2-9-87
Caswell File
323 EE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

FEB 9 1987

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDOM

SUBJECT: Update of Quantitative Risk Assessment for Banner/Tilt

TO: Alan Katz, Toxicoligist
TOX/HED/OPP

FROM: Herbert Lacayo, Statistician 2/9/87
SMSS/TOX/HED/OPP

THRU: Richard Levy, Statistics Team Leader 2/9/87
SMSS/TOX/HED/OPP
and
Reto Engler, Chief
SMSS/TOX/HED/OPP

SUMMARY

This memo updates the initial Quantitative Risk Assessment (see the Tox Branch Peer Review of Banner/Tilt and an undated Risk Assessment to Hank Jacoby, from Bertram Litt). This update, as requested by the Peer Review Committee, contains a revised tumor count by Alan Katz, an updated Peto Trend Test, and a new Q* based on a time to tumor analysis (Weibull82). The Peto Test indicates a significant dose related trend ($p < .0001$). Based on the Weibull time to tumor model, the new Q* is 7.87×10^{-2} $(mg/kg/day)^{-1}$ in human equivalent (versus 3×10^{-2} for the Q* based on the multistage model). As a result, the calculated risk, stated in the Litt memo, is marginally increased.

DATA and ANALYSIS

Alan Katz removed five male mice (# 26,79,145,149,180) from the analysis due mainly to autolysis. The actual raw data (time of death and liver tumor findings) is stored in the Stat. Team's Banner/Tilt file.

Table 1 contains the time intervals used in the trend test, together with the results of trend analysis.

TABLE 1

Peto Trend Test: Time Intervals and Significance Values

	Dose (ppm)				
	0	100	500	2500	Sig. Values
Week					
0 - 52	0/2	0/5	2/4	1/8	.51
53	2/12	0/11	3/11	4/9	.018
54 - 78	5/9	3/11	1/10	14/15	.0001
79 - 92	3/9	1/9	3/6	11/11	.0001
93 - 104	6/7	3/7	4/9	4/5	.25
105	12/24	7/20	12/21	14/14	.0001
TOTAL	28/63	14/63	25/61	48/62	.0001

The $Q^*(7.87 \times 10^{-2})$ in human eqivalent is derived from the Weilbull82 program as follows:

1. For a given time of 104 weeks, and the fixed risk level of 10^{-6} the associated .95 lower confidence bound on the dose was 1.27654×10^{-2} ppm.

2. Assuming linearity, Q^* in ppm is derived by:

$$Q^* = \text{Risk/Dose}$$

$$= 7.87 \times 10^{-4} \text{ (ppm)}^{-1}$$

3. The human equivalent is then approximately :

$$Q^*(\text{human}) = 100 \times Q^*$$

sb/hl