1046-Z1-1454 **Ala' Jamil Alnaser*** (alnaser@math.ksu.edu), Department of Mathematics, Kansas State University, Manhattan, KS 66502. *Waring's Problem in Number Fields.* Preliminary report.

Let p be an odd prime and $\gamma(k, p^n)$ be the smallest positive integer s such that every integer is a sum of s k-th powers $\pmod{p^n}$. Earlier we established $\gamma(k, p^n) \leq [k/2] + 2$ and $\gamma(k, p^n) \ll \sqrt{k}$ provided that k is not divisible by $(p-1)/2$. Also if $t = (p-1)/(p-1, k)$, and q is any positive integer, we showed that if $\phi(t) \geq q$ then $\gamma(k, p^n) \leq c(q)k^{1/q}$ for some constant $c(q)$. These results generalized results known for the case of prime moduli. Here we generalize these results to a number field setting. Let F be a number field, R it's ring of integers and P a prime ideal in R that lies over a rational prime p with degree of inertia f. Let $\gamma(k, P^n)$ be the smallest integer s such that every algebraic integer in F that can be expressed as a sum of k-th powers $\pmod{P^n}$ is expressible as a sum of s k-th powers $\pmod{P^n}$. We prove for instance that when $t = (p^f - 1)/(p-1, k)$ then $\gamma(k, P^n) \leq c(t)p^{nf/\phi(t)}$. (Received September 16, 2008)