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# THE POLITICAL AND LEGAL CAUSES OF REGULATORY DELAY IN THE UNITED STATES: FOUR CASE STUDIES OF AIR POLLUTION PERMITTING IN THE U.S. AND GERMANY

John P. Dwyer, Richard W. Brooks, and Alan C. Marco\*

*We compare the process to obtain air pollution emission permits for automobile assembly plants in the U.S. and Germany. The project consists of four case studies in which we compare the costs of obtaining air pollution permits for assembly plant “paint shops”—the part of the factory where new cars and trucks are painted. The plants are owned by the same company, use nearly identical paint application technologies and paints, and use virtually the same air pollution control technologies. Moreover, both countries are federalist in structure, with the national government setting general standards, and the states issuing and enforcing individual permits. These similarities allow us to compare the permitting processes in U.S. and Germany, and to isolate the salient political and legal differences and economic consequences.*

*In both the United States and Germany, state air pollution agencies implemented federal standards that effectively required the assembly plants to install similar pollution abatement technologies to control emissions resulting from increases in production or changes in paint composition. Nevertheless, the two countries’ regulatory processes are rather different. Air pollution control laws, regulations, and plant-level permits in the U.S. are somewhat more stringent, detailed, and prescriptive than in Germany. Moreover, U.S. law provides substantially greater opportunity for public participation in agency permitting decisions, and at one U.S. plant, public participation significantly affected the regulatory outcome. For these and other reasons, the permitting processes at the U.S. plants were much slower and more conflictual than at the German plants, resulting in much longer delays in making production changes and installing new pollution controls.*

## I. INTRODUCTION

Ground-level ozone is harmful to humans, animals, and vegetation.<sup>1</sup> The primary constituent of smog, ozone is generated by the chemical interaction of volatile organic compounds (VOCs),<sup>2</sup> nitrogen oxides, and sunlight. Consequently, a principal strategy to reduce urban smog in many industrialized countries is to regulate VOC emissions from industrial facilities and automobiles. For large industrial facilities, environmental agencies frequently implement and enforce VOC emission limits through individually negotiated air pollution permits.

In this study, we compare the process to obtain VOC emission permits for automobile assembly plants in the U.S. and Germany. The project consists of four case studies in which we compare the costs of obtaining air pollution permits for assembly plant “paint shops”—the part of the factory where new cars and trucks are painted. The plants are owned by the same company, use nearly identical paint application technologies and paints, and use virtually the same air pollution control technologies. Moreover, both countries are federalist in structure, with the national government setting general standards, and the states issuing and enforcing individual permits. These similarities allowed us to compare the permitting processes in U.S. and Germany, and to isolate the salient political and legal differences and economic consequences.

The next section briefly describes the vehicle coating process and the technological means through which VOCs are emitted and controlled. Section III summarizes U.S. and German air pollution laws and regulations. Sections IV and V tell the permitting stories in the U.S. and Germany. Section VI concludes with a summary of our findings and a discussion of the policy implications.

## **II. VEHICLE COATING PROCESSES AND VOC CONTROL TECHNOLOGIES**

Painting the newly manufactured autobody is the most pollution-intensive aspect of automobile manufacturing, and consequently it is the principal focus of environmental regulation in the assembly plant. VOC emissions from the paint-shop, which come predominantly from the paint solvents released in the paint application and curing processes, are an overwhelming fraction of the total VOC emissions from the assembly plant.<sup>3</sup>

After a vehicle body has been stamped, welded, and washed, it is dipped into an electrolytic deposition bath (e-coat), which provides the vehicle's primary corrosion-protection coating. The coated body then is put in a "bake oven" to cure the coating, and thereafter sanded to prepare the surface for the next coat. After application of the e-coat, robots in a spray-booth apply a "guidecoat," which is designed to prevent the topcoat from chipping and to provide a smooth surface for application of the topcoat. After the coating is cured in a bake oven, the body goes to the top-coat line. Modern topcoats typically consist of a thin "base coat" (BC) containing the concentrated pigment and a thicker "clear coat" (CC) containing a gloss. After each application, the coating is cured in a bake oven, left to cool in a cooling area, and then sent to the assembly plant. At each stage, VOCs are released from the spray booth, the bake oven, and the cooling area. The largest sources of VOC emissions in the assembly plant come from the application of the topcoat, followed by the purging and cleaning of the spray guns, and then the application of the guidecoat.

Auto manufactures use three strategies to reduce VOC emissions in the paint shop: reduce the VOC content of the coatings, modify the application technology to use less paint (and thus less solvent), and employ one or more emissions control technologies. In response to Environmental Protection Agency regulations, U.S. automakers have significantly reduced emissions by using coatings containing smaller amounts of VOC solvents<sup>4</sup> and by using more efficient application techniques. In the early 1980s, however, U.S. automakers faced competitive pressures from European and Japanese manufacturers using high-VOC BC/CC topcoats to produce high-quality, durable finishes.

To meet increasingly strict air pollution standards, as well as to compete with foreign automakers, U.S. automakers and paint manufacturers began to develop low-VOC topcoats and more efficient transfer technologies.<sup>5</sup> U.S. manufacturers hoped that such technological advances would obviate the need for expensive emission control technologies. In some cases, the new paint formulations and application technologies were not sufficient to meet the air pollution standards, and automakers had to install VOC emission control technologies.

Automakers rely on two emission control technologies to reduce VOC emissions: thermal oxidation and carbon adsorption. Thermal oxidizers burn VOCs in the exhaust stream before they are released through the plant's vents to the atmosphere. Manufacturers commonly use a thermal oxidizer (or "afterburner") to incinerate VOCs emitted from the bake ovens. Thermal oxidizers are much less efficient with dilute exhaust streams from the spray booths, where ventilation is required to protect worker health and safety and to prevent overspray from drifting to other vehicles. If not simply released to the atmosphere, such dilute exhaust streams first are passed through carbon filters, which adsorb the VOCs (the VOCs not adsorbed are released to the atmosphere). When the filters become saturated, the process is reversed and the desorbed (and now concentrated) VOCs are incinerated in a thermal oxidizer before the exhaust is vented to the atmosphere.<sup>6</sup>

### **III. REGULATORY BACKGROUND**

#### **A. Air Pollution Regulation of Vehicle Manufacturers in the U.S.**

Under the federal Clean Air Act,<sup>7</sup> regulatory authority over non-hazardous air pollution from industrial and commercial facilities is divided between the federal Environmental Protection Agency (EPA) and state and local air pollution agencies.<sup>8</sup> EPA's principal responsibilities are to set national ambient air quality standards (NAAQS) for common industrial and automotive pollutants,<sup>9</sup> and to adopt industry-specific emission standards for newly constructed or modified facilities, called new source performance standards (NSPS).<sup>10</sup> In 1977, Congress adopted two additional programs for new and modified facilities. The "non-attainment" program is designed for new and modified facilities in areas that have not yet achieved the NAAQS.<sup>11</sup> The "prevention of significant deterioration" (PSD) program is designed to restrict the degradation of air quality in areas where the air is cleaner than required by the primary NAAQS.<sup>12</sup> Together, the non-attainment and PSD programs constitute the so-called New Source Review program.

State and local environmental agencies implement and enforce the federal air quality and emission standards,<sup>13</sup> as well as any stricter state standards and state nuisance laws. Each state must adopt a state implementation plan (SIP) that specifies the emission limits for each source of pollution, that contains adequate provisions to monitor and enforce the emission limits,<sup>14</sup> and that has adequate procedures for public participation.<sup>15</sup> Significant sources of air pollution must obtain a five-year permit specifying emission limits, site-specific control technologies, and monitoring, recordkeeping, and reporting requirements. The permits must meet the requirement that when emissions from all facilities are aggregated under local weather and geographical conditions, the resulting air

pollution levels do not exceed the NAAQS.<sup>16</sup> The SIPs and individual air pollution permits are subject to EPA approval. In addition, EPA oversees state enforcement, and may file its own enforcement actions, even if the state agency already has sought enforcement.<sup>17</sup>

*New Source Performance Standards (NSPS).* The Clean Air Act requires emission limits for categories of new and modified facilities<sup>18</sup> to be equivalent to limits achievable by the “best system of emission reduction” that has been “adequately demonstrated,” taking into account control costs.<sup>19</sup> To implement these statutory requirements, EPA established separate VOC emission limits for the e-coat, guidecoat, and topcoat operations,<sup>20</sup> and adopted regulations requiring the manufacturer to conduct monthly self-monitoring tests,<sup>21</sup> to monitor the temperature in thermal oxidizers,<sup>22</sup> and to file quarterly reports on compliance and other issues.<sup>23</sup> The federal standards do not specify coating composition, application technologies, or control technologies. Manufacturers are free to use any methods, so long as they observe the specified emission limits.

EPA may relax NSPS standards in certain circumstances: EPA may grant an “innovative technology waiver” for emission limits to “encourage the use of an innovative technological system” of emission reduction.<sup>24</sup> Before granting the waiver, EPA must obtain the consent of the governor of the affected state and give public notice and an opportunity for a public hearing on the proposed waiver.<sup>25</sup> With the waiver, companies might avoid the need to install expensive control technologies soon rendered obsolete by new technological developments.<sup>26</sup>

*New Source Review.* In non-attainment areas, proposed new and modified major sources<sup>27</sup> of pollution must meet several stringent criteria to obtain a permit.<sup>28</sup> The source must demonstrate that it has obtained sufficient “offsets”—emissions reductions from other facilities in the same non-attainment area—so as to make “reasonable further progress” toward attaining the primary NAAQS.<sup>29</sup> For example, in a “severe” nonattainment area—which is the classification for Middlesex County, New Jersey, where Ford’s Edison plant is located—a new or modified source must reduce VOC emissions at other facilities by 130 tons for every 100 tons of additional VOC emissions.<sup>30</sup> Regardless of the offsets obtained, a new or modified facility also must install control technologies equivalent to the “lowest achievable emission rate” (LAER),<sup>31</sup> a standard that does not take into account the cost of controlling emissions. Finally, the facility owner must demonstrate that the owner’s other major sources meet the SIP requirements and that the “benefits of the proposed source significantly outweigh the environmental and social costs” of the new facility.<sup>32</sup>

In attainment areas, proposed major new and modified sources of pollution must meet certain criteria under the PSD program.<sup>33</sup> Before construction, the owner of a proposed “major emitting facility” must demonstrate that the emissions from the new facility will not cause air quality to degrade more than permitted by statute, that the facility will meet applicable NSPS, that the facility will meet an emission standard equivalent to the “best available control technology” (BACT), and that the agency has prepared an analysis of the projected air quality impacts arising from growth associated with the facility.<sup>34</sup>



There are important differences between the non-attainment and PSD programs. For example, LAER is more stringent than BACT, and only facilities in non-attainment areas must obtain offsets. But there are important similarities as well. Both programs focus on new and modified facilities, and both focus on “major” sources of pollution, although the definition of “major”—in terms of annual VOC emissions—is much smaller in heavily polluted nonattainment areas. Facilities in both areas are subject to technology-based emission standards that effectively require new or modified facilities to install certain types of control technologies to reduce emissions, with the details subject to negotiation between the facility and the state environmental agency. In addition, in both PSD and non-attainment areas the agency must prepare an analysis of the environmental impacts of the proposed new facility. Finally, regardless of the area’s attainment status, the agency’s findings and tentative decision to grant a permit are subject to public review and comment.

*State Nuisance Law.* Although VOC emissions are primarily governed by national air quality and emissions regulations, they also may be subject to state nuisance laws if they are odorous.<sup>35</sup> In the U.S., state nuisance standards are quite general, and normally are enforced through court litigation resulting in injunctive relief and damages.<sup>36</sup>

*Public Participation.* Federal and state laws provide ample opportunity for public review and comment on proposed permit decisions. The U.S. regulatory system relies on public participation in permitting, monitoring, and enforcement to ensure that regulatory agencies adhere to statutory standards. For example, in deciding whether to grant an innovative technology waiver of the NSPS emission standards, EPA must give public

notice and an opportunity for a public hearing on the proposed waiver.<sup>37</sup> In addition, under federal law, the information submitted by the owner of a facility in a non-attainment area, as well as the agency's analysis of the data, are subject to a 30-day public review and comment period.<sup>38</sup> Similarly, federal law provides that a state's tentative decision to issue a PSD permit is subject to a public hearing process.<sup>39</sup>

State statutes (recall, it is states that issue the permits) typically require a public meeting to discuss the permit conditions, and many states also permit members of the public to petition the agency for a contested administrative hearing.<sup>40</sup>

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Available data suggest that the federal air pollution control programs have significantly reduced both total VOC emissions and VOC emissions per vehicle from automobile assembly plant paint shops.

**Automobile Production in the United States  
and VOCs Emissions from Automobile Assembly Plant Paint Shops<sup>41</sup>**

Year	Passenger Vehicles (thousands)	Total VOC Emissions for Autos and Light Trucks (thousands of short tons)	VOC Emissions Per Passenger Vehicle (tons per vehicle)
1975	6,717	204	0.0304
1980	6,376	165	0.0259
1985	8,185	85	0.0104
1990	6,077	92	0.0151
1995	6,351	96	0.0151

Thus, in 1975, when most plants had not yet installed emission controls under the 1970 Clean Air Act, VOC emissions from automobile assembly plant surface coating operations were at an all time high. Installation of new emission controls reduced total

VOC emissions to 165,000 short tons in 1980 and 85,000 short tons in 1985, despite an increase in vehicle production, thus reflecting the impact of NSPS standards (which became effective in 1980 for assembly plant paint shops) and the PSD and non-attainment programs (which began to take effect in the late 1970s). These standards and programs, of course, applied only to new and modified facilities. Thus, part of the decrease in VOC emissions was due to somewhat less stringent controls required for existing, unmodified facilities in non-attainment areas, such as the requirement for low-solvent paints. Emission increases in the 1990s (both total VOCs and emissions per vehicle) probably reflect the switch to the new high gloss topcoats.

#### **B. Air Pollution Regulation of Vehicle Manufacturers in Germany**

The Basic Law (*Grundgesetz*) divides authority for air pollution control between the national government (*Bund*) and the sixteen federal states (*Länder*).<sup>42</sup> Under this arrangement, the national government has adopted substantive standards and licensing procedures to control emissions from industrial facilities, leaving the *Länder* sole responsibility for implementation and enforcement, a division of authority that is strikingly similar to the division of authority under the U.S. Clean Air Act. There are important differences, however. First, the *Grundgesetz* does not allow the federal government to oversee or take over the *Länder*'s functions.<sup>43</sup> Second, the federal government has no enforcement authority, and the Ministry for the Environment does not even have regional offices.<sup>44</sup> These two factors ensure that the *Länder* retain virtually complete discretion in the implementation of the federal statutes and regulations. Third, federal laws and regulations that the *Länder* must implement are subject to approval by

the *Bundesrat*,<sup>45</sup> the upper house of Parliament whose members are ministers (commonly, they are environmental ministers) of the *Länder*. Thus, federal environmental regulations reflect broad consensus among the *Länder*.

Germany's main federal air quality legislation, the Federal Immissions Control Act (*Bundes-Immissions-Schutzgesetzes* or *BImSchG*), was enacted in 1974 and subsequently amended several times, most recently in 1995. The Act provides general criteria to determine which industrial facilities must obtain a license—essentially facilities that would cause “considerable disadvantage” or “considerable nuisance.”<sup>46</sup> Under the regulations of the federal Ministry for the Environment, Nature Conservation and Nuclear Safety, automobile manufacturing plants must be licensed.

*Permitting Standards.* The federal Act provides two principal substantive requirements for licensed facilities. First, licensed facilities must not cause “harmful effects on the environment or other hazards, considerable disadvantages and considerable nuisance to the general public and the neighborhood.”<sup>47</sup> This provision, which is subject to a general proportionality principle that balances costs and benefits,<sup>48</sup> is most closely analogous to nuisance laws in the U.S. One important difference is that this German statutory standard is translated into specific emission limits.

Second, “precautions [must be] taken to prevent harmful effects on the environment, in particular by such emission control measures as are appropriate according to the state of the art.”<sup>49</sup> This criterion is loosely analogous to the “best available control technology” criterion in the U.S. NSPS program. Both the U.S. and German standards require some balancing of costs and benefits.<sup>50</sup>

A region with particularly polluted air must adopt a clean air plan (*Luftreinhalteplan*),<sup>51</sup> and the *Länder* are authorized to impose additional measures in areas that need special protection.<sup>52</sup> The *Luftreinhalteplan* are superficially similar to the SIPs required under the U.S. Clean Air Act, especially in non-attainment and PSD areas, but the *Luftreinhalteplan* criteria are vague, they have no force of law, and they are only required in certain areas.<sup>53</sup>

The general statutory requirements—prohibiting harmful effects and requiring precautionary measures—are implemented through the federal Technical Instructions on Air Quality Control (*Technische Anleitung zur Reinhaltung der Luft* or *TA Luft*), which provides more detailed requirements to control and disperse emissions from licensed facilities. Although *TA Luft*'s provisions do not have the force of law, one court described them as “anticipatory expert testimony,” which apparently means that they *prima facie* give operational definition to the statutory standards.<sup>54</sup>

*TA Luft* contains four types of substantive standards<sup>55</sup>—criteria to determine the height of exhaust stacks;<sup>56</sup> *immission* values<sup>57</sup> (analogous to the U.S. NAAQS); general technological control requirements and emission limits,<sup>58</sup> including VOC emission limits;<sup>59</sup> and emission limits and control technologies for specified categories of industrial facilities,<sup>60</sup> including automobile assembly plant paint shops<sup>61</sup> (like the U.S. NSPS standards). Generally speaking, facilities that do not cause *immissions* to exceed established values satisfy the statutory requirement not to cause considerable disadvantage and substantial impairment.<sup>62</sup> Compliance with the height requirements for exhaust stacks, the general technological requirements and emission limits, and the

requirements for specified industrial categories normally satisfy the statutory command to take precautions.<sup>63</sup>

In sum, although some air pollution regulations are analogous to the U.S. standards, German law contains no provisions analogous to the U.S. nonattainment or PSD programs.<sup>64</sup> Moreover, given its emphasis on minimum stack heights, the German regulatory standards are less focused on the relationship of emissions to air quality.

Stack Heights. *TA Luft* contains criteria to determine the minimum and maximum heights for exhaust stacks.<sup>65</sup> The evident purpose of these provisions is not to reduce emissions, but to disperse emissions and thereby reduce local concentrations of pollutants. Control of VOC concentrations in the immediate neighborhood (which relates to both health protection and elimination of odors), not ozone control, is the primary object of these requirements.

Immission Values. The 1986 *TA Luft* established *immission* values for several pollutants to protect human health<sup>66</sup> and to protect against “considerable disadvantage and substantial impairment.”<sup>67</sup> Using detailed criteria in *TA Luft*, the licensing agency must ascertain the actual, existing *immission* value for each pollutant (“initial load”) and calculate the additional *immission* value that will result from the proposed facility, taking into account, for example, dispersion, weather conditions, nearby buildings, and terrain (“additional load”).<sup>68</sup> As a general rule, the licensing agency must deny a license to a facility whose total load (initial load plus additional load) exceeds the *TA Luft* immission value.<sup>69</sup> The regulations make an exception if the additional load does not exceed the *TA Luft* immission value by more than 1%, and if the licensee obtains enough offsets from

other facilities to “reduce the immissions.”<sup>70</sup> The implication of this exception is that if immissions increase by less than 1%—which might be quite substantial in a polluted area—the agency must grant the license.

Because the 1986 *TA Luft* did not establish an *immission* value for ozone,<sup>71</sup> licensees whose facilities emit VOCs are subject to a slightly different procedure. In such cases, the licensing agency must determine whether the proposed facility’s VOC emissions should be considered “[health] hazards, considerable disadvantages, or substantial impairments for the general public or the neighborhood” based on “the state of science and general experience of life.”<sup>72</sup> To determine whether the health hazards, disadvantages or impairments are “substantial,” the agency must consider whether the emissions create hazards to human health (which “are always substantial”), and if not the agency must consider the land uses specified in the zoning plans, other existing land use restrictions, the impact of pollutants, “the necessity of mutual consideration in neighbor relations,” and control measures on the licensee’s other facilities.<sup>73</sup> In other words, where there is no *immission* value, the agency may license a facility only where there are no health hazards and where it determines there are no other substantial adverse effects after weighing competing considerations. Because these considerations are quite general, the agency has considerable discretion whether to grant the permit.

General Technological Requirements and VOC Emission Limits. *TA Luft* requires licensed facilities to have “emission control facilities corresponding to present state of [the art] technology.”<sup>74</sup> In addition, special attention must be paid to “reducing the amount of waste gas,” “optimizing processes,” and “optimizing start up and shut off

processes.”<sup>75</sup> The regulations also specify that VOC concentrations in the exhaust gas cannot exceed 20 mg VOC/m<sup>3</sup>.<sup>76</sup> In other words, the first provision is designed to reduce total emissions, and the second is designed to reduce VOC concentrations in the exhaust gas.

VOC Emission Limits and Control Requirements for Paint Shops. *TA Luft*, much like the U.S. NSPS, contains additional regulations for specific categories of industrial facilities,<sup>77</sup> including automobile assembly plant paint shops.<sup>78</sup> The regulations assert that the emission standards and control requirements can be met by state of the art technology.<sup>79</sup> The 1986 VOC standards establish VOC emission limits of 60g/m<sup>2</sup> of car body for non-metallic paints, and 120g/m<sup>2</sup> for metallic paints.<sup>80</sup> That is, the emissions limits depend on the type of paint used and are proportional to the size and number of vehicles produced. These provisions do not mandate an overall cap for the facility. In 1991, the Ministry for the Environment revised both of these limits to 35g/m<sup>2</sup>, effective March 1, 1994.

The paint shop regulations also limit the VOC concentration in the exhaust gas from the bake ovens to 50 mg/m<sup>3</sup>. In addition, the *Dynamisierungsklausel*—essentially a less stringent “best available control technology” requirement—requires further reductions if new control technologies become available.<sup>81</sup> These various requirements must be specified in the license “for each individual source.”<sup>82</sup>

*Permitting Procedures.* The *BImSchG* requires the licensing authority to give public notice of the project after it receives a permit application.<sup>83</sup> For new facilities, the agency must make public the permit application and any supporting documents



submitted by the firm (except for documents that might reveal trade secrets).<sup>84</sup> For modified facilities, the agency need not make the permit application and documents available for public inspection if the modification does not increase emissions.<sup>85</sup>

Members of the public have one month to review the permit application and supporting documents and another two weeks to make written objections. There is no provision for a public hearing. The licensing authority must seek the opinion of other regulatory agencies, and it must “discuss the arguments against the project with the applicant and those having raised them.”<sup>86</sup> Relative to the United States, the German licensing system is much less transparent to citizen groups, and much less subject to influence by interest groups, especially opposition groups.

The Act does not specify a time limit in which the licensing agency must decide whether to issue a license for new facilities, although it provides that the agency must make a licensing decision for a modified facility within six months. That period can be extended for successive three-month periods “if the difficult nature of verification so requires.”<sup>87</sup>

### **C. Summary and Comparison**

Although it is difficult to make precise comparisons, in part because the two countries use different types of standards, it appears that the U.S. standards are stricter, more detailed, and more intrusive, especially in non-attainment areas, and it is evident that U.S. procedures provide much greater opportunity for public participation in agency permitting decisions.

*Division of Regulatory Authority.* Under both U.S. and German law, the federal government is responsible for setting air quality standards, and the states are responsible for permitting and enforcement. The U.S. regulatory system, however, involves greater federal oversight; EPA must approve the SIP—which contains each facility’s emission limits—and air pollution permits are subject to EPA approval. In addition, EPA has concurrent enforcement authority, and may even take over permitting and enforcement functions if it deems state efforts systematically inadequate. In Germany, there is no federal oversight of the permitting or enforcement process.

*Ambient Standards and Air Quality Plans.* Both countries establish air quality standards and have provisions for air quality plans, although the U.S. requirements are more demanding. First, the NAAQS are set at a level designed to protect public health without regard to control costs. The German *immission* values are subject to the proportionality principle, which requires a balance of costs and benefits. More importantly for this study, Germany has not adopted a numerical *immission* value for ozone; regulators must decide on a case-by-case basis whether VOC emissions, which eventually cause ozone, may endanger human health or the environment. Whereas every state in the U.S. must have an SIP—or face serious economic sanctions—only certain areas in Germany need to develop such plans, which in any event do not have the force of law.

*Emission Limits for Certain Industrial Categories.* Both the U.S. and German laws establish emission limits for categories of industrial polluters. In both countries, the air pollution statute instructs the federal environmental agency to set such limits for

categories of industrial facilities that might endanger public health or the environment. In addition, the U.S. and German agencies must establish emission limits that reflect the best control technology, taking into account costs.

The established emission limits are somewhat different, however. U.S. EPA has set different emission limits for the three different coating processes in the automobile assembly plant, proportional to the volume of applied solids. The German Ministry for the Environment, on the other hand, has set a single overall emission limit (proportional to the area of the painted surface).<sup>88</sup> The single emission standard gives German manufacturers greater flexibility during the production process and reduces monitoring and reporting requirements.

*Emission Limits Designed to Achieve or Maintain Air Quality.* Although both countries establish air quality standards, they have adopted rather different means to achieve those standards. In U.S. non-attainment areas, the facility must obtain offsets, install control measures reflecting the “lowest achievable emission rate” regardless of offsets obtained, and show that the benefits of the new facility outweigh its environmental and social costs.<sup>89</sup> In other words, the facility must both reduce pollution *and* install state of the art control technologies. In U.S. attainment areas (PSD), the facility need not obtain offsets, but it must adopt controls equivalent to the “best available control technology.”

The German approach is potentially simpler and probably less demanding. Where the agency has established an *immission* value, the sum of the initial load and the additional load may not exceed the *immission* value by more than 1%.<sup>90</sup> If the agency has

not established an *immission* value for a particular pollutant, the agency must assure itself that the new pollution load will not threaten human health or the environment. In short, the German regulations are focused exclusively on not significantly increasing the exceedence of the *immission* value, whereas the U.S. system emphasizes either reducing (non-attainment areas) or minimizing increases (PSD areas) in the total pollutant load and employing the best technological controls.

*Odors.* The U.S. Clean Air Act does not address odors, which generally are left to state pollution regulations and nuisance law. However, because state pollution agencies normally issue air pollution permits, they may include provisions designed to control odors from industrial operations. State environmental agencies are more likely to require control of odors in relatively clean areas located near residential areas, where new industrial odors would be noticeable or more easily traced to a particular source.

By contrast, the *BImSchG* and *TA Luft* deal explicitly and extensively with odors. The Act specifically defines air pollution as including “odorous substances,”<sup>91</sup> and *TA Luft* contains detailed provisions to ensure the dispersion of air pollution that is vented to the atmosphere.<sup>92</sup> As in the U.S., the agency is likely to be more attentive to odorous emissions (*e.g.*, require taller emission stacks for better dispersion) in areas that are not already heavily polluted.

*Public Participation.* Both U.S. and German regulatory procedures allow some opportunity for public participation in the agency’s permit decision, although the opportunities are more extensive in the U.S. For example, under U.S. law, members of the public are permitted to review and comment on all air pollution permit applications, and

in many states they may petition the agency to initiate a formal contested administrative hearing, replete with counsel, cross examination and an administrative law judge to decide whether to issue or deny the permit.

Under German law, the licensing authority must give public notice of each project, but must permit public review and comment only if the facility is new or if the modified facility is expected to cause additional or new types of air pollution. Proposed modifications that would not result in a net increase in emissions are not subject to public review and comment. There are no provisions requiring public meetings or administrative hearings in advance of the agency's decision to grant or deny the permit.

#### **IV. THE U.S. PERMITTING PROCESS**

##### **A. The Permitting Process in an Ozone Attainment Area**

Turning the corner of a curving road in the Highland Park area of St. Paul, Minnesota, the last thing one expects to see is a truck assembly plant. The lawns are trimmed, the hedges are sculpted, and the roads are tree-lined and recently paved. Many of the homes are single-family houses, with a scattering of small apartment houses and a few larger apartment buildings. Located a few miles from downtown St. Paul, the neighborhood has a middle class, suburban look. Many of the residents are professionals, including lawyers, doctors, government officials, and business owners.

Yet the residential neighbors sit in uneasy juxtaposition with Ford's Twin Cities Assembly Plant. Located immediately east of the Mississippi River, the facility is just west of a shopping center, and surrounded by the Highland Park residential neighborhood. The proximity of the assembly plant to the neighborhood has been a source of conflicts,

some arising from odors and potential health effects of air pollutants emitted by the plant's paint shop.

EPA has designated the St. Paul area (indeed, the entire state) as an attainment area for ozone. One reason for the good air quality in the state is the relative dearth of large VOC emitters. None of the largest 25 VOC emitters is located in Minnesota,<sup>93</sup> and EPA lists only five industrial facilities with VOC emissions greater than 1000 short tons per year, and only 100 facilities with more than 100 short tons per year.<sup>94</sup> At the time of this study, the Ford assembly and painting operations emitted about 1,000 tons of VOCs annually, making it one of the largest VOC emitters in the state.<sup>95</sup>

Over 13,000 people live within a mile of Ford's assembly plant, and approximately 150,000 live within three miles, for a population density of 6200 people per square mile. Within a mile of the plant 5% of the population is minority, and 12% is below the poverty line; within a three-mile radius, the percentages are 8 and 15, respectively. These percentages are significantly smaller than the corresponding numbers for the county, and well below the national figures.<sup>96</sup> The median household and per capita income for the county are slightly greater than the national medians, and in 1994 the unemployment rate for the county was 3%. The area near the Ford facility is wealthier than the rest of the county.

Ford Motor Company opened its Twin Cities truck assembly plant in 1925. In recent years, the facility has employed approximately 2000 workers, who annually produce more than 100,000 trucks.<sup>97</sup> Most of the VOCs come from the coating lines—the e-coat, the guidecoat, and the topcoat. Because the Ford facility is a “major” facility

under the Clean Air Act, any significant modification to the facility would subject Ford to federal NSPS emission limits and potentially to the federal PSD New Source Review process.

### **1. The Permit Process: Delays from Public Concerns about Odors and Health Effects**

*The Plan for a New Paint Shop.* In the early 1980s, Ford decided to make substantial changes at the Twin Cities facility—it wanted to produce a new model, a light-duty pickup truck called the Ford Ranger, to increase the line-speed, and to build a new paint shop. The new paint shop would include a new e-coat line, a new urethane anti-chip coating line, and a new BC/CC topcoat line. Ford planned to incinerate the VOCs from the drying ovens before releasing the exhaust to the atmosphere. Ford believed that these modifications would increase the efficiency of its operations, improve the quality of its product, and, in vain as it turned out, reduce odors in the nearby community.

Ford announced its plans in October 1983.<sup>98</sup> Within a month, the St. Paul Department of Planning and Economic Development gave its approval after concluding that the plans would impose no new burdens on traffic and would satisfy zoning and land use planning requirements. In early January 1984, the Minnesota Pollution Control Agency (MPCA), which had responsibility to implement state and federal air pollution laws, granted Ford an installation permit.<sup>99</sup> To avoid disrupting production, Ford continued to use the existing paint shop while it constructed the new facility. Ford completed the new facility in August 1985, at a cost of \$236 million.

*The Innovative Technology Waiver from NSPS Emission Standards.* In February 1984, shortly after it had begun construction, Ford applied to EPA for an “innovative technology waiver” from the NSPS standards for its new BC/CC topcoat line.<sup>100</sup> Along with other U.S. manufacturers, Ford wanted the new line to compete successfully with foreign manufacturers in Europe and Japan, who also were using a BC/CC topcoat for automobiles and light-duty trucks.<sup>101</sup> According to U.S. automakers, the BC/CC topcoat was more appealing to customers and was more durable than the single-coating topcoat.

The BC/CC topcoats applied by foreign manufacturers used high-VOC coatings, which in the U.S. would require additional, expensive control equipment to meet federal NSPS standards. To meet the competition and achieve federal emission standards at reasonable costs, automakers and paint manufacturers had embarked on a research program to develop low-VOC coatings and more efficient application technologies. To gain time while developing the new coatings, and not waste money on expensive and potentially obsolete end-of-the-pipe controls, Ford sought a temporary waiver for its new BC/CC topcoat line.

In September 1984, EPA gave public notice of its intent to grant the requested waiver and invited public comment.<sup>102</sup> Leslie Davis, president of Earth Protector, a local environmental group, and organizer of grassroots opposition to Ford’s operation, objected.<sup>103</sup> Davis also gave Governor Rudy Perpich a petition with 250 signatures urging him to withhold his consent for the waiver.<sup>104</sup> Perpich gave his consent.<sup>105</sup>

Roughly a year later, EPA granted the waiver until December 31, 1986.<sup>106</sup> EPA explained that for Ford to achieve the NSPS standards on the topcoat line it must limit



production of vehicles using the BC/CC coating or install new emissions control equipment. EPA deemed both options unreasonable, the first because it amounted to an “economic penalty,” and the second because the \$15-20 million price tag for controls was too high. EPA expressed confidence that Ford and its paint suppliers would be able to comply by the end of 1986 and that the waiver created only a slight risk to public health.<sup>107</sup> Davis sought judicial review of the waiver, but the court of appeals upheld EPA’s decision.<sup>108</sup> As EPA had predicted, Ford was able to meet the NSPS standards by the end of 1986 with the reformulated paints.<sup>109</sup>

*Neighbors’ Complaints about Odors and MPCA’s Denial of Ford’s Operating Permit.* Although the political and legal battle over the waiver did not slow Ford’s efforts to bring the new paint shop on line, it signaled a broader grass-roots opposition to the Ford plant that grew out of long-standing complaints about odors from the paint shop and that evolved to include health concerns. These concerns did not abate with the opening of the new paint shop in August 1985 (which included a new incinerator), or with Ford’s use of low-VOC solvent-based coatings in 1986.

Neighbors’ complaints about odors from the paint shop dated back at least to 1979.<sup>110</sup> In 1984, the last year of operation of the old paint shop, MPCA received over 300 complaints from residents, and Ford received 140 complaints directly. The complaints continued after Ford closed the old paint shop and began operating the new paint shop.<sup>111</sup> Citizens complained not only about the disagreeable odors, but also about minor health effects and potentially more serious health risks.<sup>112</sup>

Leslie Davis led the initial grass-roots effort, which evolved into the Ford Oversight Community Task Force.<sup>113</sup> Davis sought political support from a number of sources. In addition to a 250-signature petition opposing the NSPS waiver, Davis contacted UAW officials about worker exposure to chemicals, which caused union officials to ask MPCA about the best controls for solvent vapors.<sup>114</sup> He wrote letters to local newspapers,<sup>115</sup> succeeded in generating news stories on odors from the facility,<sup>116</sup> and contacted *60 Minutes* in an unsuccessful effort to get the investigative television show to report on the facility.<sup>117</sup> He took his case to the St. Paul City Council,<sup>118</sup> which eventually adopted a resolution requesting health studies of the VOC emissions from the facility.<sup>119</sup>

Davis' political activity began to pay off. In December 1986, MPCA asked Ford to undertake an odor abatement study and delayed Ford's "total operating facility" permit application, which it had submitted in March 1986, thus giving activists, such as Davis, an opportunity to seek redress for their concerns.

In March 1987, MPCA scheduled a public meeting to consider a staff recommendation to approve the permit.<sup>120</sup> An MPCA official contacted Davis about finding neighborhood representatives to work with the agency on the draft permit. In the meantime, however, another citizen group, the Highland Area Citizens Task Force on Ford Emissions, formed to demand changes to the proposed permit. The new group, which was less confrontational than Earth Protector, thought the permit should include requirements for emissions testing and a health-risk assessment by an independent consultant.<sup>121</sup>

In late May 1987, MPCA rescheduled the public meeting on the proposed permit and reopened the public comment period. In correspondence with the new neighborhood group, MPCA staff indicated that they did not think that Ford was required to install additional emissions controls to meet federal standards. However, MPCA staff proposed to recommend a facility emissions cap of 1095 tons of VOCs to address the odor concerns.<sup>122</sup>

*The Ford Air Quality Task Force and the Negotiated Operating Permit.* The controversy had become heated and there was danger that the disputants' positions would irremediably harden. Both Earth Protector and the Highland Area Citizens Task Force requested a formal administrative hearing.<sup>123</sup> However, MPCA officials feared that a hearing would delay issuance of a final permit by several months, and private citizens feared that it would be expensive and perhaps futile.

The political resolution was the formation of a new task force that included representatives from all points of view—the Ford Air Quality Task Force. The Task Force, formed in June 1987, included elected officials, members of the University of Minnesota School of Public Health, and representatives from the Minnesota Department of Health, the St. Paul Division of Public Health, MPCA, Ford, and the community, including Leslie Davis and Judith Krasnow from the Highland Area Citizens Task Force.<sup>124</sup> After appointing the Task Force, the politically appointed MPCA Board,<sup>125</sup> authorized Ford to continue production under the 1984 construction permit while a new facility permit was being prepared, so long as Ford limited its production to 45 vehicles per hour and limited total annual VOC emissions to 1095 tons.<sup>126</sup> Contemporaneous

accounts indicate that the Task Force quickly reduced the adversarial atmosphere, which was replaced by a spirit of cooperation.<sup>127</sup>

On the Task Force's recommendation Ford retained two environmental consulting groups—TRC Environmental Consultants to test for odors and other air emissions and Clement Associates to perform a health risk assessment of emissions from the paint shop.<sup>128</sup> The consultants' studies and the Task Force report were not completed until early 1990, two and one-half years after MPCA staff formed the Task Force.

TRC Environmental Consultants confirmed that Ford's facility was causing disagreeable odors in the residential community, and it identified the central spraybooth stack as the main culprit.<sup>129</sup> TRC also concluded that the final repair spraybooth, the final repair oven, and the e-coat cooling tunnel also might be contributing to the odor problem.

In May 1989, before the Task Force could make a formal recommendation based on the TRC report, Ford obtained permission from the Task Force and a permit from MPCA to raise the spraybooth stack from 139 feet to 189 feet and to change the shape of the stack opening.<sup>130</sup> The higher, reshaped stack would not reduce VOC emissions, but it would disperse them better. In October 1989, Ford formally proposed two additional improvements that tracked the consultant's report: to improve the emissions collection system and replace the afterburner on the e-coat bake oven, and to combine the eight, relatively short stacks for the final repair operations into a single 100-foot stack.<sup>131</sup> Together, these changes, which cost Ford \$4.4 million and took more than a year to complete, totally eliminated odor complaints from Ford's facility.

Meanwhile, in November 1988, Clement Associates presented its results estimating both short-term and long-term (*e.g.*, cancer) health risks. After MPCA submitted its own methodology to calculate health risks, the Task Force spent several months discussing the consultant's report and MPCA's comments. Based on this study, the Task Force concluded that "developmental effects" and "adverse health effects due to long-term exposure to substances emitted from the plant are highly unlikely,"<sup>132</sup> although it also acknowledged the potential for short-term minor effects.

The Task Force prepared a draft report by August 1989 and issued its final report in late February 1990. The Task Force recommended that Ford reduce VOC emissions by 10% "to compensate for these uncertainties in the [health] assessment," and that Ford periodically evaluate the need for a new health-risk assessment. Ford agreed to the 10% reduction in emissions to assure members of the public that they faced no health risks from the VOC emissions.<sup>133</sup>

Meanwhile, Ford continued to seek permission to make additional improvements to its paint shop. In October 1989, Ford sought authorization to update the anti-chip coating operation.<sup>134</sup> In addition, Ford wanted to increase the number of Rangers receiving a BC/CC from 20.6 to 32.2 per hour.<sup>135</sup> Although the Task Force had not yet issued its report, Ford knew it would recommend a 10% reduction in emissions. Consequently, Ford proposed to install a new VOC emission control system for the topcoat line, namely to replace the afterburner on the spraybooth with a carbon adsorption system to concentrate the VOCs and an incinerator to burn the desorbed VOCs.

In April 1991, after a year of negotiations, MPCA staff and Ford reached agreement on a draft operating permit. Aside from the technical permit conditions, the principal effect of the permit was that it imposed annual VOC emissions limit of 934 tons, roughly a 14% decrease from VOC emissions of 1088 tons in 1987-88, when the Task Force's commissioned the health risk assessment. However, the proposed cap was a net increase of 39.2 tons of VOCs when measured under federal criteria, *i.e.*, average emissions over the previous four years.<sup>136</sup> Because this increase was still less than the "significant" threshold level under the PSD regulations,<sup>137</sup> the permit was not subject to the burdensome requirements of New Source Review; nonetheless, the emission controls met the stringent LAER standards normally required in non-attainment areas.<sup>138</sup> Plainly these stringent requirements were not necessary to meet the federal PSD standards; rather, MPCA required them to address the odor and health concerns of the neighbors.

Neither the Task Force nor EPA had any significant comments or suggestions that threatened to derail MPCA approval of the permit.<sup>139</sup> On May 28, 1991, MPCA held a public meeting to discuss the proposed permit. Only 14 people attended. At its June 25, 1991 meeting, the MPCA Citizens Board approved the permit. Ford installed the new pollution control equipment over the next 18 months at a cost of \$24 million.

## **2. Permit Conditions**

The 34-page permit imposed several categories of "special conditions," including VOC emission limits, operating requirements, compliance demonstration requirements, construction schedule requirements, and requirements to undertake periodic health risk assessments. Viewed as a whole, the permit contains a wealth of detailed requirements,

some of which limit Ford's flexibility to comply with overall emission limits, and others that require constant self-monitoring and self-testing to ensure compliance. Many of the provisions are required by the federal Clean Air Act, although some, especially those concerning odors, were solely the product of state law.

*Emission Limits.* The permit required the coating lines to meet the mandatory federal NSPS emission standards for the various coating lines,<sup>140</sup> and imposed an annual VOC emissions cap of 934 tons from all painting operations,<sup>141</sup> as well as monthly emission limits.<sup>142</sup>

The permit included special provisions for odors. In addition to requiring the spray booth stack to be 189 feet above grade, the permit imposed "odor emission limits" as required by state regulations. In particular, the permit specified that the emission limit for the assembly plant touch up operations and paint shop paint mixing operations was 25 "odor concentration units,"<sup>143</sup> for the spray booth stack the emission limit was 1,000,000 odor concentration units, and for all other stacks the emission was 150 odor concentration units. Most importantly, there could be no detectable odors outside the facilities borders.<sup>144</sup>

*Operating Requirements.* The permit established numerous operating requirements.<sup>145</sup> For example, the permit required Ford to notify MPCA of the cause and duration of breakdowns of control and continuous monitoring equipment;<sup>146</sup> to maintain and monitor a minimum temperature in the incinerators;<sup>147</sup> to keep daily operating records and calculate monthly emissions to demonstrate compliance with emission limits;<sup>148</sup> and to ensure that the emissions control equipment meets minimum efficiencies.<sup>149</sup> Most

importantly, from Ford's point of view, the permit imposed two sets of production limits—53 vehicles per hour in the paint shop, and 44.5 vehicles per hour in the assembly plant, an increase from 40 vehicle per hour specified in the temporary operating permit.<sup>150</sup> Thus, as a result of the five-year delay in obtaining a final operating permit, Ford's truck production potentially was reduced by more than 100,000 trucks.<sup>151</sup>

*Compliance Demonstration.* The permit required Ford to undertake a variety of testing procedures to ensure that control technologies are functioning properly. For example, Ford must determine the efficiencies of the carbon adsorption system and the incinerators<sup>152</sup> and file monthly reports demonstrating compliance with federal emission limits and the total annual emissions cap of 934 tons.<sup>153</sup> Every three years, or whenever Ford makes a change that “substantively bears on the health risk of the emissions,” Ford must undertake a new health risk assessment.<sup>154</sup>

## **B. The Permitting Process in an Ozone Non-Attainment Area**

The area immediately surrounding Ford's assembly plant in Edison Township, New Jersey, in contrast to the Highland Park neighborhood, is zoned for mixed-use, with light and heavy industry, commercial strips, and blue-collar residential neighborhoods. According to the local Chamber of Commerce, Edison has “crowded industrial parks,” including the largest industrial park in New Jersey. The Ford plant borders U.S. Highway 1, along with car dealerships and strip malls.

EPA has designated Middlesex County as a “severe” non-attainment area for ozone. Some of the ozone is the product of VOC and nitrogen oxides emissions from the substantial vehicular traffic in the area, which is criss-crossed by four major highways.<sup>155</sup>



Local industrial operations also contribute to the VOC load, as do more distant sources. New Jersey itself is relatively industrialized. Two of the largest 25 VOC emitters in the Nation are located in or border New Jersey, and 21 industrial facilities in New Jersey (eight of which are in Middlesex or adjacent counties) emit more than 1000 short tons of VOCs annually, compared to only five such facilities in all of Minnesota. The total annual industrial VOC emissions for the state is approximately 89,000 short tons, compared to 31,000 short tons in Minnesota.<sup>156</sup> Moreover, because New Jersey is downwind from the heavy industrial region of the Ohio Valley, it receives that region's ozone.

The demographic profile of the residential area near the Edison plant is similar in some respects to the demographic profile of the area near Ford's St. Paul facility, as the following chart illustrates.

	<b>New Jersey</b>	<b>Minnesota</b>
Population density within 3 miles of the facility <sup>157</sup> (people/square mile)	4879	6212
Population density within 1 mile of the facility <sup>158</sup> (people/square mile)	4852	4731
% minority population within 3 miles of the facility <sup>159</sup>	12%	8%
% households below the poverty line within 3 miles of the facility	8%	15%

% unemployment in county	6%	3%
% jobs in manufacturing in the county	20%	20%

Although the per capita income of Edison Township is slightly higher than the New Jersey average and nearly 50% greater than the U.S. average,<sup>160</sup> the residential neighborhoods closest to Edison's Ford facility are blue collar, whereas the corresponding neighborhoods near the St. Paul facility are middle class and largely professional. Thus, while the overall county demographics are similar, the demographics of the immediate neighborhoods are different.

The Edison assembly plant, which opened in 1948, produced the Pintos in the 1970s and Escorts during the 1980s. In the late 1980s, when demand for the Escort fell, Ford decided to consolidate Escort production from two plants. In part because of the significant additional capital investment that would be required for pollution controls to meet the stringent non-attainment requirements, Ford seriously considered closing the Edison facility.

An area's air quality attainment status may be a significant factor in a company's decision whether to re-tool or relocate.<sup>161</sup> One reason is that federal law requires more stringent pollution controls in non-attainment areas so that the state can demonstrate "reasonable further progress" toward attaining the national ambient air quality standards. Not only do stricter emission standards in non-attainment areas usually require more

expensive pollution control technologies, stricter standards may engender regulatory delay and conflict as state agencies seek to ensure compliance with federal law, and manufacturers seek to maintain or improve their competitive position. A state agency in non-attainment areas may insist on particularly stringent controls in order to avoid even more stringent federal regulations that would become mandatory if the state missed its attainment deadline. Such requirements, including greater off-set ratios, would increase the cost of modifying or constructing new industrial facilities and thus negatively affect the state economy.

Despite the potential advantages of building a new facility in an attainment area, Ford decided to re-tool the Edison plant to produce Ford Ranger and Mazda B-series trucks.<sup>162</sup> Ford also decided to upgrade the paint shop to install a BC/CC topcoat line for better vehicle finishes.

### **1. The Permit Process: Delays Due to Agency Concerns**

In August 1987, Ford applied for a construction and operating permit with the New Jersey Department of Environmental Protection (NJDEP). In it, Ford proposed to upgrade the paint shop to allow the use of new coatings such as the BC/CC topcoat. After a year of negotiations over Ford's data and emissions calculations and the adequacy of the control technologies, NJDEP denied the application, specifically refusing to permit the BC/CC system.

In September 1989, Ford submitted a revised application for the guidecoat and topcoat lines. This application sought only a single-coating line, not a BC/CC line. Ford was desperate to open the new Ranger truck line, even if it meant using an older and less

competitive paint technology. Ford's calculations showed that the bulk of the VOCs—87%—came from the spraybooth, and a much smaller proportion—13%—came from the bake oven. Nonetheless, the permit application proposed no controls on the spraybooth; an afterburner alone would do little to reduce VOCs in the relatively dilute exhaust stream from the spraybooth, and Ford did not want to install a relatively expensive carbon adsorption/afterburner system for what would be a temporary paint line. The application proposed an afterburner for the relatively concentrated VOC exhaust from the bake oven, which would eliminate nearly 95% of the bake oven VOCs. Ford estimated the topcoat line, based on a reduced rate of 40 Ranger trucks per hour and two work shifts, would emit approximately 500 short tons of VOCs annually.<sup>163</sup> In mid-December 1989, NJDEP approved the permits, relying on reduced solvent concentrations and the afterburner to ensure that the modification would not result in an increase in emissions.

In March 1990, Ford re-submitted its permit application for the BC/CC topcoat line. The application included proposed not only an afterburner on the bake oven, but also separate carbon adsorption systems for each portion of the topcoat line and an afterburner for the desorbed VOCs. Despite these controls, the VOC emissions would increase to 740 tons annually. A month later, Ford submitted a "State of the Art Analysis" to demonstrate the carbon adsorption system would adequately control emissions from the proposed BC/CC topcoat line.

Ford and NJDEP continued to meet and negotiate over the terms of the permit. According to Ford officials, the relationship was strained: they described NJDEP as

antagonistic, bureaucratic, and uncooperative, and the delays caused Ford to reconsider its decision to re-tool the Edison plant. NJDEP, on the other hand, thought the delay resulted from Ford's repeated failure to provide critical information necessary to evaluate the permit application and ensure that the air quality region would make "reasonable further progress" toward achieving attainment. In any event, NJDEP did not approve the final permit until November 1994. The modifications to the control technologies cost Ford \$31.7 million.

## **2. Permit Conditions**

The 1994 construction permit imposed several sets of conditions, including emission limits, operating requirements, monitoring requirements, testing requirements, and recordkeeping and reporting requirements. These requirements were more demanding, more intrusive, and ultimately more burdensome than the requirements in the St. Paul permit. A principal factor was that the Edison plant was in a non-attainment area, and thus had to meet stricter federal and state standards. But the differences also reflect NJDEP's more aggressive approach

*Emission Limits.* The NJDEP established hourly, daily, and annual VOC emission limits for both the prime coat line and the topcoat lines, including separate hourly emission limits for different parts of the spray booth and the bake oven. Recall the St. Paul permit imposed only monthly and annual limits for each coating line, with no separate limits for the spraybooths or ovens. Such detailed emission limits in the Edison permit, which were more than EPA regulations required, significantly constrained Ford's

flexibility during production and effectively increased the monitoring and reporting requirements.

*Composition of the Paint.* In addition to emission limits, NJDEP imposed restrictions on the amount of VOS (volatile organic solvents) in the different coatings, including both a maximum amount of VOS for each coating category and a weighted average for all paints of that category.

*Operating Requirements.* The permit imposed numerous conditions on the type of fuel and rate of fuel usage for the afterburners,<sup>164</sup> and it specified detailed operating conditions for the emission controls, including the minimum destruction efficiency, operating temperature, and residence time for the afterburners,<sup>165</sup> and the minimum removal efficiency for the carbon adsorbers.<sup>166</sup> In addition, the permit limited the plant operating hours to 4700 hours per year, or roughly two shifts, and it imposed hourly, daily, and annual production limits.<sup>167</sup>

The permit required Ford to install a continuous VOC monitor and recorder after each carbon adsorber.<sup>168</sup> Ninety days before installing the monitors, Ford had to submit for NJDEP approval detailed information on the monitors and recorders.<sup>169</sup> After reviewing the stack tests, NJDEP was authorized to require installation of continuous emission monitors in the afterburner stacks.<sup>170</sup>

*Recordkeeping and Reporting Requirements.* The permit established substantial recordkeeping and reporting requirements. It required Ford to maintain all records—daily production rates, colors, paint and solvent usage, VOS content of the paint, natural gas

consumption (for the thermal oxidizers), and monitoring data—on-site for at least five years, to be made available to regulatory officials on demand.<sup>171</sup>

Ford must report any violations of the emission limits or operating conditions within two days of their discovery, along with a description of the cause of the violation and the measures taken to correct the violation “as expeditiously as practicable.”<sup>172</sup> If emissions, including odors, pose “a potential threat to public health, welfare or the environment, or . . . might reasonably result in citizen complaints,” Ford must notify NJDEP immediately.<sup>173</sup>

Ford must submit a quarterly report to NJDEP and the Middlesex County Health Department. The report must include (1) tables showing the daily use of coatings and solvents in the spray prime, the top-coat, and the “purge and wipe”; (2) tables demonstrating compliance with requirements establishing emission limits from paint and solvent content of paint; (3) all excess emission reports from the continuous emission monitors; and (4) a summary of all exceedences and corrective actions.<sup>174</sup>

*Compliance Demonstration.* Within 180 days of beginning operations, Ford must verify compliance with emission limits. The required tests include (1) stack tests to measure the concentration of VOCs in the gas vented from the thermal oxidizers and carbon adsorbers at the maximum production of 50 Rangers per hour;<sup>175</sup> (2) determination of the efficiency of various technological controls;<sup>176</sup> and (3) determination of the solvent content of the prime, base coat, and clear coat paints.<sup>177</sup> Ford must test the solvent content of the paint monthly, and must undertake a stack test every five years.<sup>178</sup> The

permit specified the test methods<sup>179</sup> and required Ford to obtain prior approval for its testing protocols and test date.<sup>180</sup>

### **C. Comparing the Permit Processes at St. Paul and Edison**

Although Ford experienced substantial delays in obtaining its air pollution permits at both the St. Paul and Edison facilities, the permit processes were quite different. Ford officials bemoan the antagonistic relationship with NJDEP officials, but describe their relationship with MPCA officials in positive, constructive terms. Moreover, Ford officials do not have a negative view of public participation at the St. Paul facility. On the contrary, they view it—especially when it took the form of the Task Force, which brought all interested parties together—as an opportunity for Ford to understand the public’s concerns and to take reasonable steps to address those concerns, and as an opportunity for Ford to explain the actions it took to mitigate environmental harms.

This variability is not necessarily related to the fact that St. Paul is in an attainment area and Edison is in a severe non-attainment area. First, Ford officials did not press MPCA to complete the permit process quickly. Indeed, they acknowledged that the interim St. Paul permit, which permitted Ford to use the BC/CC line in the new paint shop while the Task Force completed its studies and then while Ford and MPCA negotiated a permit, imposed few burdensome or inflexible controls on their operation. Ford was confident that so long as MPCA and the public viewed it as working in good faith to address the health and odor concerns raised by the neighbors, MPCA eventually would issue a reasonable permit. However, had Ford needed to obtain the permit more quickly, Ford might have viewed the extensive, slow process of public participation with



alarm. Second, Ford was able find a relatively inexpensive, quickly implemented solution to the long-standing concerns about odors from the plant. If Ford had been unable to find a satisfactory solution to the odor problem, the permit process probably would have gotten more rather than less contentious.

## **V. The Permitting Process in Germany**

### **A. Cologne**

Located on the Rhine River in the *Land* of Nordrhein-Westfalen in western Germany, Cologne (*Köln*) is a cultural and industrial center of approximately 1 million people. The federal government has designated the region as an area of serious air pollution. This designation requires the *Land* government to monitor air quality and draft an air quality plan.<sup>181</sup>

Ford's Body and Assembly plant in Cologne, which produces Fiestas, Scorpions, and Pumas, employs more than 5000 workers. Much of the paint shop was designed, built, and permitted in the late 1970s and early 1980s.

#### **1. The Permit Process: Extended Negotiations with a Moderate Amount of Public Participation**

In February 1986, the federal Ministry for the Environment promulgated *TA Luft*, imposing a new regime of air pollution controls on industrial facilities, including emission standards for paint shops in automobile assembly plants. About the same time, Ford decided to modernize and reorganize its paint shop at the Cologne plant, including the construction of two new topcoat lines that could handle one-color, two-color, and metallic painting. Because of the large scale of the project, Ford wanted to complete it in three

stages over a period of two and one-half years. Because the project involved fundamental changes (*wesentlichen Änderung*) to the facility, Ford needed a new permit that would comply with *TA Luft* requirements.

In March 1987, Ford applied to the Cologne factory inspectorate (*Staatliches Gewerbeaufsichtsamt Köln*) for a permit to modify its paint shop. The agency sent the permit application to local agencies for comment (*e.g.*, fire service, water quality). Over the next eight months Ford and the inspectorate negotiated the details of the permit. Both Ford and agency officials felt somewhat handicapped because it was their first experience with the new *TA Luft* requirements.

In early November 1987, the *Staatliches Gewerbeaufsichtsamt Köln* announced the project in local newspapers and the official gazette for Cologne, informing the public that the proposed permit and supporting documents were available for review until mid-January 1988. During the review period, several neighbors in the Merkenich and Flittard areas of Cologne filed written objections to the project on the ground that the existing facility emitted noxious odors and that the new facility would continue to do so. In early February 1988, after the agency agreed to study and address the problem in the new permit, the neighbors withdrew their objections.

In response to the concerns about odors, Ford retained a consulting firm to determine whether extending some of the emission stacks would adequately disperse the odors. The consulting firm concluded that after construction of the new facility, the Flitard residents would encounter perceptible odors less than 5% of the time, and some residential blocks in the Merkenich area would experience odors a bit more frequently.<sup>182</sup>

The agency concluded that this level of odors was acceptable since the land development plans for both areas allowed a mixture of residential and industrial uses and the proposed modification would reduce VOC emissions from the plant and improve the area's air quality.<sup>183</sup> The agency also concluded that there were no harmful environmental effects related to the odors, so long as Ford extended two stacks to 99 and 58 meters. These measures, the agency concluded, would meet the statutory requirement of "state of the art" (*Stand der Technik*) controls. Ford readily agreed to raise the stacks.

The consulting firm also studied whether there would be any health effects from Class II or Class III organic chemicals, and concluded that there would be none. Despite this conclusion, the inspectorate prohibited use of carcinogen and Class I organic chemicals.<sup>184</sup>

In late August 1988, 17 months after Ford filed its application, the *Staatliches Gewerbeaufsichtsamt Köln* issued the permit. Although the agency approved most of the permit application, it rejected two important elements. The first issue arose in connection with the use of metallic paint. In the past, metallic paints had been a large source of VOC emissions, and a switch to water-based metallic paints would significantly reduce VOC emissions. Ford, however, wanted the flexibility to be able to switch back to VOC solvent-based metallic paints if the water-based paints gave poor quality results. Ford argued that the air purification system described in the proposed permit would ensure that VOC emission levels were no greater than with water-based paints. The agency, however, rejected Ford's request, citing insufficient data about the air purification system.

The second issue concerned the VOC control technologies for the electrostatic application zone (*ESTA Zone*) of the prime coating line. The proposed permit contained plans to construct a specific carbon adsorption/afterburner system and a more generally described air purification system. The agency found the description of the latter too vague to meet *TA Luft* requirements for this part of the paint shop, and required Ford to install the specifically described control system.<sup>185</sup>

The permitting process, while not lengthy by U.S. standards, was exacerbated by three factors. First, the agency's review was more comprehensive because the application was for a new paint shop rather than the modification of an existing one. Second, this was Ford's and the agency's first attempt to negotiate a permit under new *TA Luft* requirements. Because *TA Luft* is not specific about the type or extent of monitoring, for example, it took the parties additional time to work out the details. Ford officials claimed that their experience with the Cologne permit helped expedite the process of obtaining subsequent permits, such as the Saarlouis permit, which took less than five months. Third, the neighbors' objections to odors delayed the permit process somewhat—perhaps as much as three months according to Ford officials.

## **2. Permit Conditions**

The 45-page permit specified the construction schedule, stack heights, VOC emission limits, and monitoring and recordkeeping requirements. Relative to the U.S. permits, the Cologne permit was less detailed (except regarding stack heights) and allowed the facility greater flexibility to achieve compliance.

*Construction schedule.* The permit provided a detailed construction schedule (negotiated with Ford) for the new paint shop. The permit was set to expire by March 1991 if the new facilities were not operational by that date.

*Stack heights.* The permit specified in great detail the heights and diameters of the various stacks at the facility, including the 99-meter and 58-meter stacks to control odors.<sup>186</sup>

*VOC emissions.* The permit listed the VOC emission concentration limits (*Massenkonzentrationsbegrenzungen*) for various parts of the paint shop, including technical requirements for measuring the concentrations.<sup>187</sup> In general, the maximum concentrations were smaller than the *TA Luft*, although the permit followed *TA Luft* for carcinogens and Class I organic materials.<sup>188</sup> As this set of standards was focused on concentrations, it probably was related to odor control and health effects from VOCs.

The permit also listed the VOC emission rates (*Massenstrombegrenzungen*) for different parts of the paint shop, as well as technical standards for measuring the emissions.<sup>189</sup> In contrast to emission concentrations, this set of limits restricted total VOC atmospheric loading, and thus probably was more related to ozone formation. Total annual VOC emissions could not exceed 1275 metric tons.<sup>190</sup>

*Monitoring.* The permit required continuous monitoring of certain parameters, including VOC emission concentrations and emission rates of the gas escaping from the afterburners and the carbon adsorption systems.<sup>191</sup>

The permit also required Ford to undertake a performance test of VOC emission concentrations and emission rates within three to twelve months of beginning operations

in the paint shop and to report the results, including measurement techniques and operating conditions, to the factory inspectorate.<sup>192</sup> Thereafter, it must undertake performance testing every three years.<sup>193</sup>

In addition, the permit required Ford to keep careful records of its solvent use in different parts of the facility and the number of vehicles painted.<sup>194</sup> The permit required Ford to use this information, as well as the data from the continuous VOC monitors, to demonstrate that it did not exceed the annual VOC emission limit of 1275 metric tons or the *TA Luft* emission limit of 60 g/m<sup>2</sup> (for most paint) and 120 g/m<sup>2</sup> (for metallic paint).<sup>195</sup>

*Recordkeeping.* Ford must keep records of all disturbances, including the type, cause, time, duration, and measures taken to rectify the problems.<sup>196</sup>

## **B. Saarlouis**

Saarlouis is located in Saarland, a small, heavily industrialized *Land* in southwestern Germany, on the French border. Saarlouis is a small town of 38,000, and the Ford assembly plant, with 6000 workers, is the largest employer in the town.

Ford's Saarlouis assembly plant, which began production in 1970, today produces more than 250,000 Ford Escort sedans and wagons annually. The facility is located next to a steel factory. The federal government has designated parts of Saarland, but not specifically Saarlouis, as a site of serious air pollution.

### **1. The Permit Process: Speedy Issuance and No Public Participation**

In the early 1990s, Ford decided to modernize the topcoat line at the Saarlouis facility so as to permit both single-color painting and metallic paints, and to increase its production by 40%. Ford also needed to install new air pollution control technologies to

meet stricter emission limits in *TA Luft*, which would take effect in early 1994. Because the modifications to the topcoat line and the increase in production were fundamental changes (*wesentliche Änderungen*), Ford needed to obtain a new permit.<sup>197</sup>

A few months before submitting its permit application, members of Ford's environmental and production staffs met with regulators from the Saarland *Ministerium für Umwelt* (Ministry of the Environment) in an effort to avoid any undue delays during the permitting process. At these meetings, company and agency officials discussed the agency's data requirements for the permit application. When the agency gave Ford a lengthy list of data requirements, company officials and regulators spent one month negotiating the level of detail required for the application.

On February 3, 1993, Ford submitted its permit application to the *Ministerium für Umwelt*. The *Ministerium* distributed various parts of the application to local regulatory authorities, *i.e.*, water and construction agencies, each of which had participated in the earlier negotiation regarding the required data. The local agencies had four weeks to submit any objections to the *Ministerium für Umwelt*, during which time they met regularly with Ford representatives and visited the plant. As it turned out, these agencies had no objections to the draft permit negotiated by Ford and the *Ministerium für Umwelt*.

There was no public participation during the permit process. In fact, Ford deliberately avoided public participation by invoking a statutory provision that relieved the agency and Ford of any sort of public notice or hearing process.<sup>198</sup> That provision states that so long as the modification would not be expected to result in an increase in

emissions, the agency need not give public notice of the modification and need not make publicly available the permit application, the draft permit, or any other associated documents.<sup>199</sup>

The *Ministerium für Umwelt* issued the permit on June 28, 1993. In marked contrast to the permit process in Minnesota and New Jersey, the German permit process for the Saarland facility took less than five months. The capital cost of the emission controls for the modified facility was approximately \$24 million.

## **2. Permit Conditions**

The Saarlouis permit is somewhat simpler than the Cologne permit. Although it specifies production and emission limits, control technologies, and monitoring requirements, the permit does not micro-manage emissions in different parts of the facility. Rather, it imposes an annual emissions limit and an emissions limit based on the area of painted surfaces.

*Production Limits and Emissions:* Under its old permit, Ford's assembly plant produced approximately 1400 vehicles daily. For vehicles receiving a regular paint coating, VOC emissions for each vehicle averaged 55g/m<sup>2</sup>, and for vehicles receiving metallic paint, VOC emissions for each vehicle averaged 104g/m<sup>2</sup>. The plant emitted an average of 1776 metric tons of VOCs annually.

Under the new permit, Ford was allowed to increase production to 1950 vehicles per day, roughly a 40% increase (as a practical matter, this meant that Ford would add a third work shift). The permit required the VOC emissions per vehicle to be reduced to 35g/m<sup>2</sup>, regardless of the type of paint used, as required by the new *TA Luft* regulations



that would become effective March 1994. The total VOC emissions for the facility would be 1613 metric tons per year, a 9% decrease despite the 40% increase in production.<sup>200</sup>

*Control Technologies:* Much like the U.S. NSPS standards, *TA Luft* does not specify the particular controls a manufacturer must use to meet the numerical emission limits. Rather, it suggests using water-based or powder paints, carbon adsorption technologies, or some combination of the aforementioned. Ford's Saarlouis permit, however, was quite specific and left Ford no options. It required Ford to install on the two topcoat lines three carbon adsorption wheels with a flow-through capacity of 200,000 m<sup>3</sup>/hour, and to keep on reserve an additional carbon wheel in the event of a breakdown.<sup>201</sup> The purified air, which would be vented through a 19-meter stack, may contain no more than 100mg VOCs/m<sup>3</sup>.

The permit also required Ford to install two afterburners to incinerate the desorbed VOCs after the carbon wheels become saturated. The purified air, which also is vented up through a 19-meter stack, must contain no more than 20mg VOCs/m<sup>3</sup>. The agency specifically found that these controls met the statutory standards.<sup>202</sup> Together, the carbon adsorption systems and afterburners would ensure that the VOC emissions did not exceed 35 mg VOCs/m<sup>2</sup>.<sup>203</sup>

*Monitoring, Reporting, and Recordkeeping:* Ford must report the actual emission rate from the carbon adsorption wheels three months after beginning operations, and thereafter every six months. If the measurements are stable, and below the permit limits, Ford need only measure and report the emission rate every three years.<sup>204</sup> To ensure

compliance with the emission rates from the afterburners, Ford must continuously monitor and record the incineration temperature.<sup>205</sup>

Although the permit is not clear on the matter, Ford officials report that the air vented from the carbon wheels and the afterburners are continuously monitored. In addition, Ford must keep records of solvent usage (it relies on paint manufacturers for data on the solvent content of the paint), the amount of solvent disposed, the amount of solvent incinerated in the afterburners, and the number of car bodies painted.<sup>206</sup> From these data, Ford must estimate emissions and report the results annually.

Ford also must report any breakdown in the air purification system for the topcoat line, which must be armed with a visual and audio alarm system, within 24 hours, and it must promptly take measures to limit emissions as much as possible.<sup>207</sup> Ford must keep records on all disturbances on the topcoat line that might cause an increase in emissions—including the time, duration, type, cause, and corrective measures—for two years.

## **VI. ANALYSIS AND CONCLUSIONS**

There are important similarities in the U.S. and German air pollution permit processes in this study. The permits required the facilities to use similar pollution control technologies, and the capital costs for the control technologies were comparable—in the range of \$20-30 million. The emissions monitoring requirements also were similar. Although reporting requirements in the U.S. permits were somewhat more burdensome, the additional costs were not significant compared to the capital costs of the controls.

The principal difference—the time between the application and issuance of the permit—is striking. The German agencies approved the permits in five and 17 months, whereas the U.S. agencies took several years. At the St. Paul, Minnesota facility, Ford was allowed to use its new paint technology, but had to reduce production by as much as 100,000 trucks during the period of delay. At the Edison, New Jersey facility, Ford had to reduce the rate of production *and* was barred for a few years from introducing the popular new topcoats. The opportunity costs potentially were substantial.<sup>208</sup>

Several important factors—especially the degree of public participation, the stringency and detail of legal requirements and permits, and the extent of federal oversight—probably account for this substantial difference.

*Public Participation.* Public participation, and thus politicization of the permitting process, potentially plays a more prominent role in air pollution permitting processes in the U.S. than in Germany.<sup>209</sup> The U.S. legal structure strengthens the role of politics. In the U.S., federal and state law requires most permit decisions to be preceded by public notification, an opportunity for public comment, and a public meeting where members of the public can voice their concerns and demand answers from regulators (and often company officials). Typically, state implementation plans provide an opportunity for contested administrative hearings (as well as judicial review) to resolve factual disputes underlying the permit decision. Entrepreneurial activists can use these procedures to generate publicity, create and energize a political constituency, and force the agency to address their concerns.

Under German law, by contrast, the opportunities for public participation are restricted. Most importantly, the *Land* environmental agency has no legal obligation to give public access to the proposed permit and supporting documents when the permit is for a facility modification, so long as the modification does not increase pollutant emissions. This limitation on public participation is not trivial. The Saarlouis permit expressly states that Ford requested the agency not to notify the public of the facility modification. A Ford memorandum confirms that Ford wanted to install control technologies that would reduce total facility VOC emissions in part to avoid public notification of and comment on the draft permit.

Even when a German environmental agency must make the draft permit and supporting documents available to the public, the opportunity for public participation is more restricted than in the U.S. German agencies accept written comments and objections from members of the public, but they are not required to hold a public meeting or initiate a contested administrative hearing. As a result, the opportunities for activists to generate political action are much more limited. Absent an extremely controversial issue—such as shipping nuclear waste, which literally brings protestors into the streets—political debate about permit decisions is suppressed.

The politicization of the U.S. permitting process—and the resulting delay and relative stringency of the permit—often is magnified by the political complexion of some agencies. In Minnesota, for example, the MPCA governing Board is appointed by the governor and evidently is prepared to ignore the recommendations of its expert staff in

controversial cases. In Germany, by contrast, the agency is viewed as neutrally implementing public policy expressed in *BImSchG*.

This is not to say that U.S. environmental agencies pander to activists' demands; indeed, such agencies may be more attentive to the needs of economically powerful interests. But they also may be more likely than the German air pollution agencies to take political pressures seriously and to look for political solutions. Bombarded with a steady stream of newspaper articles detailing the neighbor's concerns, and threatened with requests for a potentially divisive contested case hearing, MPCA forged a political solution—it brought the entire range of disputants together in the Task Force, which systematically addressed public concerns about odors and health. Whether the MPCA was seeking a rational, non-adversarial and politically legitimate solution to a difficult problem, or whether it was seeking cover from political criticism and legal challenge, its approach led to a solution that Ford officials and most members of the public found acceptable.

As it turned out, odors from the paint shop at the St. Paul facility were a real and substantial problem whose solution came out of the process of public participation. Ford and the MPCA had had years to address the neighborhood's complaints about odors, but failed to make significant progress on the issue until activists forced the issue in the context of a permit renewal.

The controversy over the odors eventually spawned a separate concern about public health. To a substantial degree, the very existence of this issue was Ford's fault for letting the odor controversy fester for so long. The controversy over health effects

was also the predictable result of a style of political activism that seeks to create and energize a political constituency through predictions of dire consequences.<sup>210</sup> It bears noting, however, that the Task Force carefully addressed the issue by bringing in experts to evaluate the problem. The Task Force's conclusion and recommendation—that VOC emissions probably presented no significant threat to health but that total VOC emission should be reduced by 10% to provide a margin of safety—was hardly irrational or extreme.

As with the St. Paul facility, the modification of the Cologne facility was an occasion to raise community concerns about odors from the paint shop. The public announcement of the permit application gave neighbors an opportunity to file objections and caused the agency and Ford to investigate ways to reduce the odors. There were important differences from the St. Paul process, however. First, in Cologne, the neighbors' only option was to file written objections. There were no opportunities for public meetings or administrative hearings to air disputes. The neighbors' only remedy was to file suit asserting that the permit violated their rights; such suits are costly and, given the usual deference to agency judgments, not likely to be successful. Second, the Cologne neighbors were not allowed to participate in choosing the consulting firm or in reviewing the consulting firms' methodology, assumptions, or conclusions. There was no agency-endorsed Task Force to oversee the technical process of analyzing odors and health effects. Third, the agency made no effort to eliminate all odors. Whereas the St. Paul permit expressly prohibits any perceptible odors beyond the plant boundaries, the Cologne permit recognizes that two neighborhoods would experience odors 5-6% of the

time, but that such odors were acceptable in light of the overall reduction in VOC emissions and improvements in air quality. In short, the Cologne permit was less demanding than the St. Paul permit.

Without doubt, extensive public participation and the resulting politicization bring delay. Delay may be costly if it needlessly restricts production or delays introduction of new products. But delay also can be useful if it allows the agency to gather more information and find solutions to demonstrated problems. It is not clear how much Ford suffered from the delay in issuing the permit for the St. Paul facility. EPA allowed Ford to have an “innovative technology waiver” from the NSPS standards for 17 months, thereby allowing Ford additional time to attempt to meet the air pollution standards and eliminate noxious odors through new paint formulations and application technologies. When the odors (and complaints) persisted, MPCA allowed Ford to use the new BC/CC line while the permit process proceeded. Under an agreement with MPCA, Ford restricted its production rate and the total annual VOC emissions, but otherwise operated under few restrictions. Ford officials commented that this arrangement was satisfactory to them, and while they surely wanted the permit controversy resolved, they never expressed great dismay with the speed of the permitting process. In other words, although the delay was quite substantial, the legal system permitted agency officials enough discretion to accommodate the company’s needs during the permit process.

*Stringency and Detail.* It is evident that U.S. statutory and regulatory requirements, and the resulting permit conditions, often are more detailed and stringent than the corresponding German requirements, especially in polluted areas. The Clean Air

Act's NSPS program requires each coating line to meet separate emission limits. The non-attainment program requires the facility to achieve an overall reduction in emissions through offsets at other facilities, and separately to meet the LAER standards, which do not take control costs into account. The U.S. permits also are remarkably detailed. Some requirements, such as the extensive testing, monitoring, and reporting requirements, probably are irksome but not especially burdensome to a large company such as Ford (more detailed reporting requirements, however, may lead to greater compliance costs since permit violations are easier to detect). Other requirements, however, such as the separate emission limits for numerous points in the paint shop and the specifications for paint formulations, severely limit Ford's flexibility to address sudden changes in the production line without providing corresponding environmental benefits. When the company regards such requirements as burdensome, conflict between the company and the agency is more likely to be exacerbated, resulting in delay.

A potential aspect of stringent and detailed standards, especially when coupled with large control costs, is the tendency to view permit disputes as legal matters rather than as technical matters. Conceivably, lawyers and legal process may play a larger role in resolving such disputes. In the two U.S. case studies, however, lawyers and litigation had virtually no direct role in the permit decisions. One reason might be that standards of judicial review are deferential to agency judgments; within boundaries defined by "substantial evidence" or "arbitrary, capricious, or an abuse of discretion," courts will uphold agency permit decisions. Another reason might be that because the firm and the agency have an ongoing relationship, the parties turn to litigation only as a last resort.



In Germany, by contrast, the number of standards and the monitoring requirements are less detailed, thereby affording the facility greater flexibility to deal with changes on the production line. The statutory “state of the art” requirement, contrary to the U.S. LAER requirement in non-attainment areas, is based on the proportionality principle under which benefits and costs are balanced. Because the German permits involve fewer, less stringent, and inherently more flexible requirements, there is less for the agency and the company to fight about.

*Federal Oversight.* There is considerable federal oversight built into U.S. air pollution regulation—including EPA’s authority to approve SIPs and individual permits, to strip state agencies of the permitting and enforcement authority, and to impose economic sanctions on states that do not meet attainment deadlines. The oversight helps to motivate state agencies to apply federal standards vigorously and to demand greater proof that the facilities will meet the legal requirements, even in the absence of discernible public concern. Quite possibly, the existence of the federal non-attainment program, which together with EPA oversight can limit economic development in non-attainment areas unless new and modified sources make “reasonable further progress” to attainment, motivate state agencies to deal more aggressively with facilities seeking a new permit. NJDEP certainly realizes that it must obtain as much VOC reductions as possible to leave room for other new or modified facilities in the future.

In Germany, there are no provisions for federal oversight; there is no federal approval of the *Länder* decisions, no federal authority to assume permitting and enforcement responsibilities, and no concurrent federal enforcement authority. These

differences, which flow from fundamental structural differences in the *Grundgesetz* and the U.S. Constitution, relieve the *Länder* of political pressure that environmental activists might be able to exert through the federal government.

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<sup>1</sup> Office of Technology Assessment, *CATCHING OUR BREATH: NEXT STEPS FOR REDUCING URBAN OZONE* 40-91 (1989); U.S. EPA, *REVIEW OF NATIONAL AMBIENT AIR QUALITY STANDARDS FOR OZONE: ASSESSMENT OF SCIENTIFIC AND TECHNICAL INFORMATION*, QAQPS STAFF PAPER (1996).

<sup>2</sup> Because not all VOCs contribute to ozone formation, VOC regulations focus on so-called “reactive” VOCs. Some VOCs also are toxic or carcinogenic, and are subject to additional regulations.

<sup>3</sup> According to the U.S. Environmental Protection Agency, U.S. auto assembly plants are the sixth largest source of industrial VOC emissions when analyzed by SIC category, constituting 2.9% of all industrial VOC emissions. U.S. EPA Office of Air Quality Planning and Standards, *AIRWeb, United States VOC Air Pollution Sources* (May 27, 1998).

Because of the importance of non-industrial pollution sources (*e.g.*, automobiles on the road and architectural coatings), however, auto assembly plants represent a significantly smaller fraction of the total VOC pollutant load nationwide. In 1996 VOC emissions in the U.S. totaled 19.086 million short tons. Of that total, 2.881 million short tons of VOCs (15%) came from solvents used in surface coatings, including architectural coatings, and 123,000 short tons of VOCs (0.64% of total VOC emissions) came from automobile and light truck painting. Only one auto assembly plant (not one considered in this study) is in the list of the top 50 VOC emitters. By comparison, 5.202 million short

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tons (27% of total VOCs) came from the exhaust of on-road vehicles. EPA, *National Air Pollutant Emission Trends, 1900-1996* Appendix A (EPA-454/R-97-011, Dec. 1997).

<sup>4</sup> In the early 1970s, automobile paint shops used high solvent-based lacquer or enamel topcoats. These coatings were easy to apply and repair. Even after the topcoat dried, scratches and other imperfections could be repaired by heating the surface locally to smooth out the imperfections. Air pollution standards introduced in the 1980s forced manufacturers to reduce the amount of solvents in the top-coat paints.

<sup>5</sup> See 49 Fed. Reg. 37548 (1984). In 1984, Congress enacted the Cooperative Research Act, 15 U.S.C. §§4301-4306, which permitted the U.S. automakers to cooperate on research without violating the antitrust laws. The manufacturers began collaborating on research for low-VOC paints in 1987, eventually forming the United States Council for Automotive Research (USCAR).

<sup>6</sup> The exhaust from the bake oven is not sent to the carbon adsorption system because it is too hot for efficient adsorption. Fortunately, the exhaust is sufficiently concentrated to incinerate the VOCs directly without first concentrating them.

<sup>7</sup> 42 U.S.C. §§7401-7671q.

<sup>8</sup> See generally, Dwyer, *The Role of State Law in an Era of Federal Preemption: Lessons from Environmental Regulation*, 60 L. & Contemp. Probs. 203 (1998); Dwyer, *The Practice of Federalism under the Clean Air Act*, 54 Md. L. Rev. 1183 (1995).

<sup>9</sup> Section 109(a)-(b), 42 U.S.C. §7409(a)-(b). To date, EPA has set standards for sulfur dioxide, particulates, nitrogen oxides, carbon monoxide, ozone, and lead. See 40 C.F.R. pt. 50 (specifying primary and secondary national ambient air quality standards). EPA must set these standards without regard to the magnitude of control costs. *Lead Industries Ass'n v. EPA*, 647 F.2d 1130, 1149 (D.C. Cir.), *cert. denied*, 449 U.S. 1042 (1980).

<sup>10</sup> Section 111(a)(1), (b), 42 U.S.C. §7411(a)(1), (b) (specifying general criteria for NSPS standards). See also 40 C.F.R. pt. 60 (specifying NSPS standards for more than 75 industrial categories).

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<sup>11</sup> The 1970 version of the Clean Air Act required states to meet the primary NAAQS by the mid-1970s. The Act contained no provisions to address the possibility that the air quality in some areas would not meet the national standards by the statutory deadline. In 1977, when scores of urban areas failed to meet the primary NAAQS for ozone, Congress added a new “non-attainment” program to the Clean Air Act. *See* Sections 171-179b, 42 U.S.C. §§7501-7509a. In 1990 Congress adopted more elaborate program with longer deadlines and more stringent control measures in areas with more serious air pollution problems. *See* Sections 181-192, 42 U.S.C. §§7511-7514a.

<sup>12</sup> Sections 160-169B, 42 U.S.C. §§7470-7492.

<sup>13</sup> *See, e.g.*, Section 111(c), 42 U.S.C. §7411(c) (legal authority to delegate NSPS program to state air pollution agencies); 40 C.F.R. §60.23 (procedures to prepare and submit for EPA approval a state plan to implement the NSPS program).

<sup>14</sup> Section 110(a)(2), 42 U.S.C. §7410(a)(2). States that fail to submit acceptable SIPs are subject to sanctions, such as increases in “offsets” required for new or modified sources and a cutoff of federal funds for highway construction projects. Section 179, 42 U.S.C. §7509. In addition, EPA may assume primary responsibility by issuing a federal implementation plan. Section 110(c)(1), 42 U.S.C. §7410(c)(1).

<sup>15</sup> Section 110(a)(2), 42 U.S.C. §7410(a)(2).

<sup>16</sup> Section 110(a)(1), 42 U.S.C. §7410(a)(1).

<sup>17</sup> Section 113(a), 42 U.S.C. §7413(a).

<sup>18</sup> Section 111, 42 U.S.C. §7411. EPA’s regulations exempt (i) routine maintenance, repair and replacement, (ii) an increase in production rate if it does not require additional capital expenditure, and (iii) an increase in the hours of operation. 40 C.F.R. §60.14(e)(1)-(3).

<sup>19</sup> Section 111(a)(1), 42 U.S.C. §7411(a)(1). EPA has established NSPS emission standards for dozens of industrial categories, including surface coating operations in auto assembly plants. 40 C.F.R. pt 60, subpt MM.

<sup>20</sup> *Id.* §60.392.

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<sup>21</sup> *Id.* §60.393. EPA specifies the reference methods and procedures to conduct these tests. *Id.* §60.396.

<sup>22</sup> *Id.* §60.394

<sup>23</sup> *Id.* §60.395.

<sup>24</sup> §111(j)(1)(A), 42 U.S.C. §7411(j)(1)(A).

<sup>25</sup> Section 111(j)(1)(A), 42 U.S.C. §7411(j)(1)(A).

<sup>26</sup> In the early 1980s, EPA granted several automobile manufacturers waivers for their topcoat lines. *See* 40 C.F.R. §60.398 (describing waivers for several plants).

<sup>27</sup> A “major source” is a facility that has the potential to emit more than a specified number of tons of VOCs annually. In a “severe” nonattainment area, such as Edison, New Jersey, where Ford’s Edison assembly plant is located, a “major” source is one with the potential to emit 25 tons of VOCs annually. Section 182(d), 42 U.S.C §7511a(d). Automobile assembly plants typically emit between 500 and 2000 tons of VOCs annually.

<sup>28</sup> Section 172(c)(5), 42 U.S.C. §7502(c)(5); 40 C.F.R. §51.165 (regulations for new source review in nonattainment areas). Regardless of the amount of current emissions, if the proposed modification would result in no net increase in emissions—*e.g.*, because emissions in other parts of the facility were reduced—the modification would not be subject to the non-attainment provisions. *See* 40 C.F.R. §51.165(a)(1)(v).

<sup>29</sup> Section 173(a)(1)(A), 42 U.S.C. §7503(a)(1)(A).

<sup>30</sup> Section 182(d)(2), 42 U.S.C. §7511a(d)(2).

<sup>31</sup> Section 173(a)(2), 42 U.S.C. §7503(a)(2). The Act defines the “lowest achievable emission rate” as the

rate of emissions which reflects—

(A) the most stringent emission limitation which is contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable, or

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(B) the most stringent emission limitation which is achieved in practice by such class or category of source, whichever is more stringent.

Section 171(3), 42 U.S.C. §7501(3). In any event, the LAER is as least as stringent as the NSPS standards. *Id.*

<sup>32</sup> Section 173(a)(3), (5), 42 U.S.C. §7503(a)(3), (5).

<sup>33</sup> Sections 165, 42 U.S.C. §7475; 40 C.F.R. §51.166 (regulations for new source review in PSD areas). In most cases (including automobile assembly plants), a “major source” is a facility with the potential to emit more than 250 tons of VOCs annually, and a major modified source is a major source whose modification results in a net increase in emissions. 40 C.F.R. §51.166(b)(1)(i)(b), (b)(2). Thus, as with facilities in non-attainment areas, if the proposed modification would result in no net increase in emissions, it would not be subject to the PSD permitting process. For example, because the modifications to the Minnesota facility resulted in a net decrease in VOC emissions, it was not subject to PSD review.

<sup>34</sup> Section 165(a), 42 U.S.C. §7475(a).

<sup>35</sup> There are no national standards for odorous emissions.

<sup>36</sup> *Restatement (Second) of Torts* §§821A-840E. For a study of local enforcement of nuisance standards as applied to odors, Noga Morag-Levine, *Chasing the Wind: Reactive Law, Environmental Equity and Localized Air Pollution Regulation* (PhD dissertation, University of California at Berkeley, 1995).

In Minnesota, for example, state law specifically requires a person causing “obnoxious odors constituting a public nuisance” immediately to take “reasonable steps to minimize” the emissions. Minn. Stat. §116.061.1(b). However, the Minnesota statute also provides an exception if the state air pollution agency has granted the polluter a permit that authorizes the odorous emissions. *Id.* §116.061.3(4).

<sup>37</sup> §111(j)(1)(A), 42 U.S.C. §7411(j)(1)(A).

<sup>38</sup> 40 C.F.R. §51.161. *See also* 40 C.F.R. §60.9 (information the agency has collected regarding compliance with NSPS requirements must be made available to the public,

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subject to trade secret claims); 40 C.F.R. §60.23(c), (d) (public notice and hearing procedures on state adoption of a plan to implement NSPS requirements).

<sup>39</sup> Section 165(a)(2), 42 U.S.C. §7475(a)(2); 40 C.F.R. §51.166(a)(5), (q).

<sup>40</sup> In all states, hearings are open to the public, and all state studies, reports, orders and other final documents are open to public inspection. *See, e.g.*, Minn. Stat. §116.075.1. *See also* Minn. Rules §7000.1800 (any person may petition the Minnesota Pollution Control Agency for a contested hearing to challenge the decision to grant an air pollution permit). The procedures contemplate a formal proceeding in which the parties are represented by counsel, witnesses are subject to cross examination, and the issue is decided by an administrative law judge. Minn. Stat. §§14.57-14.69; Minn. Rules §§1400.5100-1400.8401. The statute also provides for recovery of attorney fees. Minn. Stat. §15.472.

<sup>41</sup> EPA, *National Air Pollutant Emission Trends, 1900-1996* Appendix A (EPA-454/R-97-011, Dec. 1997); American Automobile Manufacturers Ass'n, *U.S. Motor Vehicle Production*, <http://www.aama.com/data/table1.html> (6/29/98).

<sup>42</sup> *Grundgesetz*, art. 74(24).

<sup>43</sup> *Id.* art. 83-85.

<sup>44</sup> Jarass & DiMento, *Through Comparative Lawyers' Goggles: A Primer on German Environmental Law*, 6 *Georgetown Int'l Env'tl. L. Rev.* 47, 55 (1993); Susan Rose-Ackerman, *CONTROLLING ENVIRONMENTAL POLICY: THE LIMITS OF PUBLIC LAW IN GERMANY AND THE UNITED STATES* 8 (1995).

<sup>45</sup> *Grundgesetz*, art. 84.

<sup>46</sup> *BImSchG*, art. 4, ¶1. Modification of such facilities also requires a license. *Id.* art. 15, ¶1. In the U.S., by contrast, the criterion for whether a facility is subject to NSPS, PSD, or nonattainment requirements is numerical, *e.g.*, the potential to emit more than 100 tons of VOCs annually.

<sup>47</sup> *BImSchG* art. 5, ¶1.

<sup>48</sup> Currie, *Air Pollution Control in West Germany*, 49 *U. Chi. L. Rev.* 355, 359-60 (1982).



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<sup>49</sup> *BImSchG* art. 5, ¶2.

<sup>50</sup> Currie, *Air Pollution Control in West Germany*, 49 U. Chi. L. Rev. 355, 370 (1982).

<sup>51</sup> *BImSchG* art. 47.

<sup>52</sup> *Id.* art. 49.

<sup>53</sup> Currie, *supra* note \_\_\_, at 374-80.

<sup>54</sup> Currie, *supra* note \_\_\_ at 355, 361-62.

<sup>55</sup> The regulations also contain detailed provisions to monitor emissions, including requirements specifying the location of measurement sites, the frequency of measurements, and the selection of measurement procedures. *TA Luft* §3.2.

<sup>56</sup> *Id.* §2.4.

<sup>57</sup> *Id.* §2.5.

<sup>58</sup> *Id.* §3.1.

<sup>59</sup> *Id.* §3.1.7.

<sup>60</sup> *Id.* §3.3.

<sup>61</sup> *Id.* §3.3.5.1.1.

<sup>62</sup> *TA Luft* §§2.2.1.2, 2.2.1.3.

<sup>63</sup> *Id.* §2.2.1.4.

<sup>64</sup> *TA Luft* contains special measures, including low-emission fuel and operating restrictions, which are required in areas that are subject to stationary weather conditions that cause a considerable increase in immissions. *Id.* §2.2.1.4. These provisions, however, are far less burdensome and cover far fewer areas than the U.S. nonattainment provisions.

<sup>65</sup> *Id.* §2.4

<sup>66</sup> *Id.* §2.5.1.

<sup>67</sup> *Id.* §2.5.2.

<sup>68</sup> *Id.* §2.6.

<sup>69</sup> *Id.* §§2.2.1.1, 2.2.1.2.

<sup>70</sup> *Id.* §2.2.1.1(b).

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<sup>71</sup> Although there are no *immission* values for ozone, a 1995 amendment to the *BImSchG* provides that if the hourly average ozone concentration exceeds exceed 240µg/m<sup>3</sup> the government may impose driving restrictions. *BImSchG* art. 40a. The *BImSchG* value is roughly equal to the U.S. NAAQS value of 0.12 ppm. *See* 40 C.F.R. §50.9. There is an important difference, however. The German standard is not an air quality limit that the *Länder* must meet or face sanctions. Rather, it is a threshold that is the basis for government-imposed restrictions on driving. The U.S. standard, which can be violated only one day annually, is a mandatory standard that states must meet by statutory deadlines or face federal sanctions.

<sup>72</sup> *TA Luft* §2.2.1.3(b).

<sup>73</sup> *Id.* §2.2.1.3.

<sup>74</sup> *Id.* §3.1.2.

<sup>75</sup> *Id.*

<sup>76</sup> *Id.* §3.1.7.

<sup>77</sup> *See TA Luft* §3.3 (the 1986 version of *TA Luft* has air pollution regulations for 10 different categories of industrial facilities).

<sup>78</sup> *Id.* §3.3.5.1.1.

<sup>79</sup> *Id.* §3.1.

<sup>80</sup> *Id.* §3.3.5.1.1.

<sup>81</sup> *Id.* §3.3.5.1.1.

<sup>82</sup> *Id.* §3.1.

<sup>83</sup> *BImSchG*, art. 10, ¶3.

<sup>84</sup> *Id.*

<sup>85</sup> *Id.* art. 15, ¶2.

<sup>86</sup> *Id.* art. 10, ¶¶5-6.

<sup>87</sup> *Id.* art. 15, ¶1.

<sup>88</sup> *TA Luft* §3.3.5.1.1.

<sup>89</sup> Section 173(a), 42 U.S.C. §7503(a).

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<sup>90</sup> Even if the additional load causes the initial load to increase by more than 1%, the agency will still grant a license if the proposed source can obtain enough offsets to reduce *immissions*. *TA Luft* §2.2.1.1.

<sup>91</sup> *BImSchG* art. 3, ¶4.

<sup>92</sup> *TA Luft* §2.4.

<sup>93</sup> EPA, *AIRS Graphics, Largest VOC Emission Sources in the United States* (May 1, 1998).

<sup>94</sup> EPA Office of Air Quality Planning and Standards, AIRSWeb, *Minnesota VOC Air Pollution Sources* (May 27, 1998).

<sup>95</sup> For plant emissions in recent years, see EPA, *U.S. Automobile Assembly Plants and Their Communities: Environmental, Economic, and Demographic Profile*, No. 34 (Ford Motor Co., St. Paul MN) (Dec. 1997).

<sup>96</sup> Nationally, approximately 20% of the population is minority and 20% is below the poverty line. EPA, *U.S. Automobile Assembly Plants and Their Communities: Environmental, Economic, and Demographic Profile*, No. 34 (Ford Motor Co., St. Paul MN) (Dec. 1997). The population data are for 1990.

<sup>97</sup> From 1991 through 1994, annual production ranged from 119,712 to 208,325 trucks. EPA, *U.S. Automobile Assembly Plants and Their Communities: Environmental, Economic, and Demographic Profile*, No. 34 (Ford Motor Co., St. Paul MN) (Dec. 1997).

<sup>98</sup> *St. Paul Ford Plant May Build Ranger*, St. Paul Pioneer Press & Dispatch (Oct. 3, 1983).

<sup>99</sup> MPCA, Installation Permit for an Emission Facility and Air Pollution Control Equipment (Permit No. 249-84-I-2).

<sup>100</sup> 49 Fed. Reg. 37,548 (1984).

<sup>101</sup> *Id.* at \_\_\_\_.

<sup>102</sup> *Id.* at \_\_\_\_.

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<sup>103</sup> Davis argued that EPA did not have adequate information to assess public health risks from the excess emissions, that the waiver might permit Ford to violate other regulatory standards, and that granting Ford a waiver to meet foreign competition was not a legal basis for a waiver.

<sup>104</sup> *Area Residents Oppose Waiving Air Quality Rules for Ford Plant*, Minneapolis Star & Tribune (Jan. 31, 1985). Under federal law, EPA could not approve the waiver without the governor's consent.

<sup>105</sup> *Perpich Backs Ford Request for Waiver on Air Standards*, Minneapolis Star & Tribune (Feb. 8, 1995).

<sup>106</sup> 50 Fed. Reg. 36,830 (1985). EPA also granted a waiver for two other Ford plants and a Chrysler plant, each of which, unlike the St. Paul facility, were in non-attainment areas. *Id.* at \_\_\_\_.

<sup>107</sup> 50 Fed. Reg. at \_\_\_\_.

<sup>108</sup> *Davis v. EPA*, 804 F.2d 1324 (1986). Davis did not file his suit until March 1986, and the court did not rule until late November 1986, about five weeks before the waiver terminated of its own accord. Because there was no injunction pending the outcome of the litigation, the suit had no impact on Ford's operations or the ongoing processes to draft an acceptable permit.

<sup>109</sup> MPCA, Ford Motor Company St. Paul Assembly Plant Permitting Fact Sheet (Mar. 30, 1987).

<sup>110</sup> See Letter from Helen Marr to MPCA (Oct. 1979).

<sup>111</sup> In fiscal 1987, MPCA received 135 complaints about odors from the Ford plant, and in 1988, it received 65 complaints. *Ford Plant's Smokestack Extended to Disperse Odors from Paint Shop*, Minneapolis Star & Tribune (Junly 7, 1989).

<sup>112</sup> Ford officials confirmed that there was a problem with odors. "How could we deny that [an odor problem] existed with over 300 complaints," the official admitted. "When it was damp and humid it just hung in the air."

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<sup>113</sup> *Earth Protector's Davis Sparks Controversy Over Ford Paint Shop*, Highland Villager (July 11, 1984).

<sup>114</sup> Letter from Leslie Davis to Tom Laney, President, Local 879 UAW (Aug. 2, 1984); Letter from Tom Laney, President, Local 879 UAW, to Leslie Davis (Aug. 13, 1984); Letter from Tom Laney, President, Local 879 UAW, to MPCA (Oct. 9, 1984); Letter from V.H. Sussman, Director, Stationary Source Environmental Control, Ford, to Tom Laney, President, Local 879, UAW (Jan. 17, 1985).

<sup>115</sup> *Ford, Drop "Wet Look" Paint*, St. Paul Pioneer Press & Dispatch (Apr. 19, 1985); *Ford Motor Story Failed to Clear the Air on Waiver Issue*, Highlander Villager (Mar. 12, 1986); *Fighting Ford*, Highland Villager (June 25, 1986); *Residents Urged to Take Action*, Highland Villager (July 16, 1986).

<sup>116</sup> *Environmental Group Says Ford Expansion May Create Toxic Emissions*, Minneapolis Star & Tribune (Nov. 28, 1984); Editorial, *Fumes, Fear Creep in Window*, St. Paul Pioneer Press & Disptch (Jan. 10, 1985); *Environmentalists, Ford Co. Discuss Plant*, Minneapolis Star & Tribune (Jan. 17, 1985).

<sup>117</sup> Letter from Leslie Davis to 60 Minutes (Dec. 24, 1984); Letter from Marjorie Holyoak, Director, Audience Services, 60 Minutes, to Leslie Davis (Jan. 23, 1985).

<sup>118</sup> *Highland Park Neighbors Protest Odors Coming from Ford Plant*, Minneapolis Star & Tribune (Sept. 11, 1986).

<sup>119</sup> Letter from John Drew, Councilman, St. Paul City Council, to Lisa Thorvig, Chief, Regulatory Compliance Section, MPCA (Apr. 30, 1987).

<sup>120</sup> MPCA, Public Notice on Proposed Air Emission Facility Permit (Mar. 20, 1987).

<sup>121</sup> *Neighborhood Task Force Seeking Changes in Ford Operating Permit*, Highland Villager (June 17, 1987).

<sup>122</sup> Letter from Lisa Thorvig, Chief, Regulatory Compliance Section, MPCA, to Judith Krasnow, Liaison, Citizen's Task Force (May 27, 1987); Memo from Michael Valentine, Director, Division of Air Quality, MPCA, to Air Quality Committee, MPCA Board (June 17, 1987).

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<sup>123</sup> *Neighborhood Task Force Seeking Changes in Ford Operating Permit*, Highland Villager (June 17, 1987).

<sup>124</sup> Task Force Meeting Minutes (July 1, 1987).

<sup>125</sup> Minn. Stat. §116.02(1) (commissioner and eight board members are appointed by the governor, subject to senatorial confirmation); §116.02(3) (no member, other than the commissioner, may be an officer or employee of the state).

<sup>126</sup> The emissions cap was the same cap in the proposed but never issued 1986 operating permit. MPCA also imposed a limit on the VOC content of the paint. MPCA, *Summary of Comments and Responses: Public Meeting re Draft Air Emission Permit, #249-91-OT-1* (May 28, 1991).

Because 2000 jobs hung in the balance, it was politically infeasible for the MPCA to close the plant until it issued the operating permit. Ford officials felt there was little danger that MPCA would deny an extension so long as Ford continued to make a good faith effort to reach a solution. Although the construction permit imposed some restrictions, Ford was not unhappy with the permit. Because the permit established performance standards (*e.g.*, 1095 tons per year), rather than specific environmental controls (except for the required afterburners), Ford had substantial flexibility to meet the permit requirements. Moreover, the construction permit did not impose onerous monitoring, recordkeeping, and reporting requirements.

<sup>127</sup> *Cooperative Spirit Smooths Way for Ford Plant Monitoring*, Highland Villager (Oct. 21, 1987).

<sup>128</sup> These evaluations costs Ford \$750,000. Ford also incurred personnel costs during the extended permitting process. Ford officials estimate that two members of its environmental staff worked an average of four hours daily over the course of five years, for an estimated total cost of about \$182,500.

<sup>129</sup> See Ford Air Quality Task Force, *Task Force Report on Air Emissions Studies, Ford Motor Company—Twin Cities Assembly Plant* (Feb. 28, 1990).

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<sup>130</sup> *Ford Plans Plant Changes to Cut Odor*, Minneapolis Star & Tribune (June 7, 1989); *Ford Plant Smokestack Extended to Disperse Odors from Paint Shop*, Minneapolis Star & Tribune (July 7, 1989). Because the exhaust stack is in the flight path of the Minneapolis-St. Paul International Airport, Ford also needed to obtain approval from the Federal Aviation Administration.

<sup>131</sup> See MPCA, *Fact Sheet: Ford Motor Company Twin Cities Assembly Plant* (May 1991); Letter from Frank Partee, Ford Motor Co., to J. Michael Valentine, Director, Division of Air Quality, MPCA (Oct. 31, 1989).

<sup>132</sup> Ford Air Quality Task Force, *Task Force Report on Air Emissions Studies, Ford Motor Company—Twin Cities Assembly Plant* (Feb. 28, 1990).

<sup>133</sup> Ford Task Force Minutes (Nov. 2, 1989).

<sup>134</sup> Letter from Frank Partee, Ford Motor Co., to J. Michael Valentine, Director, Division of Air Quality, MPCA (Oct. 31, 1989).

<sup>135</sup> With this change, all Rangers would receive the BC/CC coating. Letter from Frank Partee, Ford Motor Co., to J. Michael Valentine, Director, Division of Air Quality, MPCA (Oct. 31, 1989).

<sup>136</sup> See MPCA, *Public Notice on Proposed Air Emission Facility Permit* (May 9, 1991).

<sup>137</sup> EPA regulations provide that the threshold for a significant net increase is VOC emissions is 40 tons per year. 40 C.F.R. §51.166(b)(23)(i).

<sup>138</sup> MPCA, *Issue Statement* p. 2 (June 25, 1991).

<sup>139</sup> After reviewing the draft permit, the Task Force recommended that Ford be required to participate in any task force formed to study emissions. MPCA incorporated that recommendation into the permit. See also Letter from William MacDowell, Chief, Regulation Development Section, Air Enforcement Branch, EPA, Region 5, to Ahto Niemioja, Supervisor, Permit Unit, Regulatory Compliance Section, Division of Air Quality, MPCA (June 10, 1991) (informing MPCA about the need for minimum efficiencies in the VOC control equipment, which MPCA subsequently implemented as §III.I of the permit).

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<sup>140</sup> Air Emission Permit No. 249-91-OT-1, §II.C. The EPA regulations are found at 40 C.F.R. §60.392.

<sup>141</sup> Air Emission Permit No. 249-91-OT-1, §III.E.1.

<sup>142</sup> Air Emission Permit No. 249-91-OT-1, §III.E.2.

<sup>143</sup> The permit defines an “odor concentration unit” as

The number of standard cubic feet of odor-free air needed to dilute each cubic foot of contaminated air so that at least 50% of the odor concentration test panel does not detect any odor in the diluted mixture.

Air Emission Permit No. 249-91-OT-1, §III.

<sup>144</sup> Air Emission Permit No. 249-91-OT-1, §II.E. *See* Minn. Rules 7005.0920.

<sup>145</sup> To ensure that Ford would not delay installation of the control equipment, the permit provided that Ford may not begin operation of the modified PVC/Guidecoat/Anti-chip system until the new carbon wheel adsorption/incineration system was in operation on the main topcoat line. Air Emission Permit No. 249-91-OT-1, §III.H.

<sup>146</sup> Air Emission Permit No. 249-91-OT-1, §III.A. Ford and MPCA staff were unable to agree on monitoring equipment for the carbon adsorption system. The permit requires Ford to submit a report on alternative monitoring systems, after which the MPCA Director will select a particular system. Air Emission Permit No. 249-91-OT-1, §III.B.5.

<sup>147</sup> Air Emission Permit No. 249-91-OT-1, §III.B. There are analogous requirements for the cleaning ovens in the assembly plant. *Id.*

<sup>148</sup> Air Emission Permit No. 249-91-OT-1, §III.F.

<sup>149</sup> The minimum efficiencies for the control equipment are 90% destruction efficiency for each incinerator, 85% capture efficiency for the carbon wheel adsorption unit on the main enamel line, and overall control efficiencies of 18% for the PVC/Guidecoat/Anti-chip line, and 50% for the main topcoat line. Air Emission Permit No. 249-91-OT-1, §III.I.

<sup>150</sup> Air Emission Permit No. 249-91-OT-1, §III.G.



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<sup>151</sup> Ford lost the capacity of 4.5 trucks per hour, for about 4700 hours per year (20-hour days for 234 days), for five years, totaling 105,750 trucks. Ford officials claim that they would have used the full capacity.

<sup>152</sup> Air Emission Permit No. 249-91-OT-1, §IV.B, C, F.

<sup>153</sup> Air Emission Permit No. 249-91-OT-1, §IV.E. These calculations are prescribed by 40 C.F.R. §60.393.

<sup>154</sup> Air Emission Permit No. 249-91-OT-1, §VI.

<sup>155</sup> U.S. 1, Interstate 287, and the New Jersey Turnpike pass within a mile of Ford's plant. The Garden State Parkway is less than four miles away.

<sup>156</sup> EPA Office of Air Quality Planning and Standards, AIRSWeb, *New Jersey VOC Air Pollution Sources* (May 27, 1998).

<sup>157</sup> EPA, *U.S. Automobile Assembly Plants and Their Communities: Environmental, Economic, and Demographic Profile* (Dec. 1997).

<sup>158</sup> EPA, *U.S. Automobile Assembly Plants and Their Communities: Environmental, Economic, and Demographic Profile* (Dec. 1997).

<sup>159</sup> *Id.*

<sup>160</sup> Middlesex County, Office of Economic Development, *Demographics, Mean Income* (1990). This is also true for Middlesex County as a whole. EPA, *U.S. Automobile Assembly Plants and Their Communities: Environmental, Economic, and Demographic Profile* (Dec. 1997).

<sup>161</sup> Randy Becker & Vernon Henderson, *Effects of Air Quality Regulation on Decisions of Firms in Polluting Industries* 29-39 (National Bureau of Economic Research Working Paper No. 6160, 1997).

<sup>162</sup> At the time, Ford owned 30% of Mazda.

<sup>163</sup> Application for Permit to Construct, Install or Alter Control Apparatus or Equipment and Certificate to Operate Control Apparatus or Equipment (Sept. 26, 1989). Before Ford adopted low-VOC paints in 1986, the topcoat line emitted almost 1000 tons of

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VOCs annually. Most of the difference was due to the low-VOC paints, not the afterburner on the bake oven.

<sup>164</sup> §II.F.

<sup>165</sup> §§II.G.1, II.G.2. Deviations from the specified temperature do not constitute a permit violation if the annual duration of the deviations is less than 1.5% of the total operating hours, although all deviations must be reported. §II.H.

<sup>166</sup> §II.I.2. Deviations less than 3 hours are not a violation of the permit, although Ford must still meet the daily emission limits. Ford must submit a report on the deviation that describes the cause, duration, remedial steps taken, and measures taken to prevent recurrence. §II.I.4-5.

<sup>167</sup> §§II.A-II.E.

Average Hourly Production	40 Ranger trucks
Maximum Jobs/Hour	50 Ranger trucks
Maximum Jobs/Day	800 Ranger trucks
Maximum Jobs/Year	188,000 Ranger trucks

<sup>168</sup> §III.A. The monitors must meet EPA's specification in 40 C.F.R. pt. 60, App. B.

<sup>169</sup> §III.C.

<sup>170</sup> §III.B.

<sup>171</sup> §V.A.

<sup>172</sup> §V.B.1

<sup>173</sup> §V.B.2.

<sup>174</sup> §V.C.

<sup>175</sup> §IV.A.1. The stack tests must measure both the rate of total VOC emissions (lbs./hour) and concentrations (parts per million) in the exhaust stream.

<sup>176</sup> §IV.A.2.

<sup>177</sup> §IV.A.3.

<sup>178</sup> §§IV.A.3, IV.F.

<sup>179</sup> §IV.B.

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<sup>180</sup> §§IV.A.3, IV.C, IV.D.

<sup>181</sup> *BImSchG* arts. 44-47.

<sup>182</sup> Permit at 14.

<sup>183</sup> Permit at 14-15.

<sup>184</sup> Permit at 16.

<sup>185</sup> Permit at 2, 13-14.

<sup>186</sup> Permit at 20-24.

<sup>187</sup> Permit §§3-4.

<sup>188</sup> Permit §§3, 8.1

<sup>189</sup> Permit §§5-6.

<sup>190</sup> Permit §9.1.

<sup>191</sup> Permit §§7.2-7.3.

<sup>192</sup> Permit §§7.1.1-7.1.2.

<sup>193</sup> Permit §7.1.3.

<sup>194</sup> Permit §§9.1.1-9.9.6.

<sup>195</sup> Permit § 9.1.3. *See TA Luft* §3.3.5.1.1.

<sup>196</sup> Permit §8.4.

<sup>197</sup> *BImSchG* art. 15, ¶1.

<sup>198</sup> *See* Permit at 4 (stating the Ford requested the *Ministerium* to refrain from making a public announcement about the permit process and from making the permit application and supporting documents available for public inspection); Ford Brief Comments on the Project Appropriation Request—Waste Air Purification, Saarlouis (undated) (“Prerequisite for licensing *without making Ford’s application public* is that the specific and annual emission levels are not higher than the emissions of the two existing shift operations) (emphasis in original).

<sup>199</sup> *See BImSchG* art. 15, ¶2.

<sup>200</sup> At present, the facility operates only two shifts and emits approximately 900-1000 metric tons of VOCs annually.

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<sup>201</sup> Permit at 5-6.

<sup>202</sup> The agency found that the afterburners were state of the art (*Stand der Technik*). The agency also found that the technological controls would satisfy the statutory requirements that the modifications would not cause harmful environmental effects (*schädliche Umwelteinwirkungen*) or other dangers (*Gefahren*), considerable disadvantages (*erhebliche Nachteile*), or considerable nuisance (*erhebliche Belästigungen*) for the neighborhood or the general public (*Allgemeinheit*). *BImSchG* art. 5.

<sup>203</sup> Permit ¶28.

<sup>204</sup> Permit ¶34.

<sup>205</sup> Permit ¶40. Ford must also report the incineration temperature three months after beginning operations, and thereafter every six months. If the measurements are stable, Ford need submit reports only every three years. *Id.* The permit also specifies the type and amount of fuel that may be used in the *TNV*. Permit ¶¶41-42. *See also* Permit ¶¶47-51 (specifying other requirements for recordkeeping and reporting of continuous measurements).

<sup>206</sup> Permit ¶45.

<sup>207</sup> Permit ¶¶35-36.

<sup>208</sup> There were other costs—including personnel costs and the costs of health studies—but these costs paled by comparison to the capital and delay costs. It is not possible to calculate the delay costs precisely. For example, while Ford's production at the St. Paul facility was 40 trucks per hour rather than 50 trucks per hour, it is not possible to know whether Ford would have used the additional production capacity if given the opportunity, or whether Ford was able to make up for the shortfall at another facility.

It is also difficult to calculate the relative benefits from the environmental controls. Even if, as appears to be the case, the U.S. controls are more stringent, it is not clear how much environmental and health benefits result from that additional stringency.

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<sup>209</sup> As the New Jersey case study makes clear, not every permitting controversy involves public participation. Indeed, not all permitting processes are controversial.

<sup>210</sup> Mary Douglas & Aaron Wildavsky, *RISK AND CULTURE: AN ESSAY ON THE SELECTION OF TECHNICAL AND ENVIRONMENTAL DANGERS* (1982).