Economic Instruments and Polyvinyl Chloride (PVC)

PVC manufacturing is a major use of chlorine and has a number of environmental concerns associated with its production, use, and disposal lifecycle, including the co-use, generation, and release of a substantial number of persistent toxic substances, including several of the 11 Critical Pollutants. As noted earlier, the problem analysis and definition underlying the economic instruments work indicated that the production, use, and disposal life-cycle of chlorine and chlorine-containing compounds was a major source of the indicator persistent toxic substances.

The scope of the study (2) was only able to include actions specific to the uses of PVC in the building and construction sector, which accounts for about 46% of PVC use in the Great Lakes basin (Table H-3). These results may also be representative of the potential impacts on PVC uses not explicitly considered. Thus, these results are likely lower bound estimates.

The economic instruments program involves applying an input tax on chlorine used in PVC production, with the tax rising over time to discourage PVC use. The program considers the PVC demand and associated chlorine use only in the Great Lakes basin for 1992. All the actions identified to reduce or eliminate PVC use were substitutes, the costs of which were used to provide the first estimate of the appropriate input tax schedule that would lead to virtual elimination. The relative costs of the substitute applications examined were used to derive the least-cost curve (Figure H-2), from which a sequence of tax increments and progress towards virtual elimination were drawn.

The PVC example cannot stand alone. All chlorine uses must be factored into the program. The instruments considered for PVC should be examined for effects on other uses of chlorine.

The major findings, again taken as indicative rather than exact, include:

- About 20% of PVC uses have numerous substitutes already available at less cost than PVC. Therefore, announcement of an input tax program could encourage these actions without having to actually implement the tax at that time.
- An input tax of $2 per kg of PVC could encourage most watermain and sewer pipe applications to switch to substitutes, which involves 25% of PVC use.
- Above a level of $2 per kg, there are very substantial to extreme jumps in the level of the tax required to encourage alternatives. This is due, in part, to the restricted set of PVC uses considered.
- At a tax rate of $10 per kg of PVC, most electrical conduit applications could be encouraged to switch from PVC, involving about 42%.

- At a tax rate of $100 per kg of PVC, building and construction uses are unattractive, and almost all (44% of the 46% of the total use that was considered) could be substituted.

- At a tax rate of $300 per kg of PVC, it is likely that very few uses of PVC would remain.

- Revenues from a tax on PVC are estimated to peak at about $3 per kg (Figure H-3). The total revenue generated is about $400,000,000 per year. The cumulative reduction in the use of PVC at this tax rate is about 20%.

- After a drop, a second peak in revenues (about $325,000,000 per year) arises at about $6 per kg, when a total of about 38% of all PVC use is eliminated.

- At about $10 per kg the tax is expected to eliminate about 42% of total PVC use.

- The tax can be placed at several places in the life-cycle of PVC, including input taxes on chlorine, taxes on manufactured PVC itself, and deposits on PVC products to ensure control over disposal practices.

- The impacts on employment would be expected to balance out between the PVC and substitute sectors.

- Short-run cost increases would be diffused throughout the economy. In the long run, there would be capital switching (as noted previously); however, there is a need to account for the opportunity cost savings emergent from the declining sector. As well, costs and prices of the substitutes would normally be expected to move downwards over time, removing some of the initial price disadvantage where it exists.

- The analysis assumes that the substitutes are equally functional. Some examples, like underground irrigation pipe, appear to be exceptions, although the development of alternative plastics should be possible. In general, there is a need in this respect to consider how valuable particular specialized uses for PVC are, considering the hidden costs in persistent toxic substance contamination.

- Stakeholder consultations revealed that a combination of all three programs was most effective. This included an input tax on chlorine, combined with a ban on PVC use in building products and widely disseminated information. Industry groups in competition with PVC generally thought that a ban would be most effective.

- Stakeholders agreed that the tax revenues should be used to mitigate the impacts of the program.

- There is a need to target PVC products with fast turnaround, such as packaging.

- The consultant suggested (2) that the most effective taxes will be on the generation

of waste PVC. Voluntary programs for PVC use reduction may have limited effectiveness. Bans based on environmental impact and not economic impact would be most effective.

- Regulatory approaches could consist of a ban on manufacture of PVC, a ban on certain uses (e.g. packaging and other non-durable goods), and prohibition or limits on incineration of PVC.

- Pollution prevention can provide information and moral suasion. This can consist of information on environmental impacts of PVC. It can also provide information on audit programs and alternatives.