We present a majorization-minimization (MM) algorithm for non-linear split feasibility problems, an inverse problem that subsumes several important statistical problems. The classical multi-set split feasibility problem seeks a point in the intersection of finitely many closed convex domain constraints, whose image under a linear mapping also lies in the intersection of finitely many closed convex range constraints. Split feasibility generalizes classical inverse problems including convex feasibility, linear complementarity, and generalized linear model regression under constraint sets. When feasible solutions do not exist, methods that proceed by minimizing a proximity function can be used to obtain optimal approximate solutions to the problem. Our work extends the proximity function approach for the linear case to allow for non-linear mappings by presenting a new MM algorithm. The algorithm is amenable to quasi-Newton acceleration, and comes complete with convergence guarantees under mild assumptions, and applies to proximity functions in terms of arbitrary Bregman divergences. We explore several examples including regression for constrained generalized linear models and rank-restricted matrix regression, and consider a case study in optimization for intensity-modulated radiation therapy.