**Problem Set 2, part 2**
Introduction to Environmental and Resource Economics, October 12, 2004
Due Oct. 18

1. Return to Problem 2, due Oct. 12.

   (a) Using the graph, explain how a Pigovian tax could bring about the socially optimal level of production. How could this tax be set in order to succeed? (There are two possible answers).

   (b) Again using the graph, illustrate and explain what would happen if the tax were incorrectly set. Show graphically what the loss to society would be.

2. Return to the "market for cookies" problem (Problem 3, due Oct. 12).

   (a) Suppose the social planner, in an effort to increase cookie production, sets the price of cookies at the level where marginal social benefits equal marginal private costs. Explain how this would affect the market for cookies.

      i. Show this price on your graph.
      ii. How many cookies would be produced (at first)?
      iii. How many would be purchased?
      iv. Would the social planner's policy be successful? Explain.

   (b) Suppose the social planner commanded the cookie producers to increase production. Would they be likely to comply? Explain why or why not.

   (c) Suppose cookie producers are given a subsidy of 2 cents per cookie. Identify the new level of output on your graph.

   (d) Does the subsidy lead to a social improvement? Compare the totals of the three types of benefits to make your argument.

3. Return to the "house along the river" problem (Problem 4, due Oct. 12).

   (a) Assume the factory was required by law to compensate you for the external damages from pollution.

      i. How would this rule change the factory's marginal cost curve?
      ii. What would the factory's new optimal level of pollution be?
      iii. What conditions would have to hold for the liability rule to be effective?

   (b) Assume instead of the liability rule, the social planner limited production from the plant to the socially optimal level of output.

      i. Explain why producers and consumers have an incentive to trade beyond this level.
      ii. What is a possible unwanted result of the quantity restriction?

(c) Assume that the social planner decides to implement a Pigovian tax on output for the firm.

i. If a constant per-unit tax is set, what value of the tax would induce the firm to produce at the socially optimal level?

ii. If a variable per-unit tax is set, how should the tax be set?

iii. What information would the social planner need in order to correctly set the tax?

iv. Assume the tax is set incorrectly by the social planner. Would the mistake be likely to be more costly with the constant per-unit tax or the variable tax? Explain. (Hint: the answer may be "it depends".)

v. Even if an incorrect tax is set, explain how the tax will at least have the desired qualitative (directional) effects. What additional incentives might be created by this tax?