

UNITED STATES
NUCLEAR REGULATORY COMMISSION

REGION IV

611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

FACSIMILE FORM

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MESSAGE TO: John Jankovich

MESSAGE FROM: Vivian Campbell, RIV

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SPECIAL INSTRUCTION/ ATTACHMENTS:

John, attached you will find a copy of White Sands' submitted "interim" operating procedures (letter dated 8/26/98). You can see that they are rather vague. If you recall my original email, I stated that I wanted to wait until you completed your review before I asked them for more information. If you have questions, please call or email. I will be out of the office Wed. and Fri., otherwise I should be here the rest of the week.

Vivian Campbell

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D. Interim Operating Procedures

An objective of our investigation was to make use of the refined dynamic model described above to estimate the service life of both the large and medium source capsules. Thus, to conclude this study, we now consider the operational life of the source capsules under the currently adopted operating procedures.

Under the interim procedures now in use at the GRF, the large and medium size sources are conveyed at an initial plenum pressure of 25 psi and 12 psi, respectively. The high pressure solenoid is pulsed a variable number of times in order to first eject the carrier from the lock block and into the horizontal section of tubing, where it is allowed to come to rest, and then to propel it to the exposure head. During this procedure, the intermediate location of the carrier, when it is at rest, is not known. However, the carrier terminal velocity is a function of this unknown. Therefore, the maximum possible terminal velocity must be considered to calculate the maximum impact forces.

These maxima are as follows. Experiments conducted at the GRF indicated that the maximum terminal velocity for the large carrier at the GRF is just over 21 ft/sec. As shown in Figure 12, the large carrier will attain this velocity after it has traveled about 9 ft. Similar experiments indicate that the maximum terminal velocity of the medium carrier at the GRF is approximately 45 ft/sec. As shown in Figure 13, the medium carrier will attain this velocity after it has traveled about 19 ft.

The section below makes use of these maximum terminal velocity levels to calculate the resulting range of impact forces and to determine the service life of the source capsules.

E. FINAL CONCLUSIONS

E.1 Fatigue

We now consider the effects of repeated (i.e., cyclic) loads. We are informed that, during its 5-year design life, any given capsule is subject to a maximum of 18,000 round trips from the lock block to the exposure head. Suspended between the partially compressed Belleville springs, the capsule, according to the simulation, oscillates within the carrier at a frequency of approximately 3 kHz following the carrier's initial contact with the arresting springs. This action is depicted in the velocity and acceleration plots shown in Figures 6 and 7. For this particular