1107-11-148 **William Kang*** (williamkang531@gmail.com). *Efficient Covering Systems of Congruences and Perfect Powers Riesel Numbers.* Preliminary report.

A *Sierpiński* number is an odd integer k such that $k \cdot 2^n + 1$ is composite for all positive integer values of n. A *Riesel* number is defined similarly; the only difference is that $k \cdot 2^n - 1$ is composite for all positive integer values of n.

It is easy to construct Sierpiński (Riesel) numbers k such that k^q is also Sierpiński (Riesel) for every positive odd integer q. Chen asked whether this remains true for even values of q. Recently, Filaseta et al. solved the problem for the Sierpiński case in the affirmative. They also constructed odd numbers k, l, m such that k^2, l^4, and m^6, respectively, are Riesel numbers.

In 2009, Wu and Sun showed the existence of an odd k such that k^q is a Riesel number for all positive integers q such that $\gcd(q, 3 \cdot 5 \cdot 7 \cdot 11 \cdot 13)$. In particular, k^{2^s} is Riesel for all $s \geq 0$. In this paper we improve these results as follows:

We construct Riesel numbers k^2, l^4, and m^6 much smaller than those found by Filaseta, Finch, and Kozek.

We show the existence of an odd positive integer k such that k^q is a Riesel number for all positive integers q such that $\gcd(q, 3 \cdot 5 \cdot 7 \cdot 11)$. This improves Wu and Sun's construction. (Received January 11, 2015)