Cost Benefit Analysis of Hydrocarbon Seep Tents

Background. The Santa Barbara Channel contains some of the world’s most productive marine hydrocarbon seeps. The seeps emit both oil and natural gas. Both types of emissions cause pollution: oil pollutes the beaches and hydrocarbons are a major precursor to ground-level ozone which causes local health problems.

In the early 1980’s, ARCO installed 2 seep “tents” – concrete and metal structures each approximately 10,000ft² in size – to capture the hydrocarbons. ARCO received two benefits from this capture. First, they piped the gas on-shore, processed it, and sold it. Second, because the reduction in hydrocarbons escaping to the atmosphere created a health benefit for Santa Barbara county, the Santa Barbara Air Pollution Control District (APCD) gave ARCO “credits” for this emissions reduction. These credits could be used by ARCO to offset pollution ARCO generated elsewhere.

Twenty years later, although the seep flux has subsided a bit, the total energy seeping from the hydrocarbon field still exceeds the total amount of energy utilized by UCSB. Although the ARCO tents still capture some of the hydrocarbons, the captured gas represents only a small percentage of total emissions from the field.

Owing to great interest in reducing ground level ozone in the county, the APCD is wants to know whether more seep tents should be installed in areas of high hydrocarbon seepage. Specifically, APCD wants to know if on the basis of total costs and benefits, additional seep tents are warranted.

Your Assignment. Your assignment is to write a brief report regarding the economic feasibility of installing additional seep tents in the Santa Barbara Channel. Your analysis is preliminary because you have only limited data to work with. The available data and maps are attached to the end of this problem statement.

Available data:

1. Spatial MAP of seeps
2. COSTS (estimates of design, construction, and maintenance costs)
3. PRICE (plot of historical gas prices from the web)
4. HEALTH (table of the expected health benefits from 1 tent, and estimates of economic impacts per case from the literature)
5. CAPTURE (plot of capture of seep gas from the ARCO tent)

Deliverables: Your report should be in the form of a memo to the head of the APCD. The text of your report should not exceed 2 pages, including tables and figures (single spaced, 12 point, standard margins). You may attach appendices that detail calculations, maps, and/or models. The APCD would like you to address the following in your report: (1) How you have conceptualized your cost benefit analysis (2) a list and explanation of your assumptions, (3) your preliminary recommendation, (4) some analysis or explanation of the uncertainty in this problem and how it might affect your recommendation, and (5) suggestions about what data and/or models should be acquired before making a final recommendation.