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A CHANGE IN OPERATIONAL MODE AT SYDNEY KINGSFORD-SMITH AIRPORT: WHY IT LED TO AN AIRCRAFT NOISE DISASTER

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1. INTRODUCTION

After construction of a north-south third runway, the main operational mode of Sydney Kingsford-Smith airport (KSA) was suddenly changed on 4 November 1994 to the north-south direction. Previous operation had involved an east-west cross runway and a main north-south runway. This new mode exposed the population living along the north-south conurbation to large increases in flight numbers and noise levels, which had such severe consequences that a Federal Senate Inquiry was set up, with broad terms of reference, to investigate the reasons. Analysis of the Environmental Impact Statement (EIS) shows how steady-state methodology was justified by misuse of the findings of the scientific literature about adaptation to noise, for which there is a world-wide lack of evidence. It will be clear from the analysis that the Federal Airports Corporation (FAC) as the proponent and its consultants would have been well aware that steady-state methodology was inappropriate. The public were thus misled by the EIS into accepting the proponent's version of the noise impact which was officially endorsed.

2. WHY STEADY-STATE METHODOLOGY WAS INAPPROPRIATE

The noise impact due to the changed operational mode was specified in the EIS [1] by a dose-response relationship derived from studies around Australian airports of steady-state response to aircraft noise [2]. The populations studied could be regarded as stable, involving no large inward or outward movements. The exposure to noise could also be considered stable in that over a long period of time there was only a gradual increase in flight numbers and noise level over the same flight tracks. Noise dose is measured in terms of Australian Noise Exposure Forecast (ANEF) units (for example, 20 ANEF is approximately equivalent to Leq = 55 dBA). The ANEF system is similar to the former NEF system in the US except that flights during the period from 1900 to 0700 hours are considered to be noisier by 6 dB than those during the remaining period. The response is specified as the percentage of people in a particular ANEF zone "moderately" or "seriously" affected. Steady-state relationships such as the one described above and that of Schultz [3] have been considered by

Brown et al [4] as providing an appropriate measure of annoyance if adaptation to noise can be achieved without cost. Weinstein [5] has defined adaptation as indicating that *"...negative reactions have diminished over time even though the objective situation remains the same"*. If there is a cost to adaptation, such as internalisation of stress in the face of helplessness in dealing with the problem of increased noise exposure, then Brown et al suggest that *"noise annoyance measured under steady state conditions may be an attenuated measure of the true effects"*. This vitally important point was omitted by the EIS authors in quoting Brown et al, despite the fact that the change in operational mode involved a serious departure from steady-state conditions.

In the Majority Report of the Senate Select Committee on Aircraft Noise in Sydney [6], it was stated that *"There is a clear public perception that the noise impact of the changed operations at KSA has been understated at every turn"*. Three senators in a Minority Report described the role of the Federal Airports Corporation (FAC), the proponent of the second parallel runway, in these terms:

"We are extremely concerned by the attitude shown by representatives of the Federal Airports Corporation in evidence to the Committee in relation to the community's perception that it had been misinformed over the impact of the runway. The FAC's view appeared to be that.....whatever the reaction, residents would get used to the situation over time".

3. HOW THE SCIENTIFIC LITERATURE WAS IMPROPERLY USED TO JUSTIFY THE USE OF STEADY-STATE METHODOLOGY

The following analysis of the EIS Supplement shows that the concerns of the Senate Committee about understatement and misinformation about the noise impact were well founded. An attempt was made to dispose of any evidence from which it could be inferred that steady-state methodology was not appropriate for specifying the numbers of people affected by the changed operational mode of the airport. The necessary attack on the published scientific literature took a number of forms: ambiguity, selective quotation from sources, selective omission of key information, direct falsification of authors' findings and false attribution of findings to authors.

One of the major worries for the EIS authors appeared to be that aircraft noise at the same measured level elicits a response somewhat greater than road traffic noise. Hall et al [7] explained the difference in response in terms of Robinson's Noise Pollution Level [8]. Compared to road traffic noise, aircraft noise produced larger modulation depths and maximum levels. Kryter [9] independently gave reasons for the relatively greater response. In trying to dispose of the obstacle posed by the response difference, the EIS authors wrote ambiguously about the *"clustering of many field survey results of annoyance versus noise exposure for various transportation modes"*, thus generating the idea that differences in response were not significant. They then reinforced this idea by stating that:

"Schultz (1978) first observed this clustering, and most recently Green and Fidell (1991) updated and extended Schultz's work by including 15 additional surveys conducted since 1978".

But the EIS authors had omitted two of the major findings of Green and Fidell [10], namely that: *"....people are on average more willing to report annoyance due to aircraft noise exposure than to report annoyance due to street and rail traffic"*, and that people adopt *"different annoyance criteria for different noise sources"*.

In particular, the latter statement of Green and Fidell, was the subject of

a critical misrepresentation by the EIS authors who claimed:

"It would appear that chronically exposed (steady-state) populations may interpret the annoyance scale differently depending on the level of exposure".

The EIS authors are in effect asserting that personal decision criteria for annoyance can be unstable. Indeed, it would be useful to their viewpoint if such an artefact as "interpreting the annoyance scale differently" could be given credibility. However, both Weinstein [5] in the case of traffic noise and Fidell et al [11, 12] in the case of aircraft noise, demonstrated that such interpretations did not arise from repeated interviews. In summary, Green and Fidell's views concerning different annoyance criteria for different noise sources have been misrepresented by the EIS authors. The altered findings would have the effect of creating in the reader's mind that people adopt different criteria as a means of explaining the response to change in noise exposure from the same noise source.

The findings of Brown et al [4] were directly falsified in order to promote the applicability of steady-state methodology to changes in noise level. Brown et al had studied the response of a population to a reduction in traffic noise exposure. These authors found that: *"A reduction in road traffic noise exposure led to a much larger reduction in annoyance than would have been anticipated from responses measured under steady state conditions".* But the EIS authors claimed that, according to Brown et al, the post-change annoyance of respondents was *"consistent with earlier analyses (Schultz [1978] for steady state surveys)".* (I)

The time taken for adaptation to changes in noise level also appeared to cause the EIS authors considerable difficulty. An attempt to dispose of this problem was made in a number of ways to be described. It was asserted that in the short term, the response of newly affected populations would be equivalent to about 5 ANEF units greater than the actual noise exposure. Moreover, this increase *"would occur most likely because of changes in the criteria used for reporting annoyance.....it can be expected that, within one or two years, the proportion of people seriously affected would approach that described in the National Acoustic Laboratories study".* In other words the EIS authors are making a plea for adaptation and acceptance of the steady-state response after a specified time period, aided by the previously disclosed misrepresentation of the work of Green and Fidell [10].

In his studies on evidence against adaptation Weinstein [5] found that, 18 months after a rise in noise exposure for communities near a major highway, there was no evidence of appreciable adaptation in self-reported noise effects. Instead, people became more pessimistic about their ability to adapt with time. Weinstein also warned against the misinterpretation of complaint data. While annoyance remains at the same level, complaints may decrease when corrective action to mitigate the cause of annoyance is not forthcoming. These key findings of Weinstein were omitted by the EIS authors. Griffiths and Raw [13] also investigated the adaptation of a population to a step change in traffic noise exposure. Raw and Griffith [14] had previously reanalysed the findings of Fidell et al [11] for a step change in aircraft noise exposure. They concluded that steady-state data are not likely to be useful in predicting response to change and the effect is relatively long term. For traffic noise they assigned a disbenefit at least equivalent to 10 dB(A) for the response to change compared with the steady-state prediction. They found no adaptation after seven years and partial adaptation after nine years depending on the type of site. For aircraft noise the disbenefit was approximately 5 dB(A) with no time limit specified for adaptation. Reference to this work was omitted by the EIS authors.

Muldoon and Miller [15] would be surprised to learn that they had described as "short term" the effect of the Expanded East Coast Plan (EECP) in the US which brought new areas under the influence of aircraft noise at relatively low sound levels. Nowhere in their paper do Muldoon and Miller mention the *"short term"* effect of changed patterns of aircraft noise falsely attributed to them by the EIS authors. Muldoon and Miller did state that the FAA guidelines

"do not adequately predict the degree of public outcry that followed implementation of the Expanded East Coast Plan....The FAA would be wise to consider requirements for analysis of this nature on future proposals to change patterns of aircraft noise, particularly at low ambient levels".

However, reference to this critical statement was omitted by the EIS authors.

In its submission to the Senate Inquiry, the FAC [16] declared that:

"The FAC and its consultants went to great lengths to ensure comprehensiveness and objectivity throughout the whole process of preparing the EIS".

This remarkable statement could be considered on a par with the apparent lack of discernment exhibited by The Institution of Engineers, Australia, which in 1992 bestowed an award of excellence on the consultant Kinhill for the EIS prior to actual experience of its predictions. The evidence strongly suggests that the conduct of the FAC and that of its consultants [17] particularly in relation to the noise issue, was consistent with predetermination of the Third Runway proposal on commercial and political grounds. This affair has not only raised serious questions of ethical standards, but has also highlighted the weakness of both the federal environmental legislation and the environmental impact assessment process in Australia.

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[17] Federal Court of Australia, NSW District Registry (1991) Affidavit of Bryan Robert Jenkins, Director of Kinhill. 22 December. Para 19 affirms that Dr Norman Broner of VIPAC supervised the work in the *"VIPAC Supplement Reports....which were taken into account by myself and Kinhill staff when drafting the Supplement".*