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We consider real inversion of the Laplace transform. It appears in engineering or physics, and it is ill-posed in the sense of Hadamard. We introduce a new real inversion formula employing Tikhonov regularization on a certain reproducing kernel Hilbert space. We also introduce multiple-precision arithmetic, that enables us to reduce rounding errors and is effective for numerical computation of ill-conditioned problems. We apply multiple-precision arithmetic to the regularized equation and establish reliable real inversion algorithm. (Received January 25, 2010)