Due: ???, 2005

Construct an oracle A such that $\mathrm{P}^A \neq \mathrm{NP}^A$, but $\mathrm{NP}^A = \text{co-NP}^A$.

Hint: Construct your oracle in the form $A = \mathrm{QBF} \oplus B$ where QBF is $\leq_{\mathrm{m}}^{\mathrm{P}}$-complete for PSPACE. Now, suppose B is sparse and has a highly predictable census. Show that for all such A, we have $\mathrm{NP}^A = \text{co-NP}^A$.