We can conclude that A must be a minimum-cost arborescence. Let r be the designated root vertex in $G = (V, E)$; recall that a set of edges $A \subseteq E$ forms an arborescence if and only if (i) each node other than r has in-degree 1 in (V, A), and (ii) r has a path to every other node in (V, A).

We claim that in a directed acyclic graph, any set of edges satisfying (i) must also satisfy (ii). (Note that this is certainly not true in an arbitrary directed graph.) For suppose that A satisfies (i) but not (ii), and let v be a node not reachable from r. Then if we repeatedly follow edges backwards starting at v, we must re-visit a node eventually, and this would be a cycle in G.

Thus, every way of choosing a single incoming edge for each $v \neq r$ yields an arborescence. It follows that an arborescence A has minimum cost if and only, for each $v \neq r$, the edge in A entering v has minimum cost over all edges entering v; and similarly, an edge (u, v) belongs to a minimum-cost arborescence if and only if it has minimum cost over all edges entering v.

Hence, if we are given an arborescence $A \subseteq E$ with the guarantee that for every $e \in A$, e belongs to *some* minimum-cost arborescence in G, then for each $e = (u, v)$, e has minimum cost over all edges entering v, and hence A is a minimum-cost arborescence.

[1] ex910.984.431