ABSTRACT. We prove Li-Yau-Hamilton inequalties that extend Hamilton's matrix inequality for solutions of the Ricci flow with nonnegative curvature operators. To obtain our extensions, we apply the space-time formalism of S.-C. Chu and one of the authors to solutions of the Ricci flow modified by a cosmological constant. Then we adjoin to the Ricci flow the evolution of a 1-form and a 2-form flowing by a system of heat-type equations. By a rescaling argument, the inequalities we obtain in this manner yield new inequalities which are reminiscent of the linear trace inequality of Hamilton and one of the authors.