The biological importance of nitric oxide has been known for nearly forty years due to its role in cardiovascular and nervous signaling. The main carrier molecules, s-nitrosothiols (RSNOs), are of additional interest due to their role in signaling reactions. Additionally, these compounds are related to several diseases including muscular dystrophy, stroke, myocardial infarction, Alzheimer’s disease, Parkinson’s disease, cystic fibrosis, asthma, and pulmonary arterial hypertension. One of the main barriers to elucidating the role of these RSNOs is the low (nanomolar) concentration present in samples of low volume (typically ~100 μL). To this end we have set up a cavity ring-down spectrometer tuned to observe \(^{14}\text{NO}\) and \(^{15}\text{NO}\) released from cell growth samples. To decrease the limit of detection we have implemented a laser locking scheme employing Zeeman modulation of NO in a reference cell and have tuned the polarization of the laser using a half wave plate to optimize the polarization for the inherent birefringence of the CRDS mirrors. Progress toward measuring RSNO concentration in biological samples will be presented.