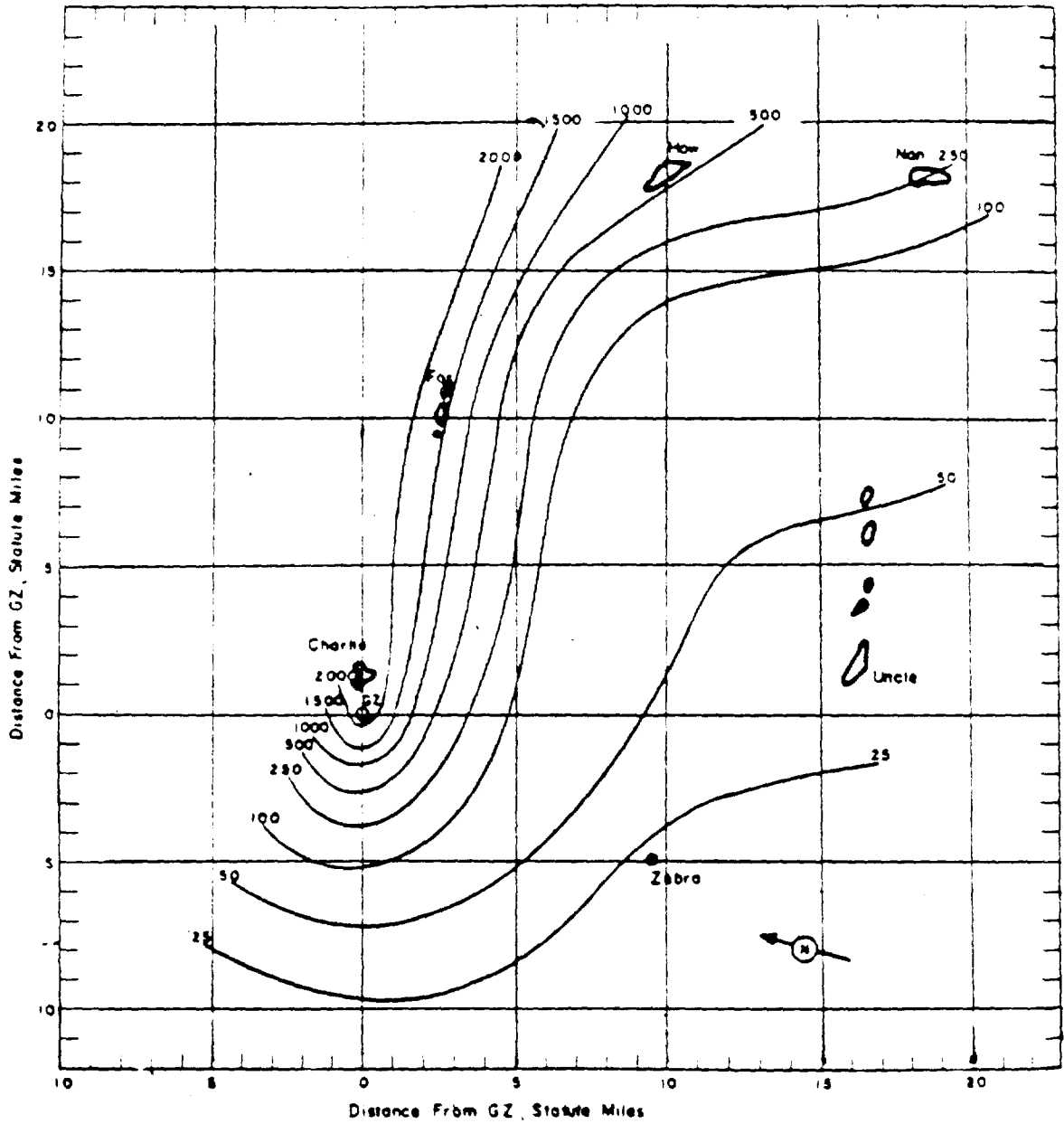




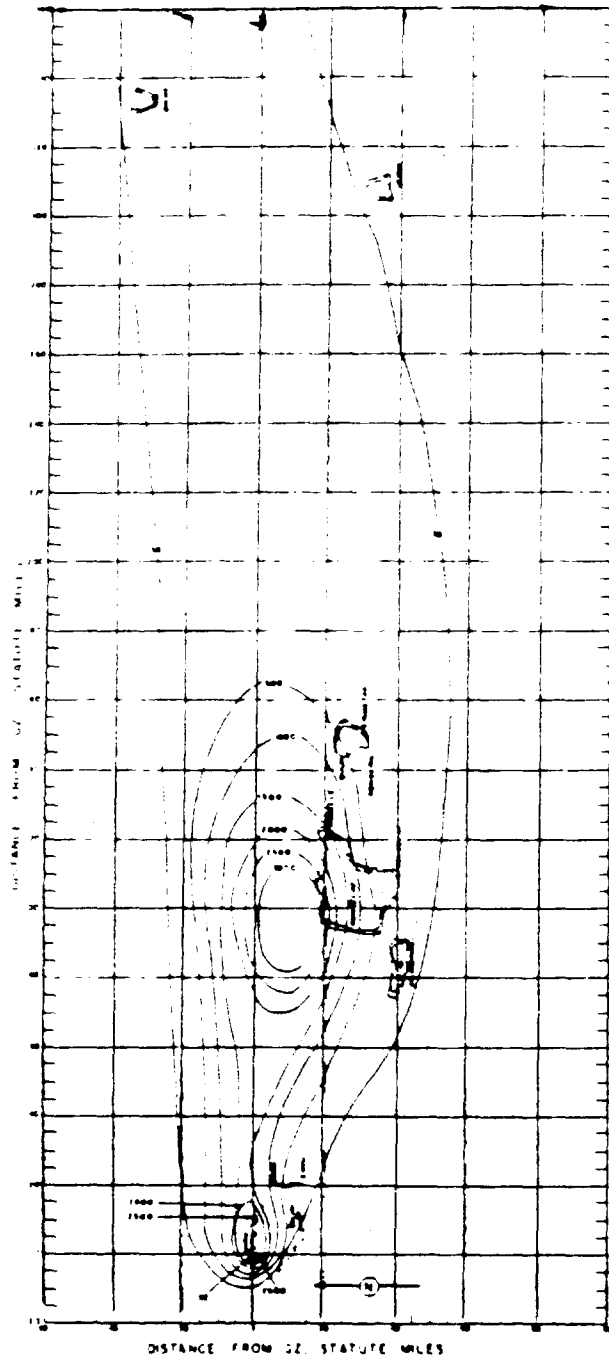
Cloud Dimensions: Operation CASTLE - Shot 1 - Bravo.



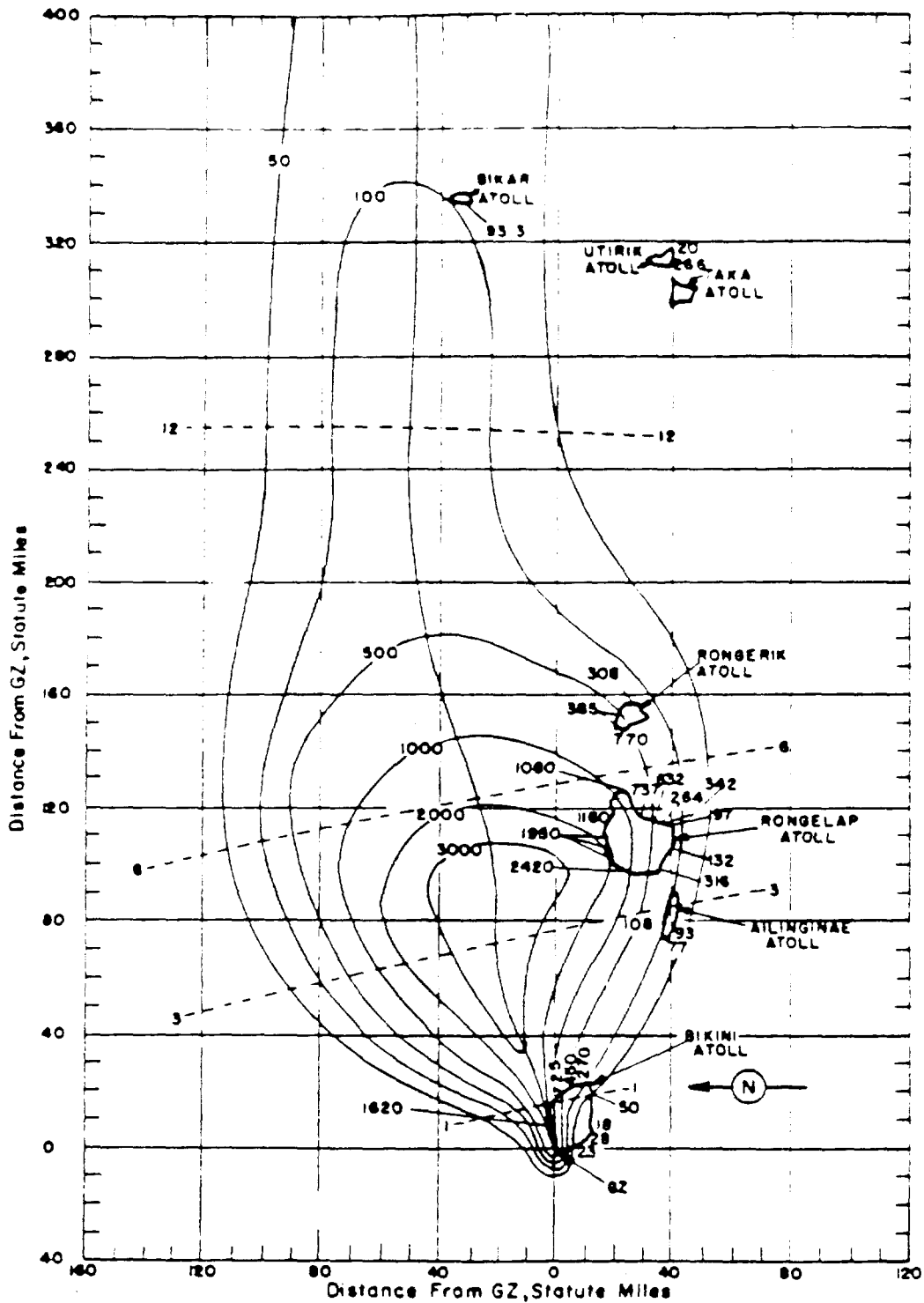
Hodographs for Operation CASTLE - Shot 1 - Bravo.



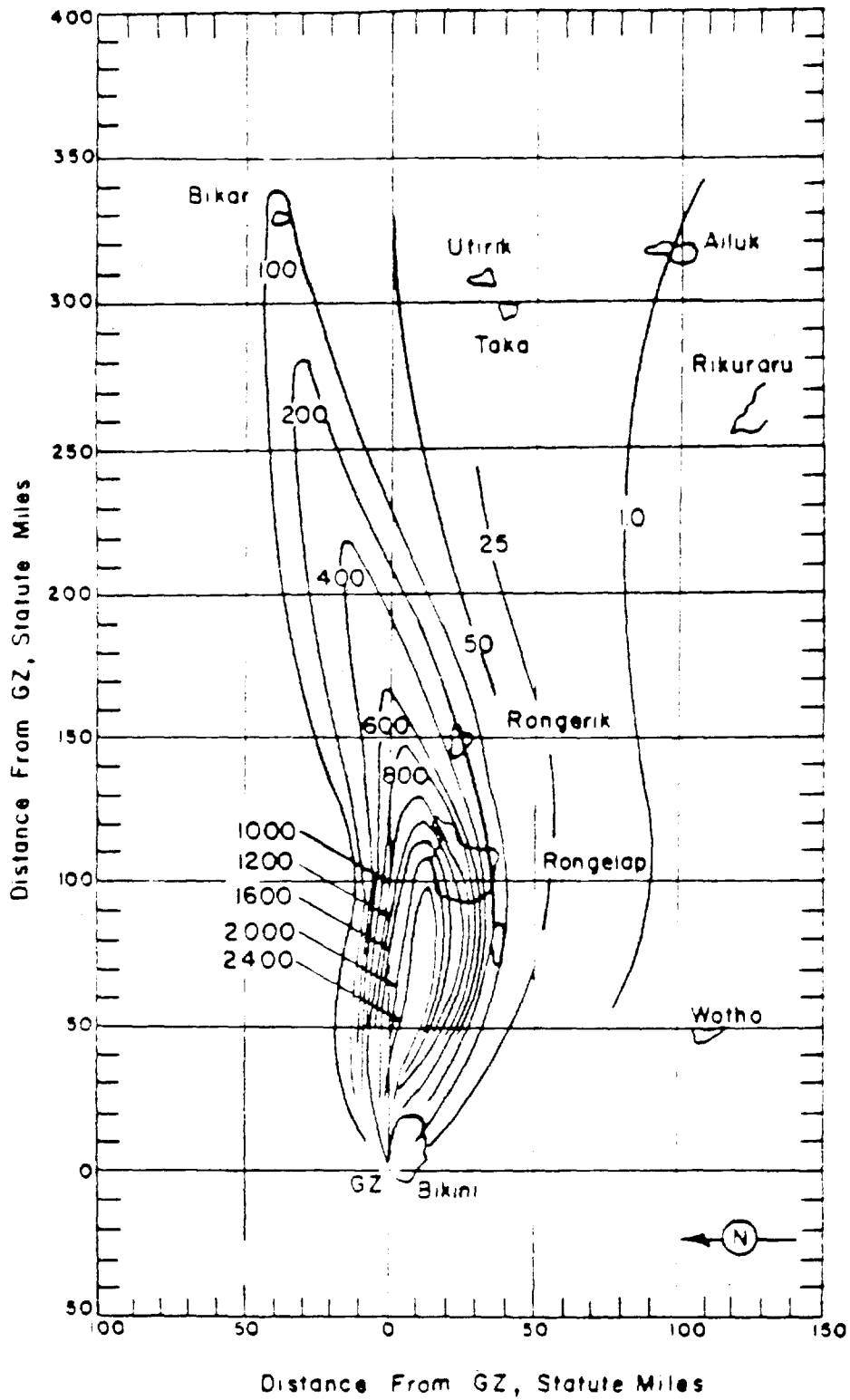
Operation CASTLE - Shot 1 - Bravo.
 On-site dose rate contours in r/h² at H+1 hour.



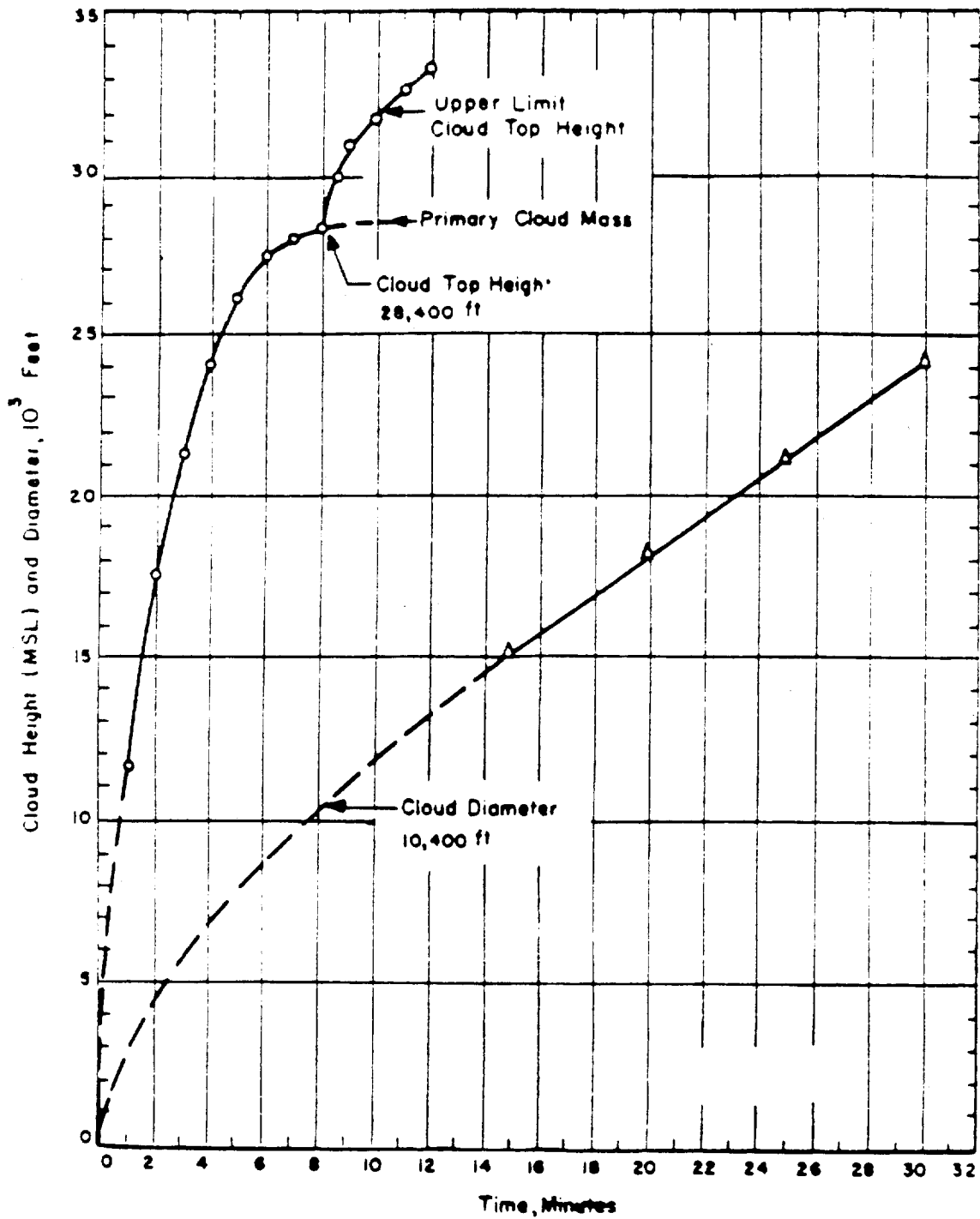
Operation CASTLE - Shot 1 - Bravo.
Off-site dose rate contours in r/hr at H+1 hour (RAND).



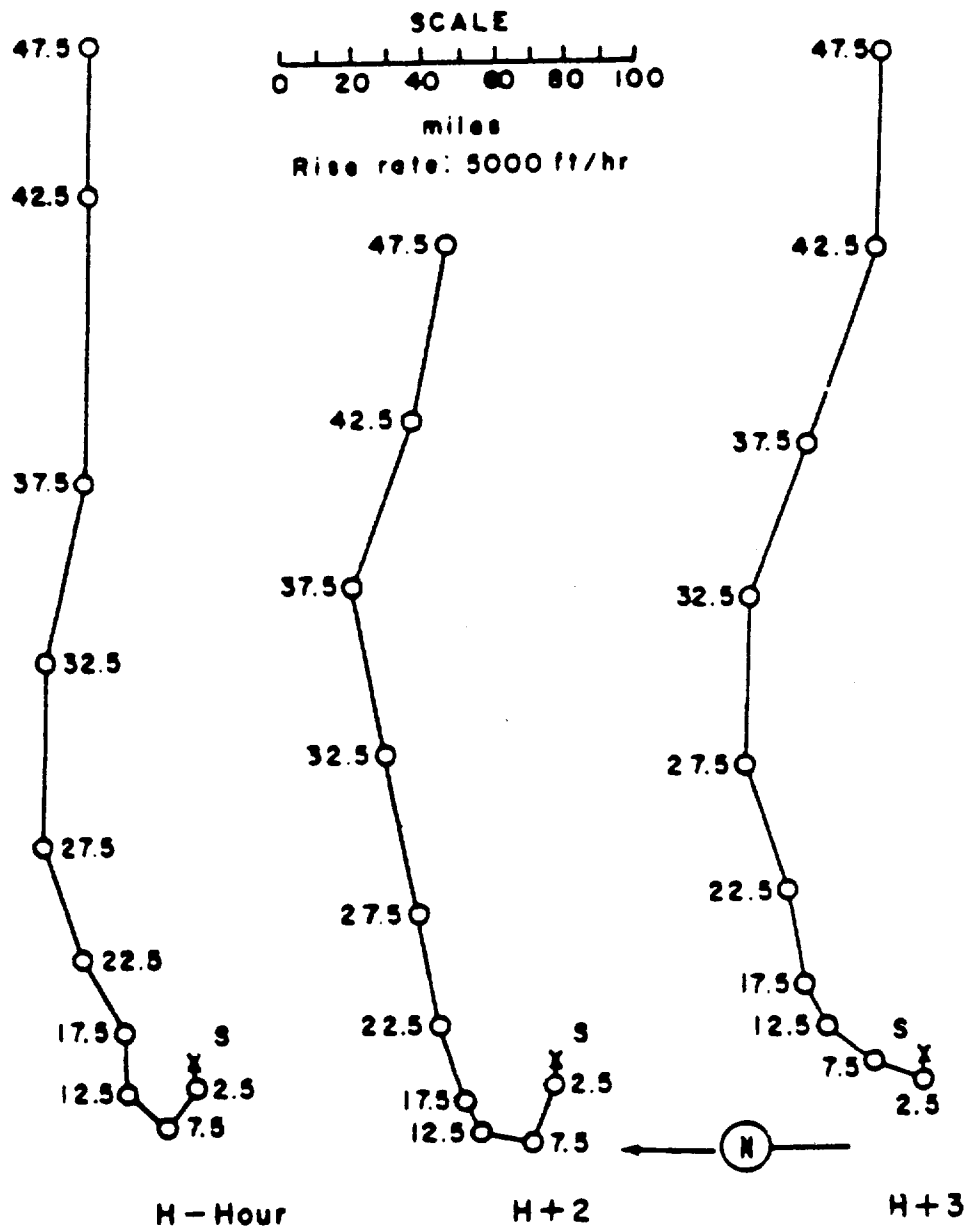
Operation CASTLE - Shot 1 - Bravo.
 Off-site dose rate contours in r/hr at H+1 hour (NREL).



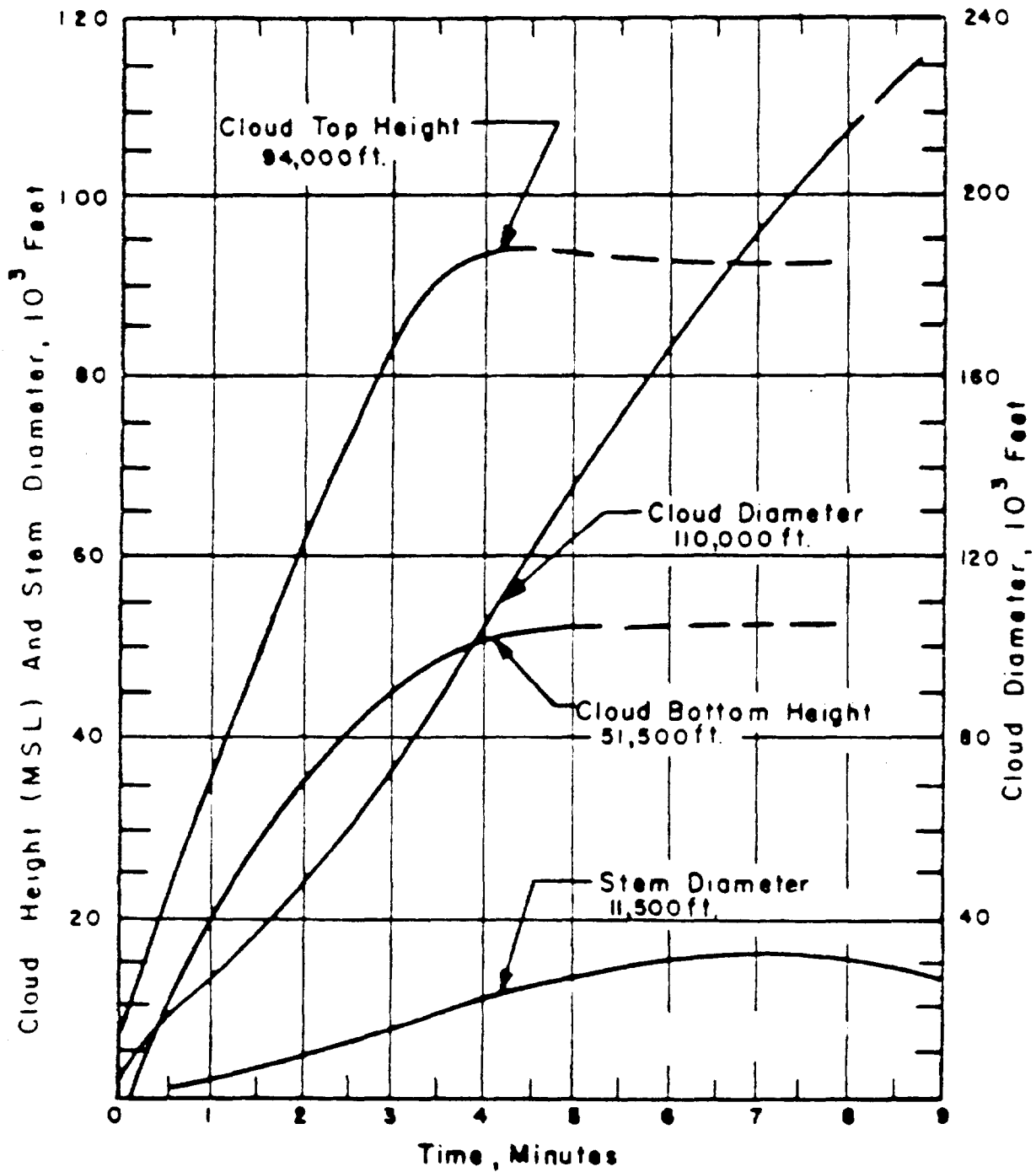
Operation CASTLE - Shot 1 - Bravo.
 Off-site dose rate contours in r/hr at H+1 hour (AFSWP).



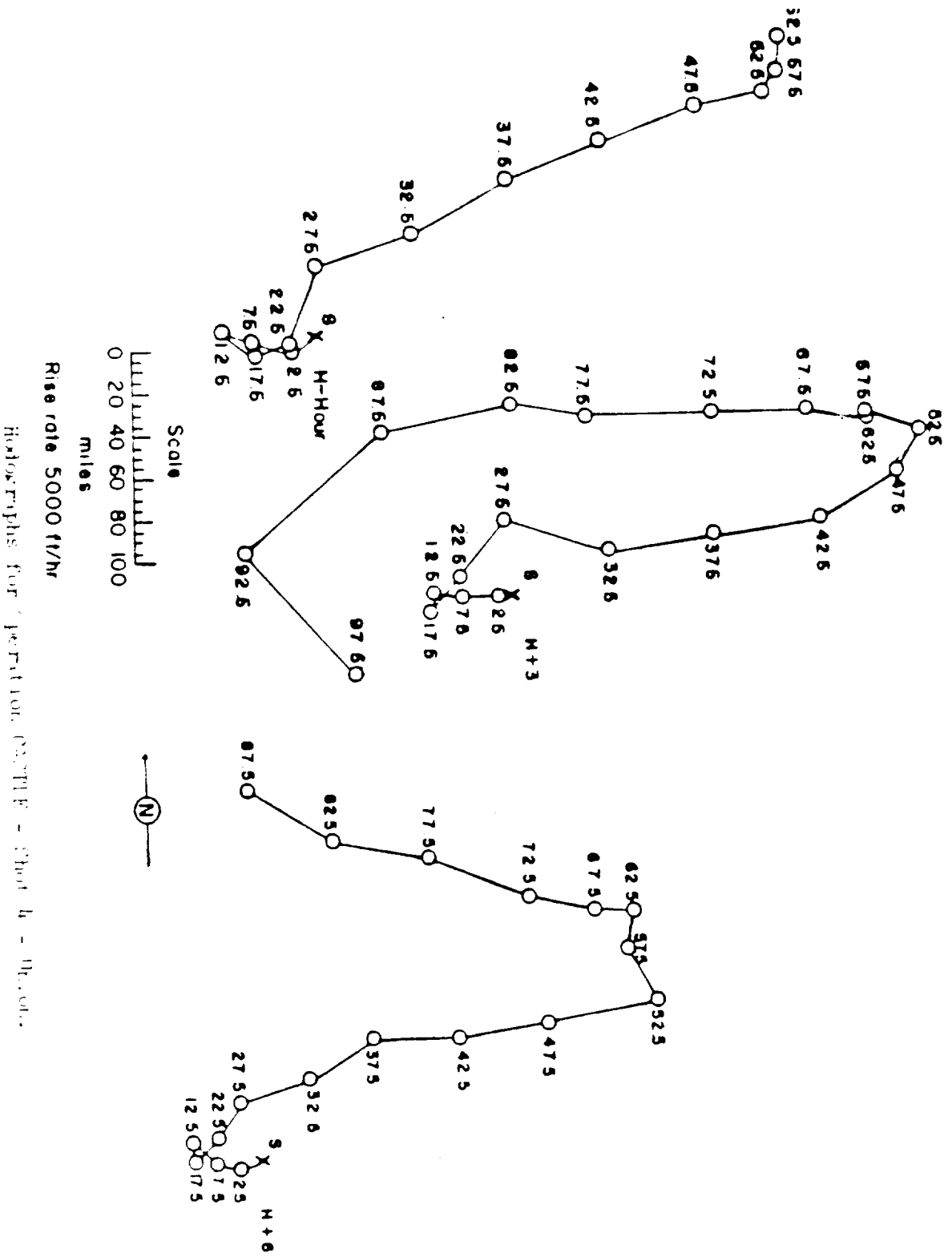
Cloud Dimensions: Operation SANDSTONE - Shot 3 - Zebra.



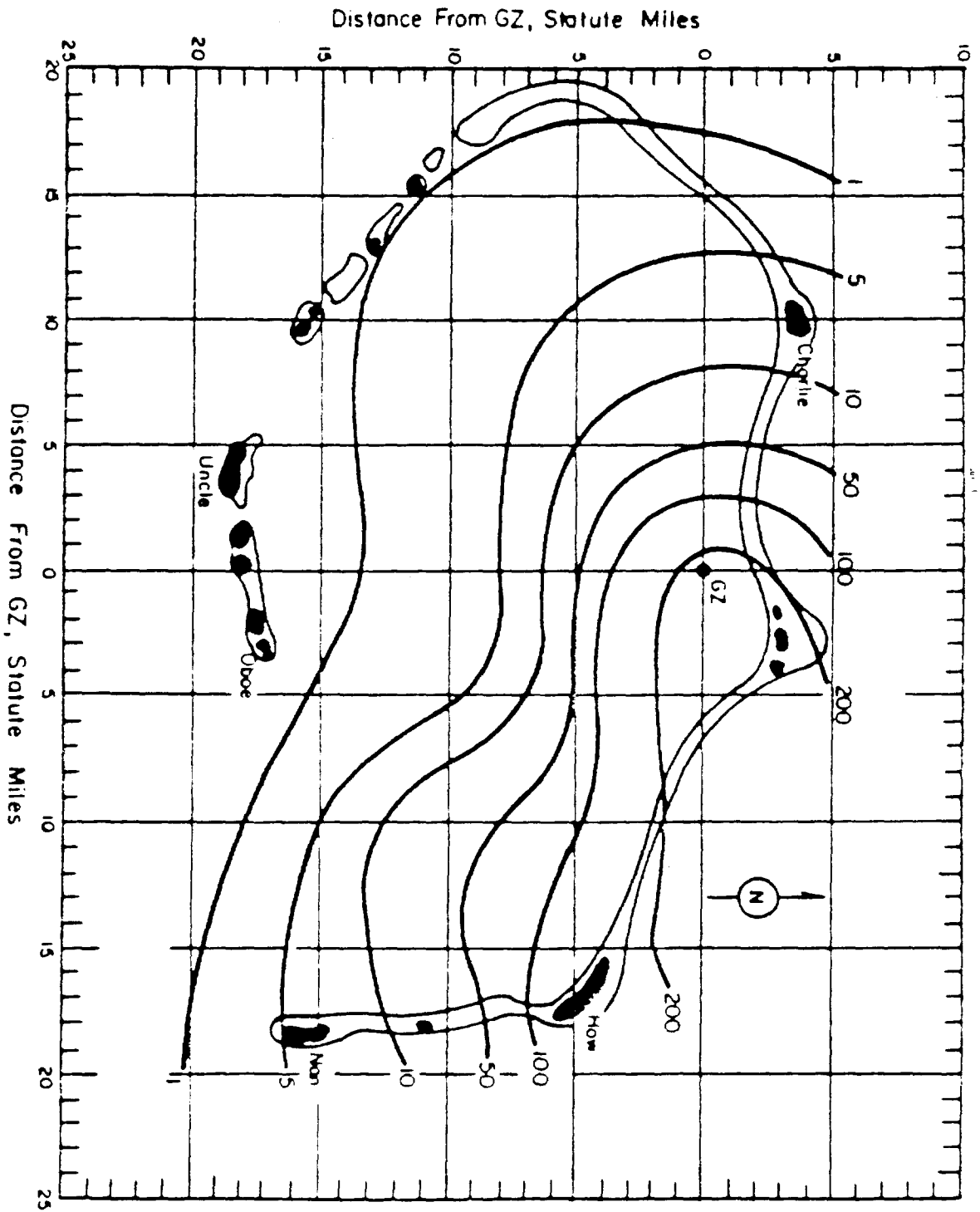
Hodographs for Operation SANDSTONE - Shot 3 - Zebra



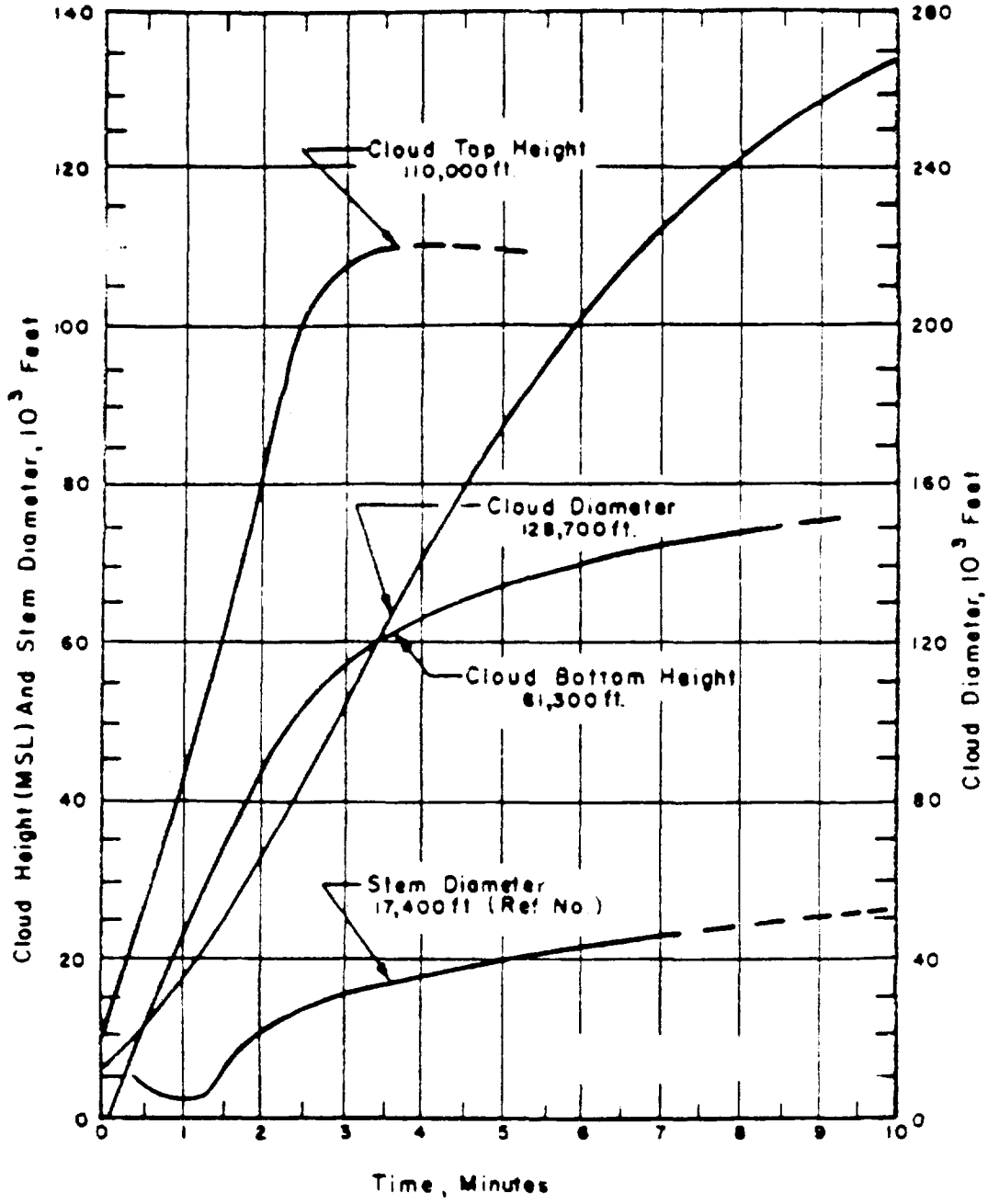
Cloud Dimensions: Operation CASTLE - Shot 4 - Union.



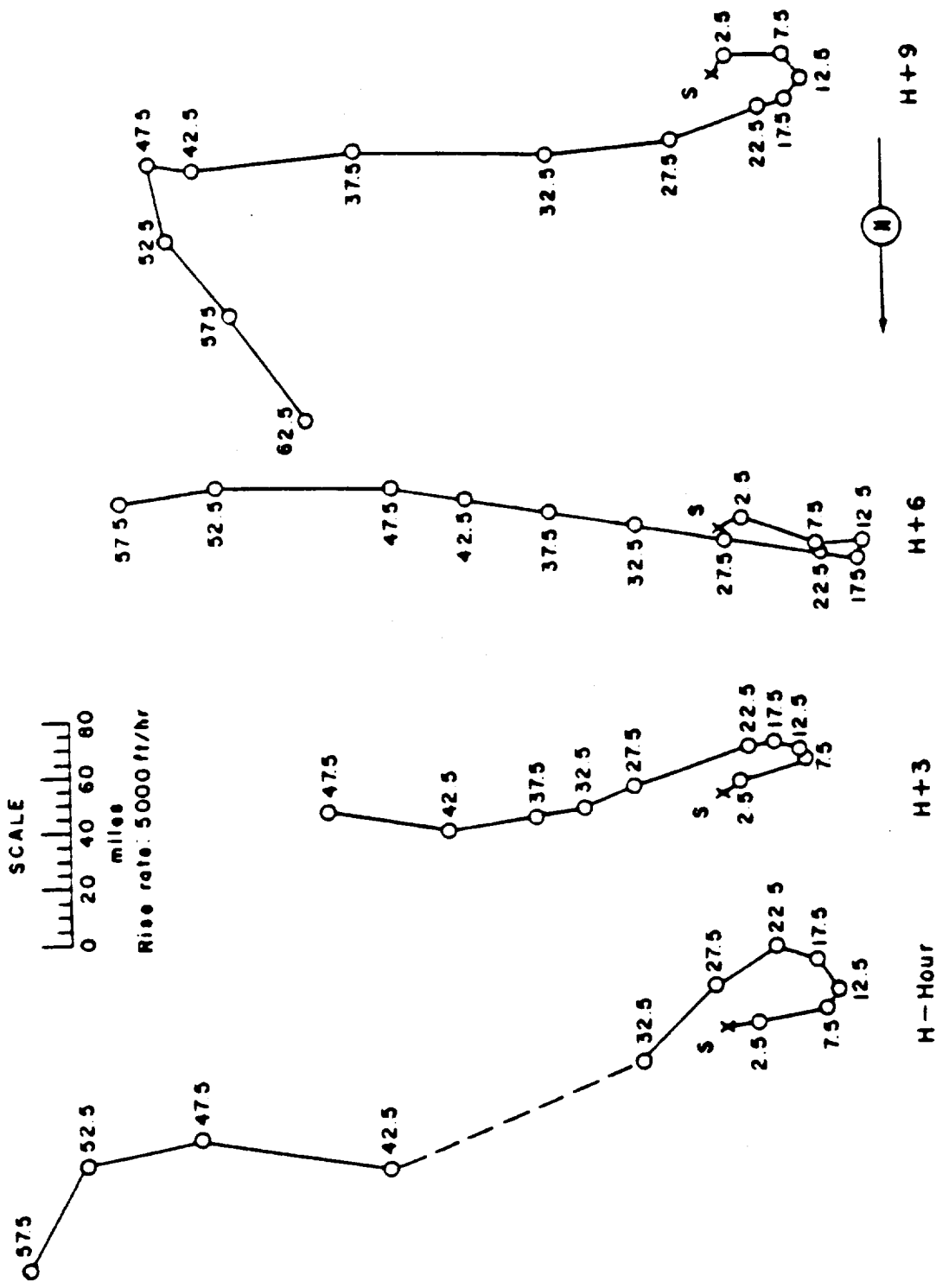
Topographic for operation example - Shot 4 - Theodolite



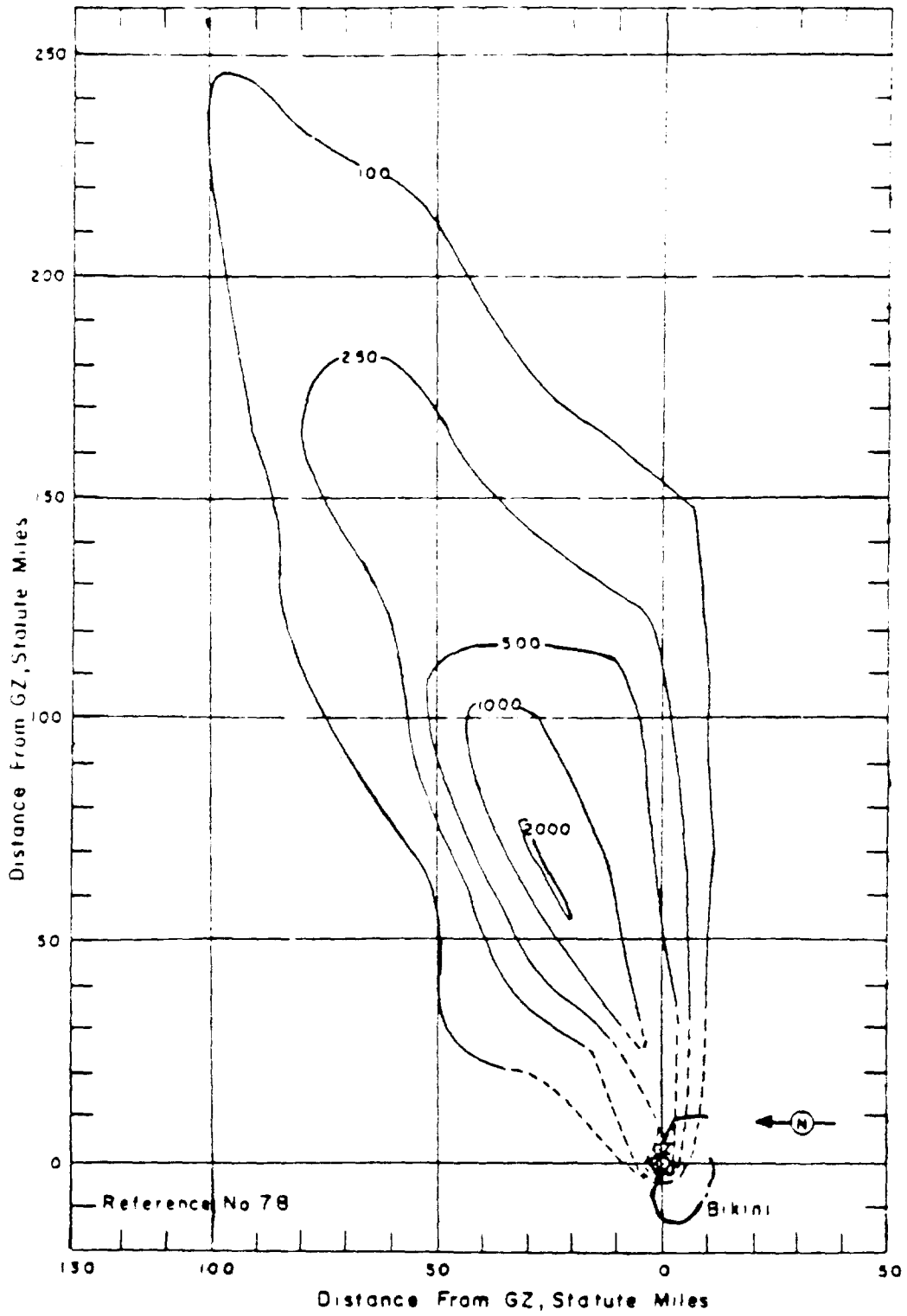
Operation CASTLE - shot 4 - Union. On-site dose rate contours in r/hr at H+1 hour.



Cloud Dimensions: Operation CASTLE - Shot 5 - Yankee.



Hodographs for Operation CASTLE - Shot 5 - Yankee.



Operation CASTLE - Shot 5 - Yankee.
 Off-site dose rate contours in r/hr at H+1 hour.