Interoffice

VLB ARRAY MEMO No. 172

National Radio Astronomy Observatory

Very Large Array

January 31, 1983

To: VLBA Site Group (Buck Peery)
VLBA Configuration Group
VLBA Coordinating Committee

From: Bill Horne

Subject: Telescope Sites

Memo No. 123 sets forth a site rating sheet with a number of parameters for rating proposed sites. In reviewing this rating sheet I have the feeling that a number of items have been included which while necessary to the proper development of a site will not vary significantly from site to site and if included in rating parameters will dilute the importance of those parameters which will vary significantly for various sites.

As examples of those items which I would consider as being of very little importance in a rating sheet (certainly important in a site development) because of the probability of general uniformity I would include the following (using your headings of memo 123):

(1) Utilities Available
(2) Present Development in Area
(3) Site Land
(4) Site Facilities

Note that in reality "Present Development in Area" is evaluated in maybe its most important aspect under "RF Interference".

In evaluating sites I would suggest the addition of one other major heading entitled "Access" which, would include the following subheadings some of which are included under various major headings you propose:

(1) Distance to nearest residential center
(2) Distance to nearest usable transportation center
(3) Construction and operation access difficulty (cost)
(4) Transportation difficulty and distance from major supply and fabrication centers.
(5) Distance from nearest utility substation with adequate power capacity.

The most important parameter to be evaluated from an antenna engineers viewpoint is the one entitled "Weather". Some comments on the different headings listed in Memo 123 under "Weather" would be as follows.

(1) Flooding ∿ yes or no certainly no point rating should apply.

(2) Ice - a very important item which should have a quite severe impact on any point rating system. Should include a maximum to be allowed (maybe 2½ to 3 inches radial build-up) number of days expected during a year, length of occurrence.

(3) Snow - Essentially the same comments as for ice but since snow is a much more common occurrence then ice storms of even more impact. Should have a very severe impact on the rating system since even small accumulations on the reflector, while not heavy enough to affect the drive system or distort the dish, do distort the beam or change the focal length such that the antenna is unusable at even 6 cm frequency. I don't think we would want to consider the cost of surface panel heating if it is at all avoidable.

(4) Wind - A very important consideration-trying to design an antenna to point properly in winds above 12-15 mph at the shorter wavelengths (3 cm or shorter) becomes difficult and expensive. Evaluation should be based on percentage of days and time with winds less than 15 mph; 25 mph and 45 mph. The frequency or likelihood of any winds exceeding about 110 mph should be viewed quite critically.

(5) Temperature - Range you have set forth fine but I would suggest length of time exposure to temperatures below say 15°F (-10°C) should be a criteria evaluated. Certainly a site which exposes an antenna to temperature below -10°C about 1 or 2 percent of the time is a much more favorable site than one which exposes an antenna to the same low temperature for 30% of the time and for which we might consider gear box, heating, gear rack lubrication protection or bearing lubrication heating.

BII/bmg