999-08-90 **Ralph N McKenzie*** (`mckenzie@math.vanderbilt.edu`), Department of Mathematics, 1326 Stevenson Center, Vanderbilt University, Nashville, TN 37240, and **Michael Jackson**. *A finitely generated variety of semigroups whose finite membership problem is NP-hard.*

For a class K of algebras (or structures) the finite membership problem asks for an algorithm which takes as input any finite algebra (or structure) A and outputs the correct answer to the question "is A in K?" We construct a 131-element monoid M so that the finite membership problems, both for the variety of semigroups generated by $(M, \circ)$, and for the variety of monoids generated by $(M, \circ, 1)$, are NP-hard—that is, the graph 3-coloring problem is interpretable into each of these problems by a polynomial-time algorithm. We ask if these problems (for this specific semigroup, or monoid) are NP-complete, i.e., can also be polynoial-time interpreted into the graph 3-coloring problem; we have only incomplete results on this problem. (Received August 13, 2004)