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**Life after the Federal Register Notice: Tracking Processes of
Environment-Saving Innovation in Three Industries**

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Abstract

The processes of innovation in response to environmental regulation have received insufficient theoretical or empirical attention. This paper, and the research framework described in detail in underlying dissertation, would provide conference attendees with a possible structure for further research that may help generate findings that better reflect both: (1) the on-going changes in the regulatory policy environment, and (2) the specific innovation issues associated with particular technologies.

Theoretically, researchers tend to attribute an innovative response to environmental regulation at the regulated firm as a function of the type of regulation (e.g., fee or standard), the stringency of the regulation, or the clarity of the regulatory process. Policy prescriptions are offered without an assessment of whether the assumptions underlying the theoretical approach hold in the real world. Empirically, academic writing on innovation tends to focus on anecdotal reports of either "success stories" (e.g., toxic use reduction) or "barriers to innovation," with the emphasis on the former. The increasing regulation of toxic substances -- by regulations of varying types, levels of stringency and clarity -- has been used as evidence for a number of competing theories. Finally, the lack of systematic research has tended to leave the impression that all firms/technologies have the same opportunities for pollution prevention as 3M and the other oft-cited cases of innovation.

To begin to address these theoretical and empirical gaps in the literature, this paper will present the findings of my dissertation research into the processes of innovation, in response to environmental regulation, in three industries, over a period of 32 years (1967 to 1998). Given the inadequacies of existing theory in predicting behavior in a complex regulatory environment, the paper will use Douglass North's notions of transactions costs

and adaptive efficiency to provide a theoretical structure. It will focus on how industry organizations reduce the transactions costs of technological change (i.e., the costs of understanding the regulations, identifying options, and overcoming organizational inertia) over time. The paper will also provide a conceptual framework for differentiating among industries on the basis of their technologies, the demands they place on the environment, and the potential nature of innovation in response to regulation.

Data for the comparative case study is taken from industry trade journals (published by technical societies) in three industries: iron and steel, foundry casting, and metal finishing. Each industry uses fundamentally different technologies that place different demands on the environment. Each has been subject to successive waves of regulatory activity. The paper will report findings on how the trade journal/technical society itself has adapted to reduce firms' transactions costs of technological change. In addition, it will report observations on how the processes of technological innovation in response to environmental regulation appear to vary with industry and technology. These observations are intended to provide the framework for on-going research into ESI.