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February 27, 1963

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METEOROLOGICAL CONDITIONS FOR THE RALA RUN OF 2/12/63

NFI:CEB

The RALA run of 2/12/63 was observed to move back over the CFA during the afternoon hours. In this discussion, a trajectory derived from the Grid No. 3 winds is presented in addition to the normal documented winds and stability data.

Strong lapse conditions were well established by 0925 MST and prevailed until 1750 MST. Clear skies prevailed with a very weak pressure gradient over southern Idaho giving light and variable winds. These wind regimes are illustrated in table I. All stations experienced northeasterly winds in the A.M. switching to southerly winds in the early afternoon. A trajectory was constructed by plotting 10-min average winds for the Grid No. 3 station for the time period 0940-1500 MST. This trajectory is illustrated in fig 1. It is noted immediately that this trajectory had not arrived back at CFA yet at the time that the scintillator in this area was indicating cloud arrival. This is undoubtedly due to two assumptions. First, that the Grid No. 3 winds are representative over the entire field, represented by fig 1 and second, that the 100-ft level wind represents the cloud's direction of travel. Neither of these assumptions are completely justified in such a variable wind field. The trajectory and wind regimes do show a change to southerly winds in the afternoon which would result in the cloud moving back over the CFA though. The lapse conditions and wind variability of this data give good diffusion properties.

The aircraft monitoring team reported a crosswind cloud width of 1.6 miles between EBR-I and Highway 20-26. Plume width was computed using Sutton's equation,

$$2y_o = 2\left(\ln \frac{100}{p}\right)^{1/2} C_y \chi^{(2-n)/2}$$

where p = 10%, C_y = .297, χ = 9000 m and n = 0.20. The plume width, thus computed, was 2.02 miles comparing quite favorably with that reported by the aircraft. Utilizing Gifford's curves of σ_y, the horizontal dispersion coefficient in the generalized Gaussian plume model, versus

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X, the distance from the source, for the appropriate meteorological conditions, a value of 3.5, 2.7 and 1.9 miles was obtained using the extremely, moderately and slightly unstable cases, respectively. The 3.5 miles of the extremely unstable case does not compare with the observed distance as well as Sutton's $2y_o$-values. It represents a good approximation, however, in view of the many uncertainties involved, ie., exact height of plume centerline, etc.

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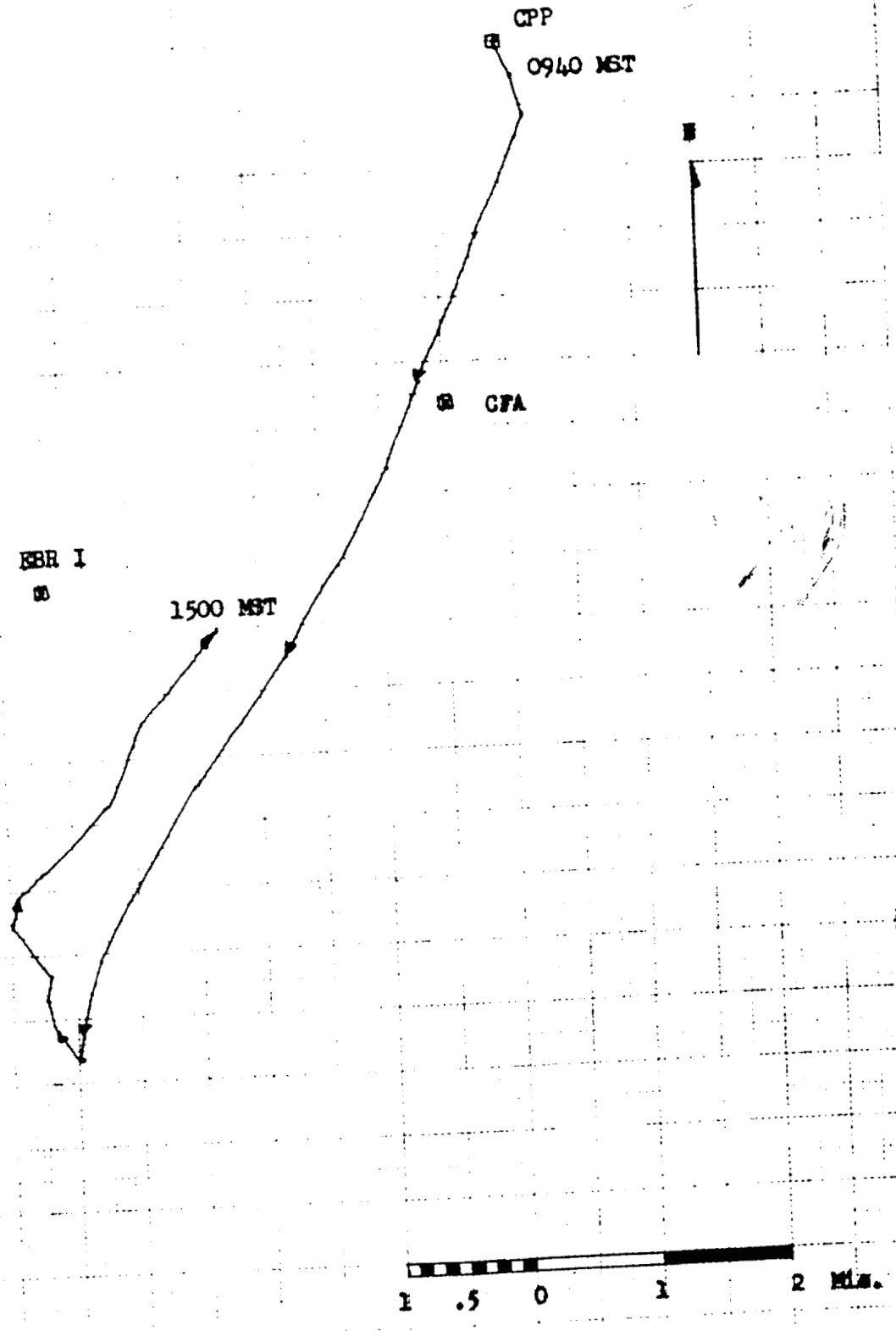
Enclosure

cc; Bill Gammill ✓
CF 613

Table I. Wind regimes of 2/12/63 over NRTS.

CFA 20'			CFA 250'			Grid 3 100'		
0910-1255	015/60	3	0920-1235	030/60	3	0940-1245	025/80	3
1255-1335	300/50	2	1235-1350	270/100	1	1245-1350	150/60	1
1335-1545	240/75	3	1350-1430	210/60	4	1350-1615	210/50	4
1545-1700	270/90	2	1430-1700	240/70	2	1615-1700	150/35	2



From Grid 3 winds. 0940-1500 MST 2/12/63.