

Reading Question 3.1:

- a) List possible solutions

Develop a plan

- b) Evaluate and rank the possible solutions
Re-evaluate the plan to check desirability

Check the result

Reading Question 3.2:

An independent company would have to treat and dispose of the acid just as our company would have to do. In addition, transportation costs and profit for that company would be added onto the charge we would have to pay. Thus, it would seem that we can do it more cheaply. This would not be true, however, if the independent company already had equipment for doing the necessary treatment. For this analysis, we assumed that no such company could be identified.

Reading Question 3.3:

The arguments may differ as they were based on at least two factors which are geographically dependent. First, the local climate influences the evaporation rate. The text mentioned the influence of the temperature on the evaporation rate. The humidity level would also influence the rate. Second, the environmental regulations differ from state to state and may therefore be different in your hometown. Also, the local availability of land on which to place the evaporation pond may be a factor.

Reading Question 3.4:

The two properties that would need to be changed are the pH and temperature of the waste stream.

Reading Question 3.5:

If our waste stream exceeded the maximum limit of dissolved solids, we would have to consider means of reducing the concentration of dissolved solids in order to satisfy the regulations.

Reading Question 3.6:

The key assumption behind the use of teams is that the team as a whole can accomplish more than the sum of the efforts of the individuals working alone. This assumption will not be true if the group does not function well because of poor communication, lack of cooperation, etc.

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Reading Question 3.7:

Answers will vary from student to student. Your response, however, should reflect an understanding of the role that you have chosen.

Reading Question 3.8:

Knowledge of the stages of team development can help the team proceed more rapidly to the performing stage. It is important to understand, for example, that conflict is normal and can be overcome in order to achieve the desired outcomes.

Homework Problem 3.2:

This should simply include items (a) through (f) as stated in the problem. Example:

From: Douglas E. Law, Engineer, Chemical Process Group
To: Barbara Magelby, Supervisor, Chemical Process Group

This is to confirm that I have received your memo concerning our hydrochloric acid waste disposal problem. My team has met and begun deliberations on this matter.

Thus far, we have considered several possibilities with regard to managing our waste product. The following ideas have the most merit:

1. Contract with an outside company to dispose of the waste for us. While this option is attractive because it requires very few other changes, it leaves us vulnerable to future instabilities in other companies as is the present case.
2. Treat the waste ourselves and dispose the final stream in the lake on the adjacent property. This would require a process similar to that used by the companies with which we might contract, but we would be spared the costs of transportation and profits required by such companies. Significant initial investment would be required for equipment and construction, but is likely to result in long-term savings, if not profits.

After consideration of these and other possibilities, my team has concluded that treating the waste ourselves is the most attractive option at this time. We are currently formulating a preliminary design and will continue to keep you informed of our progress.

Homework Problem 3.4:

The following items in the Code of Ethics were specifically violated:

- Hold paramount the safety, health, and welfare of the public and protect the environment in performance of their professional duties.
- Formally advise their employers or clients (and consider further disclosure, if warranted) if they perceive that a consequence of their duties will adversely affect the present or future health or safety of their colleagues or the public.

These were violated because the Union Carbide chemical plant personnel failed to 1) maintain the safety equipment in working order, 2) train personnel in maintenance and safety procedures, and 3) create a plan to notify/evacuate the community in the event of an accident.

Homework Problem 3.6:

- a. Put the power plant back into operation.
Overcome safety issues to reopen the old mine.
What fuel source should be used.

b. and c.

Extend the tracks to the modern coal mine.

Cost of laying track in the terrain between coal mine and plant

Any obstructions, legal or physical.

Truck the coal in from the modern mine.

Cost transportation

Regulations on transportation

Modernize the old mine.

Is it possible?

Cost of doing so.

Safety factors.

Strip mine the coal.

Cost of doing so.

Will the mine collapse underneath?

Environmental concerns to strip mining.

Convert the plant to an alternative fuel source

Is it possible?

Fuel source available i.e. oil, gas, wood.

Cost of conversion.

- d. Could be anything.