[illegible]

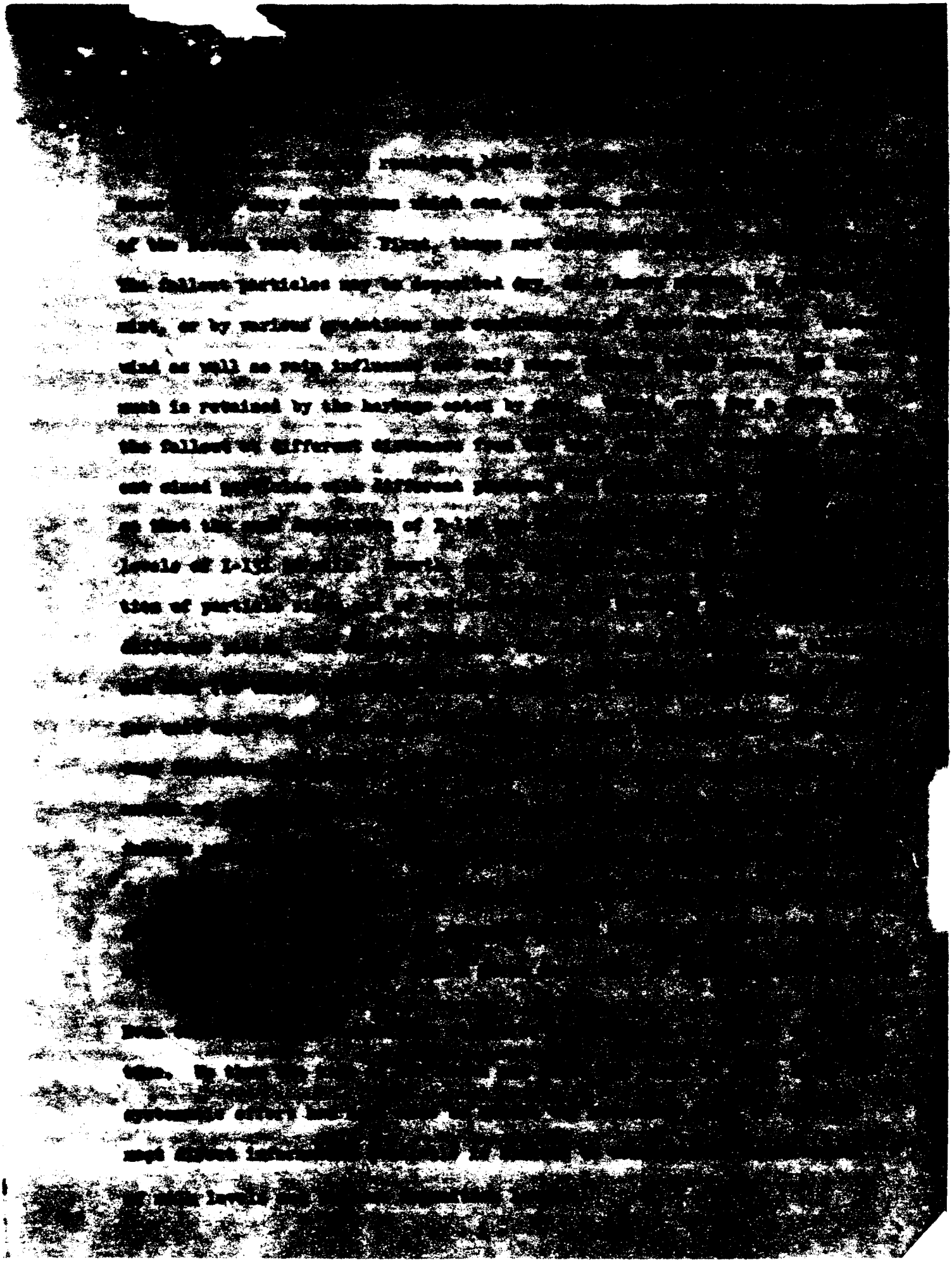
The most comprehensive data on fallout levels [illegible] of the Nevada Test Site have resulted from direct [illegible] external gamma dose rates and cumulative doses. Reliable measurements [illegible] the I-131 content of milk from cows grazing on pastures in the fallout [illegible] from a specific shot were not begun until [illegible] and were [illegible] fragmentary at the time of the [illegible] yield atmospheric test on July 14, [illegible] mental excavation experiment of [illegible]

The development of a [illegible] fresh fission products [illegible] and the resulting [illegible] deposition would [illegible]

1. [illegible]

[illegible]

3. to help [illegible] on fallout and [illegible]



[illegible] ibilities, both conceptual and practical, [illegible] the contamination level of nuclear test fallout. For [illegible] fission products -- that is fission products for which [illegible] are in the same proportions as for the debris [illegible] of a bomb, [illegible] define a time-independent measure of the contamination level in terms of the kiloton-equivalent of deposited fission [illegible] the number of fissions represented per square [illegible] area. For fractionated debris, however, [illegible] One could consider only the initial amount of [illegible] as the quantity of most direct interest [illegible] able as is the external gamma dose [illegible] quantity have been [illegible]. For the [illegible] most practical [illegible]

[illegible]

2/ A discussion of the concepts [illegible] dose [illegible] relations between [illegible] given in [illegible] the Nevada Test Site off-site area [illegible] dose rate.

[redacted]

[illegible] of [illegible] -- notably for those areas [illegible] the [illegible] will not always have arrived by this time. [illegible] one can project the dose rate back to 24 hours either by [illegible] extrapolation of a measured decay rate, or if only a single measurement has been made, by assuming a $(time)^{-1.2}$ decay rate. It is known that different samples of debris from the same shot as well as samples of debris from different shots have decay characteristics which vary from a $T^{-1.2}$ decay law. However, unless the external gamma dose rate is due largely to one or more induced activities (as was the case for the Sedan shot, [illegible] the dose rate from the isotope W^{187} is believed to [illegible] significant fraction of the observed total dose [illegible] external gamma dose rate due to [illegible] fission products [illegible] approximately in accordance with a $T^{-1.2}$ law between [illegible] hours and [illegible] months following detonation.

The symbol r_0 is [illegible] the [illegible] dose rate, in mr/hr, from deposited [illegible] hours following detonation.

[illegible]

[illegible] the initial [illegible] a maximum level of [illegible] in the [illegible] the time period of [illegible] days following [illegible] varies very little from the [illegible] level. [illegible] After 7 days, they [illegible] milk levels decrease with the 8 day half life of I-131.

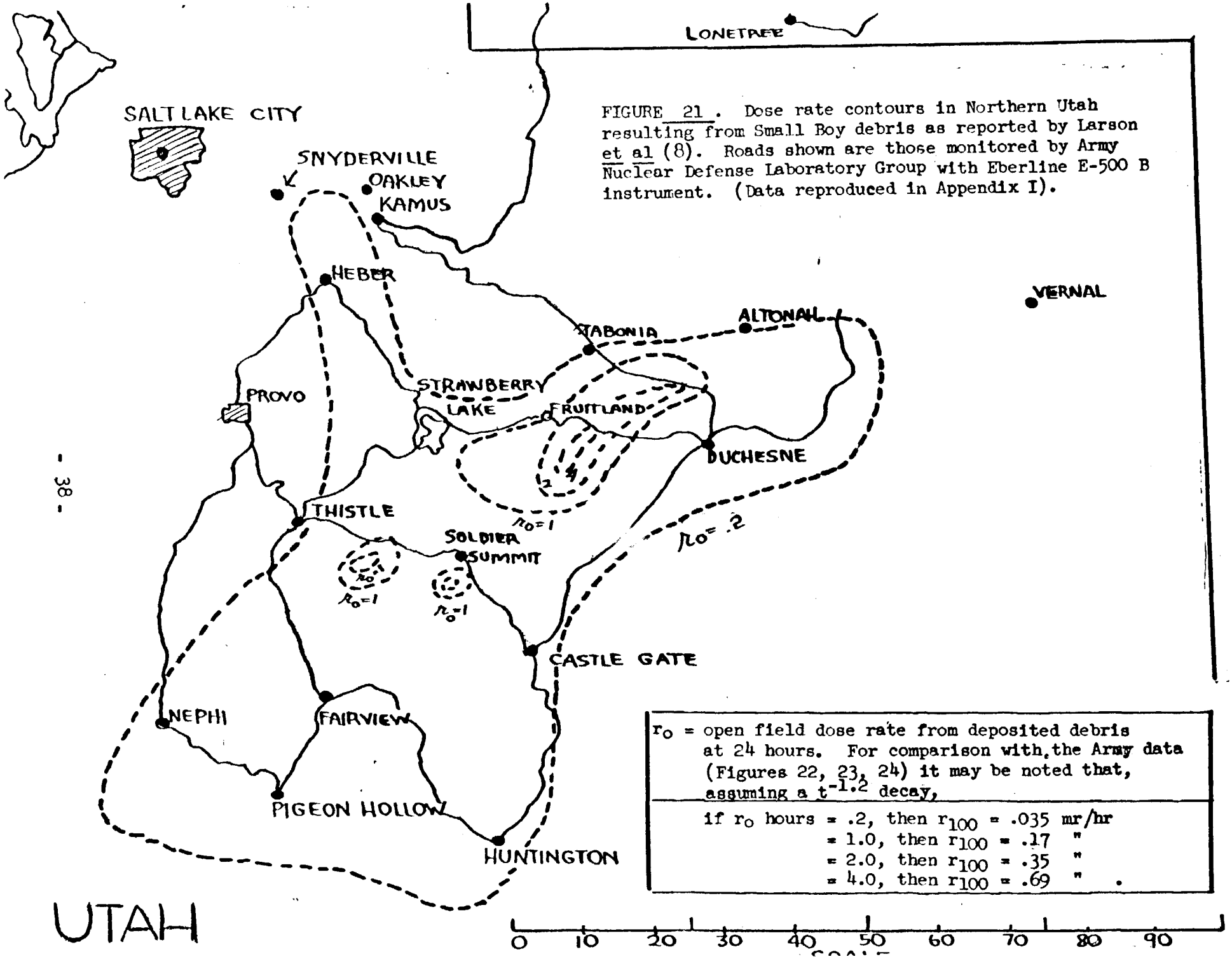
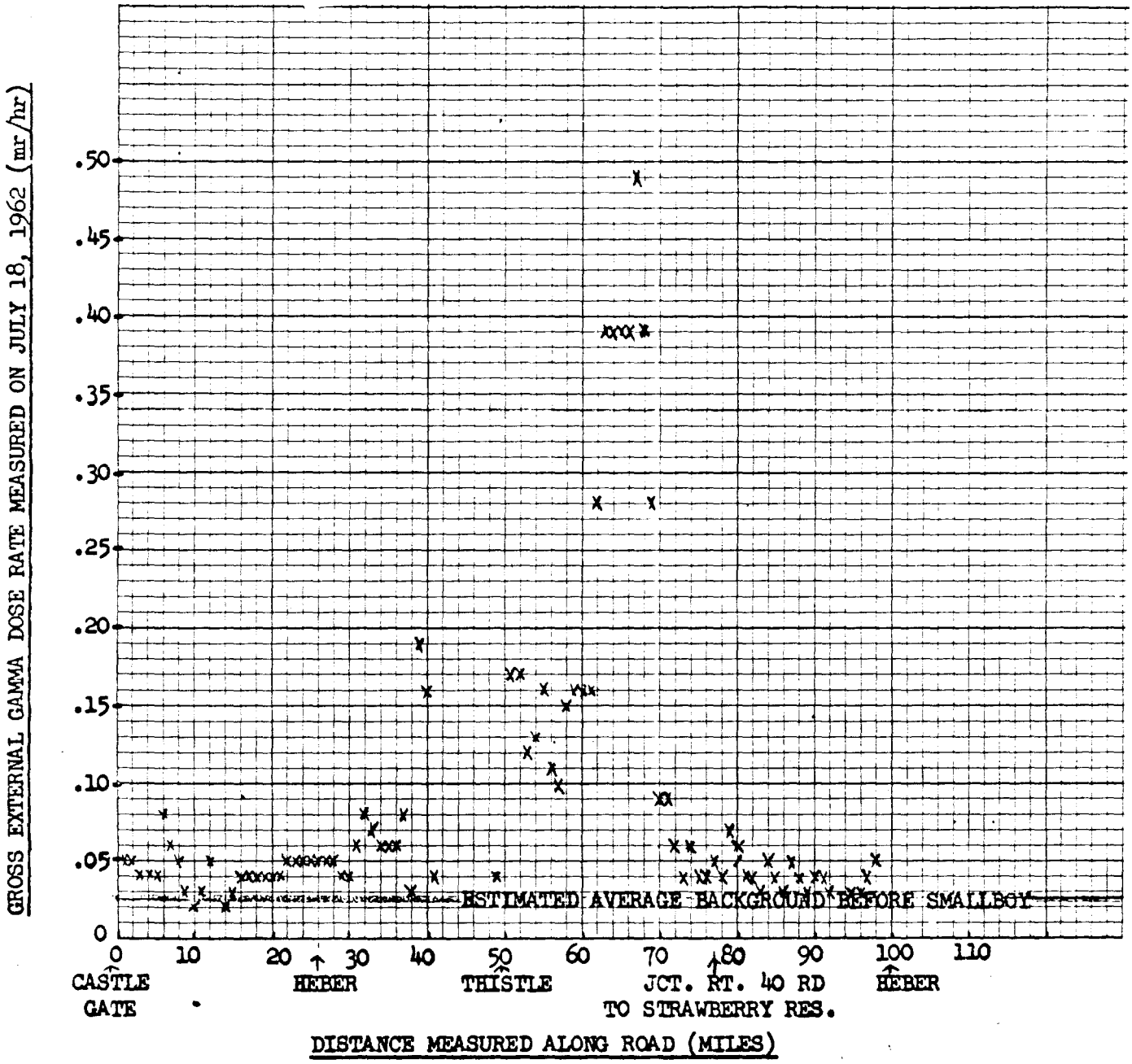


FIGURE 21. Dose rate contours in Northern Utah resulting from Small Boy debris as reported by Larson et al (8). Roads shown are those monitored by Army Nuclear Defense Laboratory Group with Eberline E-500 B instrument. (Data reproduced in Appendix I).

r_o = open field dose rate from deposited debris at 24 hours. For comparison with the Army data (Figures 22, 23, 24) it may be noted that, assuming a $t^{-1.2}$ decay,
if r_o hours = .2, then r_{100} = .035 mr/hr = 1.0, then r_{100} = .17 " = 2.0, then r_{100} = .35 " = 4.0, then r_{100} = .69 " .

FIGURE 22. MEASUREMENTS OF GROSS, OPEN FIELD EXTERNAL GAMMA DOSE RATE ALONG U. S. HIGHWAY 50 AND 189 FROM CASTLE GATE, UTAH TO HEBER, UTAH. MEASUREMENTS MADE ON 18 JULY 1962 BY U. S. ARMY NUCLEAR DEFENSE LABORATORY (SEE DATA APPENDIX I).



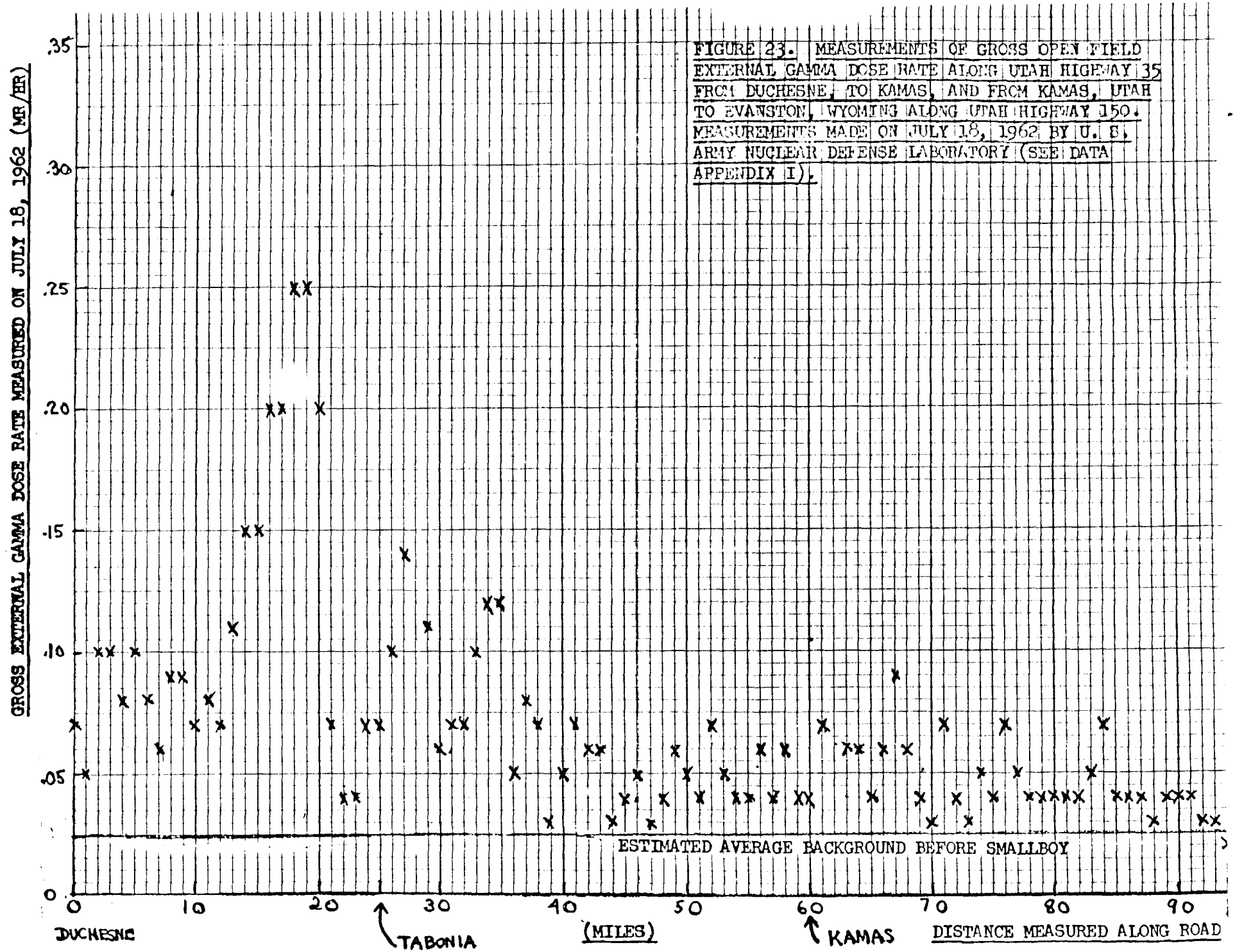


FIGURE 23. MEASUREMENTS OF GROSS OPEN FIELD EXTERNAL GAMMA DOSE RATE ALONG UTAH HIGHWAY 35 FROM DUCHESNE, TO KAMAS, AND FROM KAMAS, UTAH TO EVANSTON, WYOMING ALONG UTAH HIGHWAY 150. MEASUREMENTS MADE ON JULY 18, 1962 BY U. S. ARMY NUCLEAR DEFENSE LABORATORY (SEE DATA APPENDIX I).

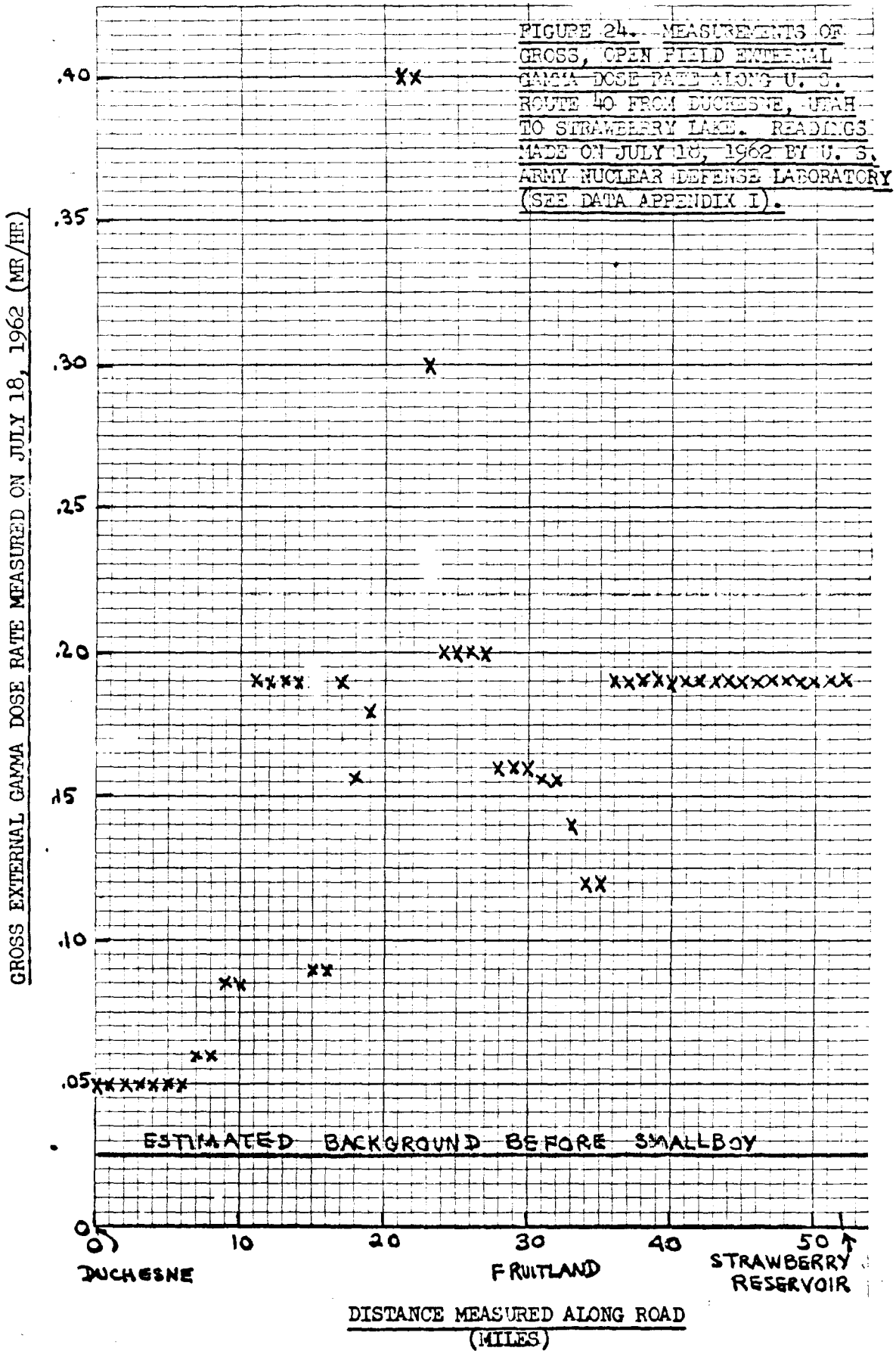


FIGURE 24. MEASUREMENTS OF GROSS, OPEN FIELD EXTERNAL GAMMA DOSE RATE ALONG U. S. ROUTE 40 FROM DUCHESNE, UTAH TO STRAWBERRY LAKE. READINGS MADE ON JULY 18, 1962 BY U. S. ARMY NUCLEAR DEFENSE LABORATORY (SEE DATA APPENDIX I).

To obtain the net dose rates due to the Small Boy debris from the [illegible] measurements, it is necessary to substract the component due to background prior to the shot. This measurement was not reported. It is assumed here to be 0.025 mr/hr, i.e. the same as measured at Alamo and [illegible] in December, 1962.

The dose rate contours reported by Larson et al from aircraft measurements and the surface measurements made by Lt. Wade and his monitors are generally consistent. Both indicate areas where the deposition level was approximately 20 times that noted in the Kamas - Oakley - Snyderville [illegible]. Both indicate some high levels of fallout on U. S. [illegible] [illegible] Strawberry Lake, and State Road 35 between Duchesne and [illegible] [illegible] levels between Fruitland and Strawberry Lake and Tabiona and [illegible] are not exactly indicated by the contours as shown. This might be due to an incorrect location of the 1 mr/hr-at-24-hour contour from the hot spot just east of Fruitland.

Although scattered high precipitation is reported [illegible] July 14, [illegible] [illegible] the [illegible] [illegible] [illegible] the fallout [illegible] largely without precipitation [illegible].

[illegible]

[illegible] (Figure [illegible]) indicate that the locations of [illegible] [illegible] [illegible], and Snyderville) lie on the edge of the hot spot area, and have 24 hour external gamma dose rates of less than 0.5 mr/hr. The only surface measurements which indicate an R_0 value at Kamas, Oakley, and Snyderville are those made by the army monitors on their route passing thru Kamas (Figure 23).

From Figure 23 it is seen that the net dose rate (i.e. substracting 0.025

[illegible] (continued) within [illegible]

[illegible] been [illegible] between 0.015 mr/hr and [illegible]

value of [illegible] mr/hr. These measurements were made [illegible]

and H + [illegible] hours. Assuming a $t^{-1.2}$ decay rate, the [illegible]

H + 24 hour dose rate in [illegible] due to deposited debris [illegible]

mr/hr. This is about 50% greater than that estimated [illegible]

but a factor of 10 lower than the 24 hour rate of [illegible] the

Pahrump Valley 9 miles south of Alamo [illegible]

It is here assumed that r_0 for [illegible], Caliente, [illegible]

range of 0.07 mr/hr at 24 hours to 0.30 mr/hr at [illegible]

single estimate taken as 0.15 mr/hr at 24 hours. [illegible]

It is of interest to compare the [illegible]

Small Boy shot with one in the [illegible]

April [illegible], 1953 [illegible]

a [illegible] device was fired on a [illegible]

hours later a [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Estimated [illegible]

Estimated quantity [illegible]

Caliente, and [illegible]

summarized in Table II.

[illegible] the net dose rates due to the [illegible] [illegible], it is necessary to subtract the [illegible] prior to the shot. This measurement was not reported [illegible] to be 0.025 mr/hr, i.e. the same as measured at [illegible] December, 1962.

The dose rate contours reported by Larson et al. from aircraft measurements and the surface measurements made by [illegible] [illegible]. Both indicate [illegible] by 20 times that noted in the [illegible] - [illegible] indicate [illegible] high levels of fallout on [illegible] Strawberry Lake, and State Road 35 between [illegible] levels between Fruitland and Strawberry Lake [illegible] are not exactly indicated by the contours [illegible] incorrect location of the 1 mr/hr [illegible] east of Fruitland.

[illegible]

[illegible] indicate [illegible] area, [illegible] The only surface measurements which [illegible] and [illegible] are those made by [illegible] there [illegible] (Figure 23).

[illegible] Figure 23 it is seen that the net [illegible]