$$q_1^* \cdot \left(-b_1 + (b_1 + d_1)\beta_1(\varepsilon_1^*)\right) + q_2^* \cdot \left(-b_2 + (b_2 + d_2)\beta_2(\varepsilon - \varepsilon_1^*)\right)$$

$$\geq q_1 \cdot \left(-b_1 + (b_1 + d_1)\beta_1(\varepsilon_1^*)\right) + q_2 \cdot \left(-b_2(b_2 + d_2)\beta_2(\varepsilon - \varepsilon_1^*)\right) \quad (3.43)$$

for all q_1, q_2 and that $q_1 + q_2 \leq 1$. The second inequality is satisfied by ε_1^* as defined by (3.33); it exists because of (3.31) and (3.32). Furthermore, using (3.34) and dividing both sides by $G_1 \cdot G_2/(G_1 + G_2)$ shows that the first inequality is equivalent to

$$\frac{1-\beta_1(\varepsilon_1^*)}{(1-\beta_1(\varepsilon_1^*))'} - \frac{1-\beta_1(\varepsilon-\varepsilon_1^*)}{(1-\beta_2(\varepsilon-\varepsilon_1^*))'}$$

$$\geq \int_0^{\varepsilon} \left[\frac{1-\beta_1(\varepsilon_1)}{(1-\beta_1(\varepsilon_1^*))'} - \frac{1-\beta_2(\varepsilon-\varepsilon_1)}{(1-\beta_2(\varepsilon-\varepsilon_1^*))'} \right] dF(\varepsilon_1)$$

for all F. Now, because of (3.26), the function

$$H(\varepsilon_1) = \frac{1-\beta_1(\varepsilon_1)}{(1-\beta_1(\varepsilon_1^*))'} - \frac{1-\beta_2(\varepsilon-\varepsilon_1)}{(1-\beta_2(\varepsilon-\varepsilon_2^*))'} \quad \text{for } 0 \leq \varepsilon_1 \leq \varepsilon$$

is strictly concave in ε_1 for $0 \leq \varepsilon_1 \leq \varepsilon$, and satisfies

$$\left. \frac{dH(\varepsilon_1)}{d\varepsilon_1} \right|_{\varepsilon_1 = \varepsilon_1^*} = 0.$$

Therefore, this inequality is fulfilled for all distributions F. If (3.38) holds, then it can be shown immediately that the solution (3.39) satisfies the Nash conditions.

■

Consider now the general problem of guarenteeing legal behaviour of the state in equilibrium, i.e., $q_1^* = q_2^* = 0$. Whereas the Nash condition (3.6) is identically fulfilled, (3.7) is given by

$$0 \geq \int_0^{\varepsilon} [q_1 \cdot (-b_1 + (b_1 + d_1)\beta_1(\varepsilon_1)) + q_2 \cdot (-b_2 + (b_2 + d_2)\beta_2(\varepsilon - \varepsilon_1))]\, dF^*(\varepsilon_1) \quad (3.44)$$

for all q_1, q_2 such that $q_1 + q_2 \leq 1$, where F^* is the equilibrium distribution of the IAEA's inspection effort. Now (3.44) is equivalent to

$$0 \geq q_1 \cdot \left[-b_1 + (b_1 + d_1) \cdot \int_0^{\varepsilon} \beta_1(\varepsilon_1)\, dF^*(\varepsilon_1) \right] + q_2 \cdot \left[-b_2 + (b_2 + d_2) \cdot \int_0^{\varepsilon} \beta_2(\varepsilon - \varepsilon_1)\, dF^*(\varepsilon_1) \right]$$

for all q_1, q_2 with $q_1 + q_2 \leq 1$. This is true if and only if