Annexure 1

Calculation of worst case positions[1]

Below is a simple example as provided in the circular to illustrate the worst case exposure method of determining whether a portfolio of option positions on the same underlying is an acceptable "hedging and portfolio rebalancing" strategy. Considering the following stock option strategy:

a. Long call options on 5 million shares at a strike price of Rs 80
b. Long put options on 2 million shares at a strike price of Rs 90
c. Short call options on 1 million shares at a strike price of Rs 110
d. Long put options on 3 million shares at a strike price of Rs 120
e. Long call options on 4 million shares at a strike price of Rs 130
f. Short call options on 3 million shares at a strike price of Rs 140

Since the fund has a bullish position on 9 million shares (a plus e) and a bearish position on 9 million shares (b plus c plus d plus f), its option delta could be comparatively small especially when the stock price is not far from the weighted average strike price. However, depending on what the stock price turns out to be at expiry, only some of the options will end up in the money and will therefore get exercised by or against the fund. Consequently, the fund could end up with a long or short position in the stock at expiry depending on what the stock price turns out to be at that point of time. The worst case long and short exposures can be worked out as follows:

Price at expiry	Options that end up in the money and therefore get exercised by or against the fund	Net number of shares (short or long) the fund ends up holding as a result of the option exercises
Below 80	b and d	5 million shares short
80-90	a, b and d	Nil
90-110	a and d	2 million shares long
110-120	a, c and d	1 million shares long
120-130	a and c	4 million shares long
130-140	a, c and e	8 million shares long
above 140	a, c, e and f	5 million shares long

The worst case short exposure arises when the share price at expiry is below 80 and the fund ends up delivering 5 million shares to exercise the in-the-money puts. This would be an acceptable level of hedging only if the fund's position in the underlying and the futures were at least 5 million shares.

Its worst case long position (8 million shares) is when the share price is above 130 and below 140. The fund receives 9 million shares from exercising its in-the-money calls (a and e) and delivers 1 million shares against its short calls (c) which are also in the money. This means that the fund can take up this option strategy only if this 8 million shares plus its position in the underlying shares and futures is together less than the maximum permissible limit for the fund's holding in the stock.

[1] MFD/CIR/21/ 25467/2002