Peter J. Wilcoxen
PAI 723, Economics for Public Decisions

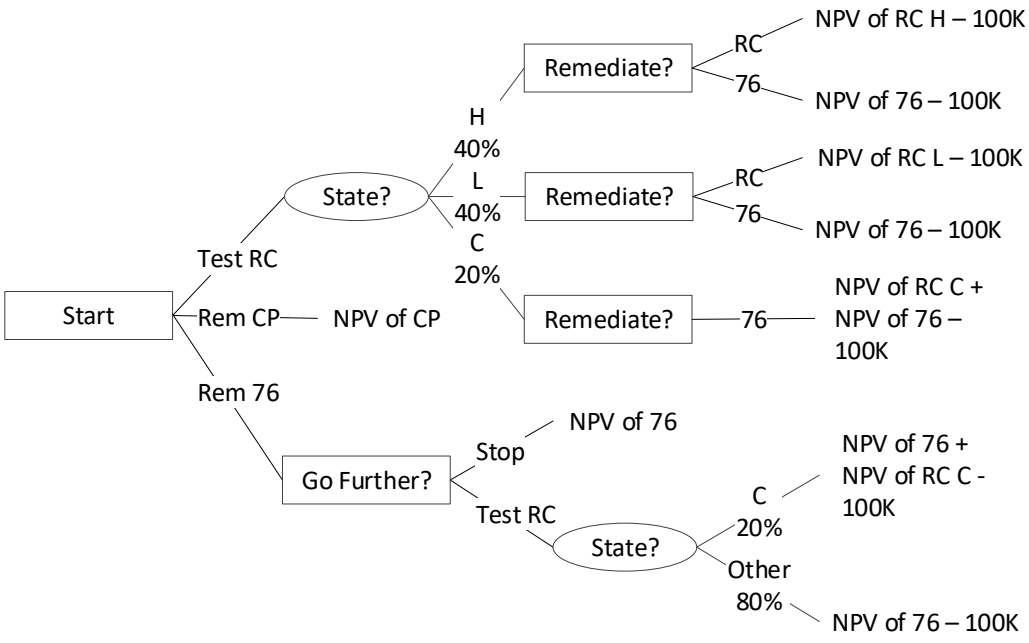
Department of Public Administration
The Maxwell School, Syracuse University

Solution to the Brownfields Exercise

Note: this explains the analysis but it's not in the form of a memo.

The starting point for the analysis is an initial choice between three actions: testing Roosevelt and California, remediating Cuneo Press, or remediating 76th and Albany. Moving on from there produces the decision tree shown below. For compactness, the tree uses the following notation: Roosevelt and California is abbreviated RC, Cuneo Press is CP, 76th and Albany is 76, the heavily contaminated state of RC is H, the lightly contaminated state is L, and the clean state is C. Remediating a site is abbreviated "Rem" in places. Each of the payoffs involves a cash flow (discussed in more detail below) abbreviated "NPV of RC H" for remediating RC when contamination is H, etc. In principle, each decision also includes a branch for "stop" but that option is never taken and all but one of those branches have been omitted for clarity.

Figure 1: Full Decision Tree with Abstract Payoffs



Some brief notes on reading the diagram: (1) there's no initial branch for remediating RC because it's not possible to do that without doing the test first; (2) along the "Test RC" branch, the action to remediate CP is no longer available because it costs more than the amount of budget remaining after the test ($525K); (3) along the "C" branch for the state of RC, the only available action (other than stopping) is to remediate 76 since RC itself is clean; (4) the payoff from that

last branch is the sum of the benefit from showing that RC is clean and the benefit from cleaning up 76.

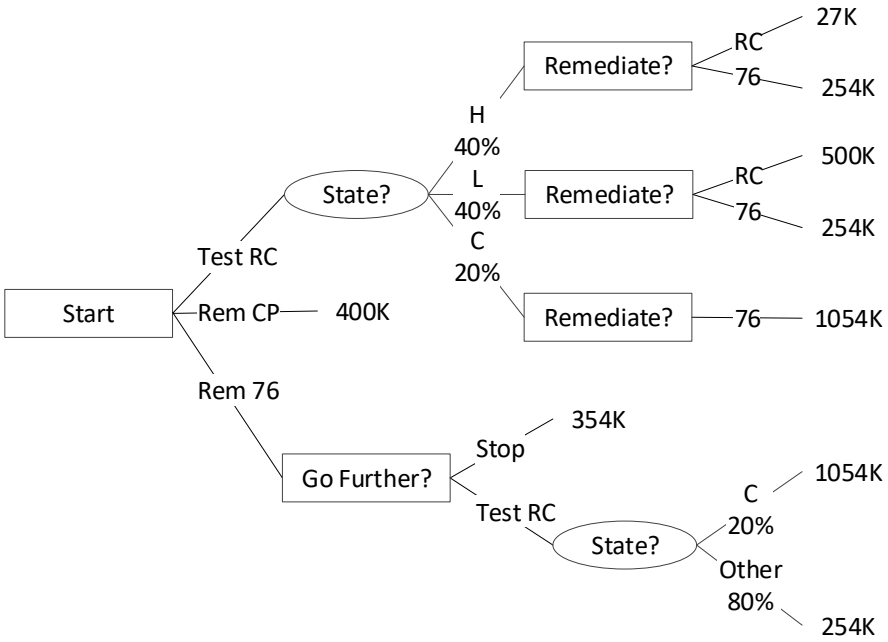
The NPVs are calculated by computing the avoided damages of treating each site (the benefits produced) and comparing that to the cost of remediation. The avoided damages from treating each of the sites, as well as the remediation costs and NPVs are summarized in Table 1.

Table 1: Summary of Avoided Damages and Remediation Costs

Site and condition	Avoided damages	Cost of remediation	NPV
CP	$1M	$600k	$400k
RC H	$627k	$500k	$127k
RC L	$800k	$200k	$600k
RC C	$800k	$0	$800k
76	$854k	$500k	$354k

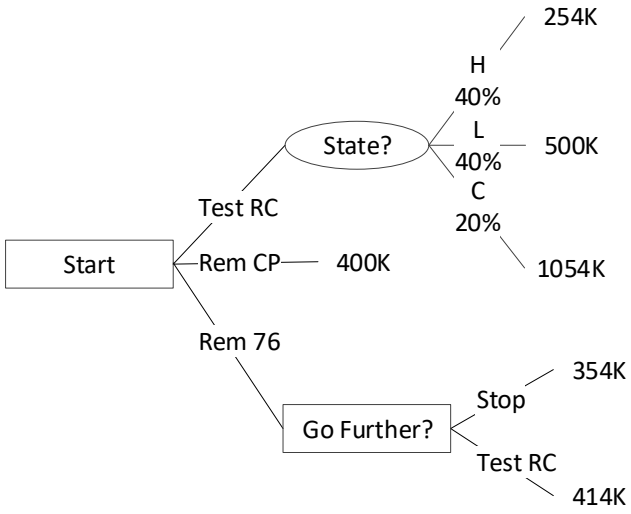
Inserting those numbers into the tree produces the following:

Figure 2: Decision Tree with Numerical Payoffs



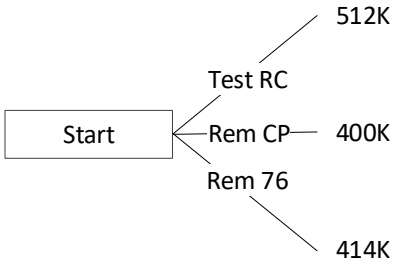
Simplifying the tree by choosing the highest value branch of each of the remediation decisions at the far right and computing the EV of the "State?" node at the bottom right produces the following:

Figure 3: Decision Tree After Simplification



Finally, taking the EV of the "State?" node on the "Test RC" branch and choosing the best action from the "Go Further?" node produces the tree shown below.

Figure 4: Simplifying the Tree to the Root Node



Since the EV of the test is higher than the payoff from the next best option, which is cleaning up 76 and testing RC just in case it happens to be clean, it's best to do the test. Note that the EV includes the payoffs from making the best subsequent decision under each possible condition of RC.