Lemma. For $A, B, C, D \in \mathcal{A}\mathbf{P}$, $A \leq_{\mathcal{A}\mathbf{R}} C$ and $B \leq_{\mathcal{A}\mathbf{R}} D$ implies $A \cup B \leq_{\mathcal{A}\mathbf{R}} D$ $C \cup D$.