MODULE $AR1$

EXTENDS $Naturals$, $Integers$, TLC, $TLAPS$

VARIABLES h, m

$Init \triangleq \land h = 0$

$h1 \triangleq h \in 0 \,..\, 22 \land h' = h + 1$

$h2 \triangleq h = 23 \land h' = 0$

$Next \triangleq h1 \lor h2$

$Spec1 \triangleq Init \land \Box[Next]_{\langle h \rangle}$

$Initr \triangleq h = 0 \land m = 0$
$m1 \triangleq h \in 0 \,..\, 22 \land m = 59 \land h' = h + 1 \land m' = 0$
$m2 \triangleq h \in 0 \,..\, 22 \land m \in 0 \,..\, 58 \land h' = h + 1 \land m' = m + 1$
$m3 \triangleq h = 23 \land m = 59 \land h' = 0 \land m' = 0$

$Nextr \triangleq m1 \lor m2 \lor m3$

$Spec2 \triangleq Initr \land \Box[Nextr]_{\langle h, m \rangle}$

LEMMA $m1h1 \triangleq$
ASSUME $m1$
PROVE $h1$

BY DEFS $m1$, $h1$

LEMMA $m2h1 \triangleq$
ASSUME $m2$
PROVE $h1$

BY DEFS $m2$, $h1$

THEOREM $Spec2 \Rightarrow (\Box[Nextr]_{\langle h, m \rangle} \Rightarrow \Box[Next]_{\langle h \rangle})$