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Fresh Air: Innovative State and Local Programs for Improving Air Quality

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**FRESH AIR:
INNOVATIVE STATE AND LOCAL PROGRAMS
FOR IMPROVING AIR QUALITY**

Environmental Law Institute
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INTRODUCTION

Prior to passage of the 1990 Amendments to the Clean Air Act, there was increasing concern that traditional regulatory approaches still had not produced cleaner air. As a result, the 1990 Amendments combined stricter standards for air emissions with new market incentives, permitting requirements, enforcement tools, and greater citizen involvement in an attempt to find more efficient, effective and innovative ways to control air pollution.

As state environmental agencies and local air pollution control districts have moved forward to implement their new responsibilities under the 1990 Amendments, many have been able to combine their stricter regulatory requirements with a variety of innovative, sometimes voluntary mechanisms for controlling air pollution. In this manner, they have sought to improve air quality and protect public health while also promoting economic growth and pollution prevention. The results of many innovative state and local programs are quite promising, and they offer potential models for other states and localities to adopt similar initiatives for achieving greater reductions of air pollution.

Despite the benefits associated with these programs, they have received little attention from the public, industry or policy makers beyond the immediate areas affected by their implementation. The Environmental Law Institute (ELI) has prepared this report in order to document these innovative state and local air programs and to disseminate their results more widely to all those involved in implementing clean air laws: state and federal regulators, local officials, citizens, industry representatives, Congressional staff, and environmental groups.

ELI has focused the research for this report on determining how and why particular state and local air initiatives have been successful and what specific results have been achieved in terms of reduced air emissions. In conducting this research, ELI sought a wide range of strategies for reducing or preventing air pollution from mobile, stationary, and area sources. To identify examples of effective air programs, ELI launched a nomination process for identifying particularly noteworthy air innovations. All state and local air administrators were invited to nominate their own initiatives or promising programs in other locations.

In response to wide circulation of the invitation for nominations and a short nomination form, ELI received about 30 nominations. Twenty-one innovations were then chosen for this report because some of the nominated programs were never implemented, were not yet effective, or were too new to produce results. ELI staff obtained information for the 21 case studies through in-depth telephone interviews with the appropriate program managers.

The state and local air initiatives included here address a wide variety of air pollutants and pollution sources. Some are using innovative technologies; others have adopted new approaches to emissions trading and permitting. Several have focused on preventing air pollution, and some are offering financial incentives for activities that produce less pollution. Many have involved education and outreach, either for the general public and or for particular groups such as the business community and regulators. Most of these initiatives have been accomplished using existing legal authorities, and a number have been financed within the agencies' regular operating budgets. Others have been funded by special grants or with specially earmarked revenues from mobile or stationary pollution sources.

All of these innovations demonstrate that creativity, determination, and broad participation can produce real progress in preventing and reducing air emissions. The states and localities whose initiatives are included in this report deserve strong support and commendation for the results accomplished by their respective programs. They have successfully tackled the complexities of the Clean Air Act and have produced effective strategies for controlling air pollution. With wide dissemination of this report, their programs can now be used by other states and localities to develop similar initiatives, thereby promoting a proliferation of innovations that will achieve additional improvements in our nation's air quality.

Chapter One

Pollution Prevention

PARTNERS FOR A CLEAN ENVIRONMENT (PACE)

CITY AND COUNTY OF BOULDER, COLORADO

I. Background

Partners for a Clean Environment (PACE) evolved out of the City of Boulder's need for a non-regulatory approach to help small businesses reduce emissions. The city knew that numerous small businesses lacked the staff, funding and technical expertise necessary to identify opportunities for preventing pollution. In order to reduce air and other emissions from these firms, the city realized it would have to provide them with some technical assistance and other incentives.

II. Program Description

PACE was started in November 1993 by the City and County of Boulder to assist small businesses in preventing air, water, and waste pollution. PACE is a voluntary, non-regulatory program that provides free technical assistance and recognition to participating businesses which satisfy its criteria for certification. The structure of the PACE program was designed by the businesses themselves. They wanted the certification to be meaningful -- a real achievement -- and they were very interested in working with the city to develop the certification criteria for each sector. Each PACE firm can choose its own level of involvement, which in turn determines the amount of recognition it will receive. Boulder began the PACE program by hosting workshops with representatives from the auto body and repair, printers, and metal finishing sectors. Those who attended were asked to choose criteria for determining how firms in each sector could be evaluated for pollution prevention efforts. Each sector ultimately chose 10 to 12 criteria specific to the three sectors.

Firms are able to qualify first for "partial" certification if they can meet between three and eleven criteria. They can then work toward achieving full PACE certification. Boulder publishes advertisements 4-5 times per year in local newspapers and in county and city government employee newsletters to publicize the list of firms achieving partial and full certification. Firms with full certification receive a distinctive PACE logo on a window

decal to advertise to their customers, as well as PACE certificates. Awards of full certification are announced at a recognition breakfast with the Mayor, County Commissioner, and occasionally some City Council members. All other PACE participants are also invited to the breakfast to encourage those with only partial certification to work toward meeting all criteria for their sector.

The air pollutants targeted by PACE are VOCs and HAPs. From the automotive repair and body shops, these pollutants are released by washing parts with solvents, applying paint, cleaning spray painting machines, and energy consumption. From print shops, the sources are inks, solvents for washing parts, fountain solutions containing isopropyl alcohol, and energy use. From metal finishers, the sources are solvents, oils, acids, metals, and alkalis.

To start the program, the city worked with the Chamber of Commerce, specific industry groups, individual businesses, a local non-profit organization, and the County Health Department. At the outset, PACE focused on three sectors: small and medium-sized auto body and repair shops, printers, and metal finishers. The targeted sectors were chosen from the state of Colorado's list of the top 10 categories of pollution sources. A city data base of all small businesses was used to identify potential PACE participants.

During 1997, the PACE program expanded to cover more city businesses, plus some county businesses, in those three sectors. Favorable publicity about firms participating in PACE from the first three sectors has now prompted a number of other firms from those sectors to join. Three new sectors -- manufacturers, the hospitality industry (restaurants and hotels), offices and institutions (especially the University of Colorado) -- were also added in 1997. With a grant from US EPA's "WasteWiSe" program, Boulder was able to hold three workshops in May 1997 to inform manufacturers, hospitality firms, and offices/institutions about pollution prevention. Program administrators have also begun to issue twice-yearly newsletters to all participants, and staff are continuing to visit each PACE firm for technical assistance every six months.

As for follow-up activities, Boulder will continue to work on educating the public about PACE both to encourage environmentally friendly consumerism and to help participating firms increase their customer bases. Efforts will also be made to help participating firms document whether their customer bases have increased as a result of PACE certification. Finally, sector-based workshops will be held to recognize efforts made by participating businesses and to further educate firms about pollution prevention opportunities.

III. Authority, Funding and Staffing

The PACE budget for FY 97 is about \$95,000, which is a large increase over

approximately \$40,000 - 45,000 in FY 96. For FY 98 the planned budget is \$80,000. FY 97's budget was larger because it included some extra one-time expenses for marketing the program: designing a logo, producing the window decals, publishing brochures, and making a video.

A state grant for pollution prevention helped to fund the start-up costs for the program. Since then, Boulder has used some money from its general fund, as well as revenue from a recent 1.5% city sales tax on all consumer goods which is earmarked to be spent for environmental improvement projects. Since receiving the original state grant, the city has received two or three more state grants, plus one from EPA's "WasteWiSe" program. No new legal authority was needed to launch PACE.

One city employee works 80% of the time on PACE and is responsible for all of the promotional/marketing aspects of the program, as well as expanding the number of firms participating in PACE and drawing new business sectors into the program. One county employee works 60% of the time on PACE and is responsible with the follow-up technical assistance visits every 6 months to current PACE participants. A local non-profit group received funds from the city and the EPA grant for one person to spend 25% of his/her time on PACE, particularly organizing the recent workshops for three new sectors.

Current staffing levels have been sufficient thus far. The Boulder Chamber of Commerce and specific industry groups have also made in-kind donations of meeting space and equipment and free publicity. The county was an original participant because staff at the Health Department already had some expertise in pollution prevention. Paid interns, as well as college-age volunteers, have helped by conducting surveys of PACE members, writing articles about the survey results for the PACE newsletters, and preparing industry-specific pollution-prevention fact sheets for each sector.

IV. Barriers Encountered

The PACE program has had to overcome a number of barriers:

- (1) Initial industry resistance and mistrust due to concern about the city's dual role as technical advisor and enforcement authority and due to some past history of problems with wastewater discharges from the same small firms targeted to join PACE;
- (2) Difficulty compiling a complete and accurate data base of all the small firms potentially eligible for the PACE program and, even for firms already on the city's data base, figuring out who was the appropriate person at each firm to contact about the program;

- (3) Time and staff constraints, especially due to the need to call each firm to find the appropriate person at each firm, which can be the owner, the production manager or the EHS coordinator;
- (4) The need to establish personal contacts with the firms' key people, in order to attract more firms to join the program;
- (5) Lack of awareness by firms and the general public that pollution prevention means more than just recycling;
- (6) Motivating firms to increase their level of participation in PACE from partial to full certification, due to the potential for increased costs to firms meeting all certification criteria;
- (7) Inability to include dry cleaners and help them to reduce their emissions because most retail outlets within the city limits do not do the actual cleaning; and the large cleaning facilities out in the county which serve the retail outlets cannot afford to install the new equipment needed to reduce their excess air emissions.

V. Evaluating Program Effectiveness

The PACE annual report estimated that, in 1996, participating firms saved over \$150,640 in operating, disposal and materials costs, and reduced VOC air emissions by 5.9 tons, hazardous waste volumes by 2,100 gallons, solid waste by 2.3 tons, and wastewater discharges by 960 gallons. Worker exposures to toxic substances have also been reduced by approximately 12 tons/year of VOC, 5100 gallons/year of hazardous wastes, and 6.6 tons/year of solid waste. Boulder believes that PACE has been so effective because it is voluntary and provides recognition to the businesses achieving certification. The free publicity and technical assistance have also attracted more participants.

In addition to emissions reductions and cost savings, Boulder measures the success of PACE by the number of calls received at the PACE Connection hot line from interested firms and by the number of new businesses joining the program by achieving either partial or full certification. From 1994 to 1996, the PACE program grew from an original group of 15 firms to over 65 firms. By mid 1997 the total number of firms was 100, and others are currently joining from the three new business sectors. The goal is to add 50 more firms by the end of 1997, bringing the total participation to 150 firms.

The on-going success of the program has led to continuing support from both city and county officials, as well as the business community. The success of the PACE program has also been recognized both by the state of Colorado and nationally. It has received an Achievement Award from the National Association of Counties, the Governor's "Clean Air

Colorado" award, the state's "Don't Let It Go to Waste" award, and the Governor's "Smart Growth and Development" award in the pollution prevention category.

Despite the program's evident success, Boulder has had each firm's precise level of emission reductions and cost savings that can be attributed to participation in PACE. While some companies have been able to document increased business resulting from customers interested in firms with PACE certification, most firms have very little data on their cost savings. Thus, the city has had problems getting emissions and cost data from PACE participants and also gathering its own data to measure the results of the program. Officials are currently working with PACE participants in each sector to develop a few, very specific indicators for each of the six sectors to use to measure their results.

VI. Program Impacts

The impacts of PACE on the regulated community have all been beneficial so far. Industry's liabilities for excess air emissions have been reduced; workers are not exposed to as many harmful fumes; and PACE participants' customer bases are increasing as more consumers seek out firms with PACE certification. Participating firms (particularly the auto body industry) also benefit from reduced operating, material, and disposal costs.

Other than the general public benefit of reduced air pollution, there have not been many impacts on the public. The city has learned that the general public still is not very aware of the PACE program. As a result, the city is working on more advertising and educational efforts to teach citizens to look for firms with the PACE logo and also to inform them about the benefits of pollution prevention and waste reduction.

VII. Advice and Lessons Learned

Participation of the regulated community, beginning in the early stages of program development, is extremely important for initiatives like PACE. Agencies wishing to implement similar programs should first work with businesses to compile an accurate data base of potential participating firms and the appropriate individuals to contact at each firm. Agencies should also work with the business community to become knowledgeable about the operations, processes, emissions, and potential constraints of the industries included in the program.

In evaluating the potential to replicate the PACE program in other locations, air agencies should keep in mind that Boulder may be a somewhat unique community because both its residents and businesses have such strong interest in environmental protection.

The PACE program has been able to take advantage of the fact that the business community wants to project the image of protecting the environment. Public recognition of participating businesses has given firms a great incentive to join a voluntary pollution prevention program.

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POLLUTION PREVENTION AT AUTO REPAIR SHOPS

HILLSBOROUGH COUNTY, FLORIDA

I. Background

In response to the possibility of reduced funding, Hillsborough County's Environmental Protection Commission (EPC) sought more cost-effective strategies to create incentives for the various sectors of its regulated community to prevent pollution. EPC decided to use incentives for pollution prevention in all phases of the regulatory process, because it has found that pollution prevention is more cost-effective than the traditional command-and-control approach.

EPC chose to focus on auto repair shops because it was already conducting inspections of these shops to determine (1) whether they were tampering with emissions control technology, using earmarked funding from automobile tag fees; and (2) to ensure the shops were complying with the CFC recovery and technical requirements, using state inspection funding. With this auto repair shop inspection and enforcement program already established, it was easy for EPC to incorporate pollution prevention reviews into each inspection without much additional staff time or effort.

Local environmental regulations control many practices in these repair facilities, and EPC's usual practice had been to fine the shops if there were any violations. Because most of these auto repair shops have been in compliance or close to compliance with air quality standards, EPC believes it is more effective to emphasize education among shop owners. However, prior to the program's inception, EPC had no means of informing the regulated community -- especially small auto repair shops -- about opportunities for voluntary compliance with air quality standards that would reduce sources of pollution more effectively.

II. Program Description

The purpose of Hillsborough County's pollution prevention initiative is to inform auto repair shop proprietors about the importance of pollution prevention as a way to improve air quality. EPC is trying to provide the county with a proactive approach to preventing pollution in small sources of air pollution such as auto repair shops. Many types of repair facilities are included in the program, such as engine and body repair shops, paint shops, air conditioning repair shops, and new car dealer repair shops. EPC's overall goal is to change the culture within the small local industries -- particularly, auto repair facilities -- from thinking they are simply a small shop to thinking they are part of a group of facilities which, when taken together, contribute large amounts of air pollution. The

program is particularly innovative, because it combines education and awareness with elements of pollution prevention strategy.

EPC's initiative emphasizes a proactive but nonconfrontational approach. It operates by sending an EPC representative to an auto repair shop to contact the person in charge (the owner or the manager) and provide that person with an on-the-spot pollution prevention review of the facility. The review focuses on sources of air pollution, specifically, chloroflourocarbons, hydrochloroflourocarbons, hydrocarbons, particulate matter, and smog-forming volatile organic compounds. EPC representatives point out the sources of these pollutants such as leaking heating, ventilation, and air conditioning systems, refrigerant recovery and recycling equipment, uncovered parts washers, soiled rags, and liquid storage containers, brake dust, and inefficient lighting. Additionally, EPC inspectors emphasize to shop owners the positive effects of pollution prevention on worker health. They explain how decreasing VOC exposure can improve worker health, particularly where auto repair shops have open solvent baths.

After completing the inspection, EPC's representative provides the shop manager with a copy of EPC's twelve-page "Pollution Prevention for the Repair Shop" booklet containing guidelines for the shop to continue implementing air pollution prevention measures. The EPC representative also leaves information about how to contact EPC in case the shop manager would like to have a subsequent review, ask technical questions, or seek other advice regarding air pollution prevention. There have been a few instances of follow-up calls with shops asking for technical assistance. In most cases, however, shops tend to consult the booklet for answers to technical questions.

EPC's education approach and pollution prevention review are in addition to the enforcement authorities of EPC inspectors. When an EPC inspector finds a violation, the inspector has discretion to issue a verbal warning or a written warning notice. If the violation is minor, EPC does not usually take enforcement action unless the firm already has a history of violations. Typically, the offenders are car lots rather than auto repair shops. In these cases, EPC inspectors have the power to require pollution prevention projects in lieu of fines. Polluting shops often prefer to pay for pollution prevention because their money is spent directly on improvements at their own facility instead of going into the Pollution Recovery Fund and being used to clean up other sites.

EPC's auto repair initiative began on October 1, 1996. In the first fiscal year (through September 30, 1997), EPC inspected 212 facilities as part of its normal regulatory inspections. During the first year of the program, EPC inspected and reviewed about 20% of the approximately 1100 automotive repair shops that generate air pollution. Approximately 95% of the auto repair shops inspected are in compliance with air quality standards. When an EPC inspector finds a shop is in compliance, the inspector spends the last ten minutes of the inspection discussing pollution prevention. When a facility is not in compliance, the inspector might not discuss pollution prevention. Because there are few

problems and most violations tend to be minor, shop owners tend to be receptive to EPC's pollution prevention suggestions.

III. Authority, Funding and Staffing

EPC did not need any special authority or legislation to initiate this program. The program is funded through EPC's general operating budget, which builds upon permit fees collected from all large stationary sources within the county. In addition to these permit fees, funding for EPC comes from the county's ad valorem general revenue tax, the state's automobile tag fee, and EPA's Title V and section 105 grants. EPC uses this variety of sources to fund the staff who inspect auto repair shops. This diversity of the funding sources makes the program more robust and less threatened by the possibility of reduced funding.

The annual budget for the auto repair shop initiative is \$28,582. Estimated costs are as follows:

- \$2,400 Development, based on two staff members at an average hourly rate of \$15.00 for 80 man-hours
- \$1,462 Start-up: initial set-up, publishing, and printing of 1000 copies of their 12-page booklet on pollution prevention in auto repair shops
- \$24,720 Staff time, based on 8 staff members spending 10% of their time at an average hourly rate of \$15.00 for 2060 hours (one full time employee for a year)

While the staff time budget provides for eight people to spend 10% of their time on the program, six staff people and a section chief devote approximately 20% of their time to the initiative. All of the staff participate in the various aspects of the program, including inspections and pollution prevention reviews at repair facilities. In total, their efforts amount to approximately one full time employee. This level of staffing has been sufficient to carry out EPC's initiative. Ideally, though, EPC would like to have two or three more people involved to reach more facilities and to do follow-up visits.

IV. Barriers Encountered

EPC found it very difficult to conceptualize pollution prevention as applied to air pollution, because it is hard to see practical ways to prevent air pollution from sources that generate such small quantities. Developing this program, therefore, required extensive planning. EPC examined several concepts for achieving pollution prevention before

figuring out what approach to adopt. In the end, EPC chose to focus on auto repair shops based on the industry's propensity for polluting activities.

V. Evaluating Program Effectiveness

The success of EPC's pollution prevention review depends in large part on the attitude of the regulated community. EPC's only measure of the program's success so far is the numbers of auto repair shops visited and booklets distributed. EPC inspectors have been well-received in almost every instance, and there has been no resistance by shop owners to adopting pollution prevention measures. Some shops have eagerly changed practices on the spot and others have asked for more information and suggestions. This type of qualitative feedback during initial site visits has led EPC to believe that its initiative has been effective in preventing pollution, but there is no way really to determine whether air pollution at auto repair shops has been reduced as a result of the program. EPC can only make such conjectures based on word of mouth and by observing whether a facility's emission level is better or worse than it was before the first EPC inspection.

Otherwise, EPC has not yet developed a feedback program. Eventually, the Commission would like to make follow-up trips to the shops to ascertain the effectiveness of the program. However, due to limited staff and the need to make initial visits to more repair shops, EPC expects that staff will only revisit a statistical sampling of the shops and extrapolate the results from that group. In addition to site visits, EPC is considering telephone questionnaires to measure the success or output of the program.

VI. Program Impacts

There has been no negative comment or resistance from the regulated community. Because every auto repair shop entered by EPC is regulated by federal, state, or local regulations, the shop owners and managers are used to having environmental inspectors visit them. What shop managers have not seen previously, however, is inspectors who offer assistance and helpful suggestions instead of looking for violations and interrupting their day. Shop managers prefer EPC's focus on voluntary measures, because in many cases these suggestions save them money. EPC inspectors help shop managers to understand the financial consequences of pollution prevention by drawing their attention to issues such as the cost of evaporated materials and the perspective of potential customers who perceive that a clean shop causes less pollution. Ultimately, the program has led shop owners and managers to become more receptive to visits of EPC inspectors.

EPC has not explicitly addressed the potential impacts of the program on the public, nor has it attempted to measure public response. However, EPC knows that reducing target air pollutants from auto repair shops will improve the health of the local population.

Particulate matter affects breathing and respiratory systems, aggravates existing respiratory and cardiovascular disease, alters the body's defense system against foreign materials, and damages lung tissue that can lead to cancer and premature death. Smog reduces lung functioning and sensitizes lungs to other irritants. Stratospheric ozone depletion caused by CFCs and HCFCs results in skin cancer, cataracts, and other health problems created by increased ultraviolet rays from the sun. Generally, people seem to like the idea of pollution prevention because it means that each person is doing his or her share to protect the environment, not just the regulators. The public (and industry) will also enjoy cost-savings as a result of the program, because the amount of pollution that needs to be cleaned up will be reduced.

VII. Advice and Lessons Learned

EPC's program worked well due to its "kinder, gentler" approach to air quality improvement. Everyone involved prefers to see problems corrected voluntarily and by cooperation rather than through the confrontation that is typical of command-and-control methods. Nevertheless, EPC emphasizes that it is still important to reserve the agency's regulatory "hammer" for serious or repeated violations.

EPC advises that, if another agency is interested in adopting a similar program, the key element is to choose the target industry. EPC chose the automotive repair industry, but the same approach could be used for the restaurant industry, dry cleaners, or any other industry. Depending on the industry, the agency must determine what types of pollution to prevent. Once the agency has determined the pollution sources on which it will focus its attention, it must plan in advance how to reduce pollution from those sources. A similar pollution prevention program is likely to work in any area where there are pollution sources, air or otherwise.

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REDUCING EMISSIONS FROM DRY CLEANERS

PUGET SOUND AIR POLLUTION CONTROL AGENCY

I. Background

When air emissions from small dry cleaning establishments began to be regulated, the Puget Sound Air Pollution Control Agency realized the difficulty it would experience in obtaining compliance with air standards. This was largely because small drycleaners had a perception that government agencies were "out to get them;" because many of the dry cleaner owners were immigrants, they had a fear of government. Communication was also very difficult, particularly with the Korean operators in the Puget Sound area. As a result, dry cleaning operators had trouble understanding the agency's inspectors and the requirements to which they must adhere. The agency realized that if dry cleaners were visited by someone whom they could trust and who could speak their own language, dry cleaners would be more likely to clean up their shops voluntarily or convert to unvented machines before they received a citation for excess emissions and were subject to enforcement. Puget Sound, therefore, developed a program that focuses on obtaining voluntary compliance from small drycleaning establishments. It attempts to remove the fear of government regulation that the operators often have and gives them information they need to clean up their shops.

II. Program Description

Puget Sound began this program in 1993. Since that time, the agency has had a contract with the Northwest Dry Cleaners Association to send trade association representatives to the dry cleaners in the area to educate them about the requirements of applicable regulations and how to solve their compliance problems. This program is most innovative in its emphasis on working with the industry and using voluntary measures to achieve compliance and to produce a measurable air quality benefit.

Dry cleaners are required to keep records of their PCE emissions, and these are monitored by the agency. If the agency experiences difficulty obtaining compliance by a particular dry cleaner, it will inform the contractor that a site visit is in order. The contractor's agent will then visit the owner and attempt to educate the proprietor as to what the rules are. The agent's primary strategy is to encourage operators to replace vented dry cleaning machines with unvented ones so as to reduce perchloroethylene (PCE) pollution and to avoid the stringent regulation associated with vented machines. Because unvented machines require less attention from the agency in terms of follow-up inspections and reporting requirements, contracting trade association agents to convince dry cleaners to use unvented machines allows the agency to focus regulatory activities more effectively.

No funding or incentives have been provided to the dry cleaners to replace the vented machines, although the agents do provide information to the owners on loans and funding alternatives for this purpose.

Initially, Puget Sound trained two agents from the staffs of the two drycleaning associations in the area, the Northwest Drycleaners Association and the Korean Drycleaners Association. Both agents had been dry cleaners and, therefore, knew the business well. The agents had no enforcement authority, but would make preliminary visits to all the dry cleaning establishments and educate them about what the rules require. If a dry cleaner did not voluntarily clean up the shop or switch to an unvented machine, the agent would notify the agency, which would send an inspector for a follow-up visit. By employing contractors to make initial site visits, the program has reduced the number of times an agency inspector must contact a drycleaner. The reason why the current agency contract with the trade association calls for only one agent to visit dry cleaners is that the switch to unvented machines has greatly reduced the need for additional site visits. While the need for agency contact with dry cleaners has diminished, agency staff keep in touch with the contractor to discuss particular dry cleaners and to inform the agent about any new rules pertaining to dry cleaners.

III. Authority, Funding and Staffing

No legislation was required to implement the program. The annual cost of the contract with the trade association is \$40,000, which is paid from the agency's general operating funds. Obtaining these funds only required the approval of the agency director and the governing board. When the program was first started, the contractor provided two agents to inspect and visit the drycleaners. Two years ago the contractor switched to one agent because there was not enough work for two.

Puget Sound provides training for the association's agent, but not much is needed since he already knows the industry well. He just needs to be kept up to date on EPA regulations. Puget Sound also employs three full-time inspectors whose time is partially dedicated to inspecting drycleaners, as well as one supervisor who helps the inspectors with questions. Before the contract with the trade association, these inspectors were unable to visit all the dry cleaners in the area on a timely basis. Now all the dry cleaners are visited on a regular schedule.

IV. Barriers Encountered

Having the trade associations involved in the problem eliminated any potential barriers to implementation. Trade association agents made the inspection process especially smooth, because they are knowledgeable, trusted by the community, and have

an interest in helping their members follow the regulations or avert them by converting to unvented machines. Requiring the contractor to include a Korean representative in the outreach program overcame the initial communication barrier with the large number of Korean owners operating in the Puget Sound area.

V. Evaluating Program Effectiveness

Puget Sound measures the success of this program by the fact that the region's PCE emissions have dropped from 3,121 tons in 1990 to 158 tons in 1996. During the last two years, about 60% of the vented dry cleaning machines in the agency's four-county jurisdiction have been replaced. Vented machines use approximately 120 gallons per year of perchloroethylene, while unvented ones use only 30 gallons per year. When the program first began in 1993, there were approximately 140 vented machines out of the 450 - 500 drycleaning machines in the area. Now there are only 70 vented machines out of the 600 machines currently operating. The agency's hope is that by 1999 all machines will be converted to unvented ones.

Puget Sound believes that the program is largely responsible for the reduction in PCE emissions, because agency inspectors would not have been able to visit all the dry cleaners in the area without the involvement of trade association agents. Moreover, the poor communication between the agency inspectors and the dry cleaners would not have fostered the voluntary replacement of vented machines that has occurred. By working with the industry and securing agents who speak the language of many immigrant dry cleaners, the agency has achieved better compliance and greater reduction of PCE emissions.

VI. Program Impacts

The dry cleaners appreciate the agency's efforts to educate them and to help them with compliance. They now understand that the agency doesn't just want to give them a citation and collect a fine, but wants to clean up the air. Because the program has fostered more trust, agency staff have been invited to various functions of the dry cleaners association which, in turn, helps to improve communication. In addition to ameliorating relations with the dry cleaners, this program has benefitted the general public with cleaner air.

VII. Advice and Lessons Learned

Puget Sound learned that regulators need to communicate with the regulated community on a "common wave length" in order to achieve better results and to foster trust

and understanding. Another agency interested in adopting a similar program for dry cleaners should identify a local contractor within the trade association who is able to effectively communicate with the dry cleaners to deliver the information that the agency wants disseminated. If an area does not have an organized trade association, there might be difficulty finding the right contractor. Fortunately, though, almost every area has a dry cleaners association, and working through that association can cure these small business owners' distrust of government.

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BAY AREA GREEN BUSINESS PROGRAMS

ALAMEDA AND NAPA COUNTIES, CALIFORNIA

I. Background

In June 1995, a group of elected officials from the nine counties in the San Francisco Bay Area decided to develop a comprehensive, proactive approach to reducing hazardous waste. They found that small businesses produced about 30% to 50% of the region's hazardous waste. These officials wanted to try to meet the needs of small businesses, while encouraging them to achieve compliance with waste disposal regulations and to implement pollution prevention and resource conservation measures.

The agencies constituting the Bay Area Hazardous Waste Capacity Allocation Committee, which is part of the Association of Bay Area Governments (ABAG), asked small businesses that contribute significantly to hazardous waste generation about their specific needs for reducing waste. The businesses responded that they wanted a better working relationship with government regulators, a single point of contact for all environmental compliance issues, a consolidated set of environmental requirements, information on useful resource conservation and pollution prevention practices, and recognition for being environmentally responsible. These needs and desires shaped the development of the Bay Area's Green Business Program (GBP).

II. Program Description

The Bay Area GBP is a cooperative effort between local governments to consolidate compliance efforts, provide resource conservation and pollution prevention information to small businesses, and provide "green" certification to businesses that go beyond compliance. The GBP reduces pollution by encouraging businesses both to achieve compliance and to go beyond compliance. The GBP provides small businesses with information about how to comply with regulatory requirements, flexibility in reducing pollution, and recognition for their efforts. ABAG coordinated the development of the GBP based on two models: the Sonoma Green Business Program which certifies businesses for full environmental compliance and for moving beyond compliance to prevent solid waste pollution, and the Santa Clara Pollution Prevention Program for pollution prevention and resource conservation. ABAG has had several partners in GBP development, including the US EPA and regional, state, and local agencies.

ABAG began the GBP by hiring consultants to assess which of the nine counties in the Bay Area had the motivation and capacity to implement such a program. In assessing the nine counties, the consultants looked for counties that met three basic criteria: 1) Those

with existing outreach components to their regulatory programs; 2) Those with multi-media regulatory programs indicating an interest in conducting coordinated inspections; and 3) Those with agency managers who would support the GBP approach for waste reduction. During this process, the consultants also asked the nine counties to indicate their high-priority small businesses. Automobile repair shops were mentioned often. Because Napa and Alameda Counties ranked highest in the three criteria, a pilot program for automobile repair businesses was started in these two counties in 1996. Both counties began with GBP kick-off meetings for their automotive repair shops so that all the small businesses could learn about the program and choose to participate if interested.

The first step in GBP participation is to demonstrate that a particular business is in compliance with environmental standards established by both county agencies in coordination with auto repair industry representatives. The counties worked with automotive repair shop owners to develop a consolidated, easy-to-understand Environmental Compliance Checklist based on the uniform checklist prepared by California's Department of Toxics for the nine Bay Area counties. The Environmental Compliance Checklist reflects the owners' desires for a yes-no format organized by operation, such as brake cleaning and auto body repair. Any business can participate by calling the counties' GBP coordinators, who then determine what the business must do to achieve compliance.

The second, and more challenging, step for the GBP is determining what else a business must do to go beyond compliance to be certified "green." The auto repair shops wanted flexibility in determining how they would go beyond compliance. So, ABAG-funded consultants created four categories of compliance: energy, water conservation, pollution prevention, and solid waste reduction. They set up a point system with a certain number of points assigned for each activity or control strategy within a compliance category. A "green" business then needs a specific number of points in each category. ABAG prioritized activities by assigning points based on the importance of each activity, so businesses can choose a variety of strategies to achieve the necessary number of points for green certification. This point system forms the Pollution Prevention and Resource Conservation Checklist and is uniform from county to county.

In some counties, participating agencies have tried to cross-train all their inspectors so that one person can cover the four or five agencies' inspections at one time. The theory behind the cross-training is that it is not hard to do a full environmental compliance inspection for a small business. In such cases, the lead agency conducting the inspection depends on the nature of the business sector, but consolidation of inspection responsibilities in this manner does not occur in every county.

Any business can contact the GBP to obtain information on how to achieve compliance or to use pollution prevention to move beyond compliance. Any business can also obtain the counties' GBP checklists for environmental compliance and can ask for a

unified, multi-media inspection. However, the consensus of the county agencies, after heated discussions, was that a business had to do more than just be in compliance in order to be certified as "green." The GBP also attempts to improve the working relationship between business and regulators by emphasizing constructive cooperation rather than fear that the government will issue citations for non-compliance. The two pilot counties have selected different approaches to implementing the GBP.

A. Napa County

In Napa County, all the relevant county, local, regional and state regulators -- including the Department of Environmental Management, other regulatory agencies, the local POTW, and the fire department -- worked together to develop the program under the guidance of an EPA facilitator. Because most of the issues associated with automotive repair shops fall within the jurisdiction of the Napa County Environmental Management Department (EMD), the EMD became the lead agency.

Ten of the county's 60 automotive repair shops attended the kick-off meeting. Despite some initial suspicions of a hidden government agenda, by the end of the meeting, all ten said they were interested in participating. These ten became the participants of pilot program. It took the Napa County EMD six months to help them through the certification process and to figure out solutions to various problems. For example, EMD coordinated with other county agencies to make sure that the pilot businesses would not be repeatedly inspected if they had passed GBP inspection in the past year or so. Businesses welcomed this attempt to coordinate inspections, but the agencies feared that businesses might use it to avoid inspections.

Napa's EMD continues to coordinate inspections, and applying businesses can choose to have a joint compliance verification and pollution prevention inspection, or have the compliance verification inspection first. The compliance verification inspection requires only one inspector, and this inspector is also qualified to conduct solid waste, water conservation, and pollution prevention inspections. The local electric utility conducts the energy conservation inspection because it has a rebate program and needs to ascertain the baseline conditions for each business before implementing energy conservation measures.

Six of the ten pilot businesses in Napa County worked diligently with the EMD to obtain certification. Of the six, one had some compliance problems that would take time to fix, and another facility was close to being in compliance with all the criteria. The latter business did not achieve compliance in time to participate in the recognition ceremony, but those that did were presented "green" certifications in a public ceremony held by the EMD, the local board of supervisors, the mayor of Napa, and other officials. The local governments paid for advertising for the ceremony and encouraged articles in the local

newspaper congratulating the newly certified businesses. The pilot businesses that went through the certification process appreciated the recognition of their efforts.

B. Alameda County

Alameda's program differs from Napa's program in a number of ways, some of which arise from the different nature of the counties. Alameda is much larger than Napa; it has 17 large cities, many with more than 100,000 inhabitants, while Napa's largest city has 60,000. Consequently, the outreach in more rural Napa was largely grassroots, with word of mouth being important to the program's advancement; but when a business wishes to participate in the Alameda GBP, it submits the forms to the coordinator who arranges for the personnel from the appropriate agencies -- usually, a three to five person team -- to conduct the comprehensive assessment.

The Napa and Alameda GBPs also differ in terms of coordination among participating agencies. In Napa, the inspectors were more involved in developing and implementing the county-specific checklist. In Alameda, the coordinator did most of the legwork in developing the checklist. In Napa, where the county has significant environmental regulatory power, the county agencies committed to working together regularly to cross-train their inspectors and to obtain inspectors' support. In Alameda, the cities have most of the environmental regulatory power. As such, the GBP coordinator met initially with key city staff to set up the program, has followed through with a series of Green Business focus meetings, and has appeared as a guest speaker at other meetings regularly attended by key city staff.

III. Authority, Funding and Staffing

The counties have not needed any new authority or changes in their local regulations in order to implement the GBP. Because the counties cross-train their inspectors, they know to look for all types of violations. If a potential violation falls outside an inspector's jurisdiction, he or she is able to alert the appropriate agency to follow up using existing authority.

A. Funding

EPA provided part of the start-up funds for the Bay Area GBP, while the county governments have provided the ongoing expenses. The start-up funds were primarily used for facilitating the initial meetings between the county governments and small businesses. California EPA funded the six-month study assessing which counties would be the pilot counties and the business sectors on which to focus initially. \$75,000-100,000 was paid to consultants and to the Santa Clara pollution prevention program. \$89,000 for the second phase (January through December of 1996) came from an EPA grant. ABAG

used \$65,000 for facilitating the two counties in implementing their green business programs.

The counties have been primarily responsible for covering on-going program expenses. Costs for adding new industries range from \$20,000 to \$40,000 each for the first year. The ongoing costs of each GBP are \$5,000 to 10,000 for marketing the program, which is primarily done through advertising in local papers. In addition to marketing costs, Napa staff spent approximately \$50,000-75,000 in staff time developing norms, inspecting facilities, and advertising. Cross-training the Napa inspectors and developing materials costs an additional \$25,000 in staff time. EPA provides matching funds to the extent possible. For the upcoming year, the Bay Area GBP also has received an EPA Pollution Prevention Incentives Grant for \$100,000 through California's Integrated Waste Management Board, which is a new partner involved in helping to bring printers into the GBPs. The counties' costs for recertification are as yet unknown, but the agencies will certainly need staff and financial resources.

Alameda's 1997 budget for GBP is \$57,000, with \$50,000 from the EPA (through the California Department of Trade and Commerce) and \$7,000 from local agencies. Of the \$57,000, \$39,000 is for the coordinator's salary; \$5,350 is for administration and overhead; and the remaining \$12,650 is for expenses. About the same amount is committed for next year, but the coordinator is seeking more funding for public outreach and advertising. The 1998 budget for GBP comes largely from the Alameda County Waste Management and Recycling Board (\$20,000) and the County's clean water program (\$20,000), with the remainder coming from the California Integrated Waste Management Board, the City of Fremont, the Alameda County Department of Environmental Health, and the Union and Castro Valley sanitary districts.

All of the counties are trying to make their GBPs self-sustaining. One possibility is to charge for certification. With 250 wineries in Napa county, such fees would constitute a significant portion of the administrative costs. However, the counties have not decided to require a fee, because some politicians are adamant about not charging for the certification. Other politicians believe that businesses would willingly pay for a streamlined inspection and certification process. Businesses' primary concern is to avoid repeating a bad experience had with the American Automobile Association's certification for automobile repair shops, which was originally free but now costs \$400 a year. Whatever the counties decide about future funding, businesses do not want to start with a free certification and then be charged a fee later. If the counties choose not to charge for certification, they may have to devise an alternate strategy, because program funding is currently unstable.

B. Staffing

Napa County used some of the EPA funds to hire an outside facilitator to help in developing its GBP, whereas Alameda used EPA funding to pay for one of their own staff members to coordinate the creation of the program. The Alameda staffer is part of the county's environmental health department but is assigned to the Small Business Development Center in the Alameda County Community College. Both counties' coordinators work about one-half of their time on the GBPs. Because EPA funding was limited to start up costs, Napa's position is now funded from an hazardous materials fees and is integrated into the county government. Alameda's GBP coordinator has to raise funding from the various city agencies for the position to continue. Some of this difference arises from California laws which allow Napa County to consolidate its environmental programs in the EMD, while Alameda County's environmental programs are distributed among the 17 city governments.

In addition to these staff members, the California Department of Toxics has a full-time staff person assigned to the GBP, and two EPA staff have spent substantial time assisting the counties in developing the program. The counties' GBPs generally have sufficient staff. Because their inspectors are exploring different ways of doing their jobs, they have been participating extensively in the program on their own free will. Whenever a new industry is added to a GBP, an inspector from each agency must attend a two-hour meeting twice per month to develop the procedures and program for that industry. After implementation, such meetings occur monthly. The inspectors also spend four to eight hours together establishing the checklist to be used for inspection.

IV. Barriers Encountered

The primary barrier to implementing GBPs has been the length of time involved in inter-agency coordination. Overall, it took the counties about a year to establish and develop their GBPs. Much of the time was spent getting the regulators to talk with one another, primarily between the different regulatory agencies within the county. Part of the difficulty also was the involvement of various agencies at different levels of government. Often there are four to six agencies that need to coordinate their activities. For example, regulation of air pollution is organized on a district basis which covers all nine counties; fire departments are organized on a city basis; and water pollution, on a city or regional basis.

Another obstacle has been overcoming the inertia of the existing regulatory system and trying to accomplish something different, especially within the regulated community. To overcome this inertia, the counties needed to assert repeatedly and to the same groups of people the need for, and merits of, GBPs until eventually some changes began to occur. For example, with the initial ten businesses in Napa County, there were two to four who

were positive about the program, four to six undecided "fence sitters", and two to four opponents. The agencies initially focused attention on the opponents who stated that the GBPs would not work. In doing so, they found that most small businesses do not trust county regulators at all but, expect when the GBP is endorsed by a trade association or another small business. This process ultimately led to improved relations between small businesses and the counties.

Challenges now facing the counties include increasing public awareness of the GBPs and bringing remaining businesses into the program. The latter problem requires better marketing for the GBPs, an area in which the county governments do not have much experience and wish to improve. One idea is that the counties could market the GBPs with insurance companies who could then provide accident victims with a list of authorized auto repair shops that are certified "green." Additional ideas for marketing the program include advertisements in the newspaper, at bus stops, in the telephone directory, and on the radio; "green" patches that auto repair shops can affix to their uniforms; and improved stickers for businesses to use in advertising their certification.

Recertification is another challenge. The agencies need to determine what ongoing steps a business must take to remain "green" for purposes of recertification every three years. The counties' goal is to implement a continuous improvement process, perhaps similar to the environmental management systems used by larger businesses. This process would include a plan for energy conservation, water conservation, solid waste reduction, and pollution prevention, and it would identify major improvements that a business would make to become more green. The initial recertification would then certify that the particular business has an appropriate plan in place for continuous improvement.

Finally, the GBPs need to expand to other business sectors. In Napa, agencies will begin to focus their attention on wineries. In Alameda County, printers and graphic artists are being targeted. The agencies are finding not only the requirements to be different for different industries, but the strategies and approaches also need to be different. For instance, although automotive repair shops wanted a yes/no list structured by function, the wineries wanted a more descriptive (almost narrative) enumeration of the items that the inspectors are looking for in terms of environmental compliance.

V. Evaluating Program Effectiveness

The main method for measuring the GBP's effectiveness is by tracking the number of businesses that have responded to, and are participating in, the program. In Napa's program, ten of the county's 60 automotive repair shops showed up at the kick-off meeting. All ten said they were interested in participating at the end of the meeting. After six months of walking them through the process, six of the ten really worked with the county to make it happen, and four businesses were recognized in June 1997. In Alameda's

program, 60 of the county's 600 automotive repair businesses attended the kick-off. After walking them through the process, the agencies certified seven businesses, while another 35 to 40 said they were interested in becoming certified. To date, there are 8 certified automotive businesses and 2 printers in Alameda. Since Napa County's first recognition ceremony, the two businesses that did not satisfy all the requirements by June 1997 moved forward and were recognized in another ceremony in late November 1997.

A second benchmark for measuring the program's success is the number of similar programs implemented in other business sectors and other geographic areas, especially within the Bay Area. Printers in Alameda County and wineries in Napa County have already expressed interest in developing GBPs for their sectors. In February 1998, Napa expects to start the certification process for wineries, with a recognition ceremony in April. Napa will implement the GBP for wineries jointly with Sonoma County. They will share information, develop their programs at the same time, and conduct outreach jointly. The programs will have slight differences due to different water control boards, and the inspectors will only certify and inspect wineries within their own county. Alameda County has already expanded its GBP to printers and has certified 2 out of the 250 printers in the county as "green."

In Sonoma County, the City of Cloverdale has incorporated green certification into their procurement program for their fleet, requiring businesses that bid on repair contracts to be certified under the GBP. The Sonoma County Environmental Health Department wants to expand its GBP to include all automotive repair shops. It next plans to offer the GBP to its 200+ wineries, then printers and photo processors. Outreach efforts aimed at printers will be made with the Waste Board this spring. Contra Costa County has also started working on developing a GBP for automotive repair shops; and Marin County is interested in GBPs, perhaps also starting with the automotive repair industry.

EPA is interested in the Green Business Program and wants to expand the approach nationally and present it to other groups, including the Joint Center for Sustainable Communities which is a partnership of the National Association of Counties and the Conference of Mayors. The Joint Center for Sustainable Communities will promote GBPs to demonstrate that peer-to-peer communication is more effective than directive from regulatory agencies.

A third, more qualitative, indicator of the program's success gauges businesses' attitudes toward the program. At this point, it is too soon to characterize precisely how the greater business community is responding to the GBPs. However, after two or three years, a survey of Sonoma County businesses indicated 100% satisfaction by participating firms. They all said that they would recommend participating to their colleagues.

Lastly, and perhaps most importantly, is the success businesses experience in meeting compliance. While it is still too early to tell what environmental benefits can be

attributed to the program, lessons can be drawn from other similar initiatives. One of the models used to develop this program was Santa Rosa's Sonoma Green Business Program, which recognized companies for simply reaching compliance, plus meeting some solid waste pollution prevention requirements. This program is five years old and, although only a few shops participated initially, now approximately 75% of the area's 225-250 auto repair shops now are recognized for being in compliance with environmental regulations. Sonoma's experience indicates that, when a GBP is starting, a small number of participating businesses might not be a reliable indicator of the program's future success.

VI. Program Impacts

Participating businesses have benefitted from efficiency gains associated with the program. Using the counties' checklists, they are now able to monitor their levels of compliance and to determine any results achieved beyond compliance. Another, less tangible, benefit to businesses is the improved relationship between county agencies and the regulated communities. Through participation in the program, business people have gotten to know the inspectors and relate to them in a more personal manner. Many businesses have expressed contentment with the agency relations that grew out of their involvement in the GBP.

The Bay Area GBP has changed how the counties pursue their regulatory and pollution prevention goals. By asking small businesses what government could do to help them to become more environmentally responsible, they attracted answers that have dramatically changed how they work with the small business community. In general, there is a movement by the counties toward working cooperatively with the business community, rather than as adversaries. Counties now listen more to the needs of the regulated community and treat businesses as their customers. The relationship between the regulated community and the regulators is now more productive, and they are able to work together to reduce waste and prevent pollution.

All of the Bay Area GBPs have tried to include the public, most commonly through solicitation of consumer support for certified businesses. Sonoma has also used a questionnaire to determine if its participating businesses have gained customers as a result of being certified. Although answers varied, on the whole businesses said that certification is a marketing tool, albeit a modest one. Another public benefit of GBPs is that in determining how to become more environmental, some businesses have instituted programs that cater to their consumers' needs. For example, one shop owner set up a used oil deposit center for customers received more business from people who viewed him as progressive. Other shop owners have noted increases in safety and a reduction in accidents. Generally, though, the counties have not built substantial public awareness of the GBPs yet, and they want to work on marketing their GBPs to the general public.

VII. Advice and Lessons Learned

The Bay Area GBPs demonstrate that recognizing compliance wins greater business participation. Even so, the counties have found it takes much longer than expected to bring businesses into their GBPs. For this reason, the Bay Area counties advise other agencies interested in implementing a GBP to be committed and to be patient. It is absolutely critical that there be a program leader from at least one agency who is dedicated to getting the program off the ground and to sustaining its momentum. Before starting a GBP, agencies should also confirm that the local business community wants to participate. Most small businesses do want a GBP, and if the government involves them from the beginning, they will be more likely to participate. Agencies should consciously seek support from three constituencies: other government agencies, the relevant business community, and the public.

Napa found using a professional facilitator to be very effective in focusing the group on resolving issues about re-inspection frequencies and their dependence on the severity of violations. When problems did arise, the facilitator was able to settle them expeditiously. While this may add expense, agencies interested in establishing a GBP should know that large amounts of funding are not necessary. The original Sonoma County GBP started on less than \$30,000 from the City of Santa Rosa's wastewater treatment division, most of which was used for advertising and marketing the program. The City of Santa Rosa now is incorporating the GBP into its inspection program. The current \$10,000-15,000 budget for the Sonoma program, primarily for marketing and publishing a newsletter to raise awareness, comes from the county, the City of Santa Rosa, and the Sonoma Environmental Quality Assurance Committee, which includes the police and sheriff's departments and meets once a week.

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Chapter Two

Emissions Trading and Permitting

POLLUTION PREVENTION PERMITTING PILOT PROGRAM

ALBUQUERQUE, NEW MEXICO

I. Background

In early 1996, Albuquerque had 240 air permit applications pending but only four staff members available to evaluate them. Because each staff review took about 45 days, and it typically took 180 days for the entire process of review and approval that is required to obtain an air permit, a serious backlog was building up. This problem was due, in large part, to the city's need to start reviewing applications that incorporated any new permitting requirements from Title V of the 1990 Clean Air Act Amendments. Sensing the effects of the backlog, industry became concerned about the economic impacts of the delays. It also became apparent to the city that the permitting process needed to change to better accommodate the industry's permitting needs.

In February 1996, the city started to work on its Pollution Prevention Permitting Pilot (P4) program. The permitting staff from the Air Pollution Control Division of Albuquerque's Environmental Health Department spent 12 to 13 months conducting a detailed re-evaluation of all the permitting requirements to determine what changes were needed and whether the permit reviewing process could be streamlined. During this re-evaluation, the Department looked for any administrative items that might be no longer necessary and for possible new provisions that could be implemented to help the city achieve better environmental quality.

Through this re-evaluation, the Department found that many provisions could be eliminated. For example, facilities that only needed minor permit changes should be allowed to avoid many of the existing requirements when the changes would either have no environmental effects or would benefit the environment. The Department found that such changes could be reviewed and approved in seven days instead of the usual 180 days. The city learned that one way to eliminate this hurdle would be to revise the new source review regulation (20 NMAC 11.41), because it prevented sources from revising air permits to reflect operational changes that would provide more flexibility without re-opening their permits.

The city also found that permit forms needed to be revised to be more understandable by lay people during the comment and hearing process. As such, the Department developed a prototype P4 permit and involved the public in the P4 project by asking environmental justice and other local groups about their air pollution concerns. The city then worked to educate these groups about the technical aspects of air permits and the P4 prototype, as well as opportunities to participate in the city's permit revision process.

II. Program Description

Albuquerque's P4 project deals with three problems: (a) how to provide facilities some flexibility in air permitting requirements without relaxing emission limits and other regulatory standards; (b) how to create incentives for facilities to reduce their emissions; and (c) how to make it easier for the public to participate in reviewing permits. It offers air pollution sources flexibility for future operations by providing a streamlined permit revision process and advance facility-wide approval of emission changes as long as an emission cap is not exceeded and all other applicable requirements continue to be satisfied. In return for monitoring and reporting actual air emissions, sources can obtain reduced annual permit fees.

The P4 program is currently in its pilot phase. The city is testing the new approach to permits on the first facility (Rio Grande Portland Cement), which was selected from four or five facilities that were initially identified as eligible sites. A public comment period and hearing on Rio Grande's draft permit occurred in late 1997. The city is now working to obtain approval of the P4 initiative from EPA (headquarters and regional office), plus industry representatives and citizen groups. As of September 1997, 26 large sources of air pollution had submitted permit applications under the P4 program; the city expects 25 or more facilities to apply later.

Examples of the potential changes for which advance permitting approval could be sought under the P4 program are illustrated in the options for flexibility listed in Rio Grande's recent P4 application: (1) using tire-derived-fuel (TDF) for kilns which requires adding a tire feed system; (2) changing the sources or vendors of raw materials such as bottom ash (alumina), iron, gypsum, coal, sand (silica), and finish grinding additives; (3) changing the mix design of the kiln-feed by varying the proportions of the kiln-feed constituents; (4) performing the finish grinding of the clinker with materials such as aluminum or fly ash; (5) installing high efficiency cyclones in the preheater systems; (6) installing a stacker/reclaimer; (7) increasing the transfer rate between the secondary and primary cement storage silos; (8) loading bulk trucks from the secondary cement storage silos; (9) adding or changing the material handling devices; (10) upgrading/retrofitting dust collection equipment; (11) relocating the crushing and screening system to the quarry; and (12) using covered belt conveyors to transport materials from the quarry to the processing plant.

The P4 program seeks to establish an equilibrium between industry's needs for flexibility in making process changes and the interests of the city and the public in maintaining compliance with air quality standards. The P4 program puts all applicable air emission requirements for an entire facility into a single, federally enforceable permit that addresses all criteria and hazardous air pollutants. It also provides for annual reporting to the city of any changes in operations and emission levels and then allows the city to adjust sources' annual permit fees based on the amounts of air pollutants actually emitted.

The P4 program has six elements:

1) **Pre-Approved New Source Review Changes** -- A change that previously would have triggered new-source review will be pre-approved if a source's emissions still satisfy both its facility-wide allowable emission limit (the emission cap) and relevant National Ambient Air Quality Standards (NAAQS), and if all other applicable requirements are met. A source is required to notify the city at least 30 days prior to implementing any change.

2) **Pollution Prevention** -- Sources can use pollution prevention projects to reduce air emissions permanently and to create credits for emission offsets which can be traded (see below). A source does not need city approval of a pollution prevention project until it uses emission offsets created by the project for emission trading except when the pollution prevention project involves construction, which requires seven days' advance notice to the city. Albuquerque defines pollution prevention as an activity that: (a) reduces a source's baseline uncontrolled emissions or its potential to emit; (b) does not add to uncontrolled emissions or potential to emit; or © generally does not involve installing additional control equipment. A source's operating permit application will establish its baseline potential to emit. A source adopting pollution prevention techniques will be required to submit to the city a process tracking form and supporting documentation to demonstrate that emissions have been reduced. Once the city approves them, these pollution prevention techniques will become part of the source's operating permit.

3) **Emission Trading**: Emission offsets created by pollution prevention projects can be applied as credits either (a) to offset a source's future changes that would otherwise qualify for new-source review (a new unit or modification) or (b) to reduce a source's facility-wide emission cap, thereby reducing its permit fees (see below). A source is required to submit to the city a request to trade an emission credit at least 30 days prior to implementing the trade, and city approval is required before the trade can be implemented. As part of approving the trade, the city will also approve a source's pollution prevention project(s) that generated the emission credit.

4) **Alternative Fuels and Raw Materials**: A source will be allowed to use alternative fuels or raw materials under certain conditions without triggering new source review requirements. A source may use an alternative fuel or raw material without triggering new source review if, prior to January 6, 1975, the source was capable of accommodating such

fuel or raw material or if use of an alternate fuel or raw material is caused by any natural gas curtailment or emergency allocation or any other lack of supply of natural gas (20 NMAC 11.41). Proposed fuel or raw material changes will be accounted for and tracked by requiring a source to provide advance written notification to the city at least seven days prior to the proposed changes. If the changes are approved, the notice will be attached to the air permit.

5) **Alternative Operating Scenarios:** In order to gain city approval of different operating scenarios without having to revise its permit, a source must provide to the city all of the technical information on its different operating scenarios, and permit conditions for each operating scenario will be written into its permit. The source will be required to keep records and notify the city when it switches between operating scenarios.

6) **Fees:** Previously, Albuquerque's permit fee regulations provided for annual fees based on allowable emissions under the permit and for reducing a source's annual emission fee in only three situations: (a) when its emission rates were reduced by discontinuing certain operations; (b) when its operating permit was terminated and the source ceased operation; or © when certain equipment was removed and the source provided written notification to the city (20 NMAC 11.02).

To give sources an incentive for monitoring and reporting their air emissions, the city adopted a new fee regulation in May 1997. It allows a source to reduce its annual emission fees by submitting an annual emission inventory so that its fee amount can be calculated on actual emissions rather than maximum allowable emission limits. To pay for its administrative costs, the city will assess a fee for reviewing the annual emissions inventories and adjusting sources' permit fees.

By re-designing its permitting process, fee structure and prototype application form to obtain a better understanding of the amounts and impacts of all air emissions from a source, Albuquerque is using P4 to protect the community's public health while still promoting industrial growth. Recognizing the need for achieving equitable and effective emission reductions, the city has streamlined the permitting process within the existing regulatory structure, revised its permit fee calculations, and used the P4 prototype to make applications more easily understandable by lay people.

The city's tasks are now to keep the P4 program growing by processing the additional 50 or more permit revisions that are already filed or expected, by tracking the new emissions data generated by P4 permits, and by determining whether P4 is actually producing emission reductions.

III. Authority, Funding and Staffing

No new funding or authority has been needed for the P4 project because the underlying regulatory requirements have not changed. EPA's review and approval has been key, however, to ensuring that Albuquerque's proposed changes and prototype P4 permit comply with all applicable requirements. The city used an EPA grant to cover the costs of their meetings with EPA (approximately ten at the regional office in Dallas and two in Albuquerque). These meetings included representatives of affected industries, and there were also meetings with local politicians and the public living near potential P4 facilities. The EPA grant also paid for a facilitator at these meetings and preparation of meeting reports. In addition, there were many conference calls among all the interested parties to discuss various details of the P4 project. Otherwise, P4 is funded with regular city appropriations for the Environmental Health Department. Because all staff time is financed through Department funding, there is no specific budget for the project. Permit applicants will pay the city's costs to review the new annual emissions inventories and adjust their annual permit fees.

The city has devoted three and one-half full-time employees (FTEs) to the P4 project. The one-half represents a city attorney who specializes in Title V. City resources which cannot be quantified include the delay of staff work on other projects. P4 has been unusually resource intensive, and has required so much staff attention, because so many people have been working on developing the program for so long. The number of city staff ultimately needed to administer P4 will depend on the number of applications for new or revised permits. Currently, existing city permitting staff are trying to manage the workload themselves. Their credentials are typical of permit writers. They are engineers and scientists but do not necessarily have prior training in air pollution matters.

IV. Barriers Encountered

In setting up the P4 program, Albuquerque has had to overcome four barriers:

- 1) The city's entire regulatory structure for air permitting had become entrenched in traditional ways of writing and revising permits;
- 2) The need to change the city air permitting staff's old ways of thinking about its regulations and to "look outside the box" for new approaches to revising permits;
- 3) The lack of much interest or participation by the public who is either not very well-informed about air permitting issues or has adopted a wait-and-see attitude until specific sources apply for P4 permits; and

- 4) Convincing facilities to be willing to anticipate future changes and to include them in their permit applications, in order to make their future plans available to the public and potentially to competitors.

V. Evaluating Program Effectiveness

The city has three benchmarks for measuring the success of the P4 program: (1) the number of changes that facilities are able to make in their operations; (2) the number of pollution prevention programs that facilities adopt as part of their P4 permits; and (3) actual reductions in air emissions. The city expects to provide special recognition to facilities that reduce their air pollution levels through P4 permits. A network of those facility managers will be helping the city to identify the benefits of various pollution prevention strategies and to educate other sources about how to reduce air emissions.

Albuquerque has been working to change its electronic emission data base so it can process and track the more comprehensive, meaningful information about air emissions that will be provided in each P4 permit for monitoring and record keeping. The data base will also include data from each source's annual emission inventory and any other data reported by facilities to show they are complying with permitted emission limits. This revised data base will allow the city to track both facility-specific emissions of all applicable criteria pollutants and the ambient air quality levels in various neighborhoods of the city, and thereby determine whether the P4 program is effective in preventing or reducing air pollution.

The one barrier to evaluating the program's success has been the lengthy process of revising this data base. It has taken two years to make the necessary changes and to revise requirements for how sources track specific pollutants. The city estimates another \$30-50,000 is needed for further improvements in the data base. It has already developed an electronic system for tracking the permitting requirements and emissions data, using GIS and permit modeling data. In the future, the city hopes to enable facilities to submit emission data electronically so that it can keep more accurate, up-to-date track of pollution levels.

VI. Program Impacts

Industry has reacted positively to the P4 program for several reasons. First, businesses like the new permit fee structure because it is based on actual emission levels and is, therefore, more equitable. Some larger sources will now pay lower fees if they can show, through monitoring and mass balance calculations, that their actual (not potential) production and emission levels are resulting in lower total air emissions. Although more sources are now paying emission fees, which have increased to \$31 per ton, they have

accepted the new system as more equitable because it is based on actual emissions. Second, industry has been able to think in new ways about adopting pollution prevention through energy conservation, source reduction, and materials substitution instead of just through emissions controls. All of these approaches offer them potential for cost savings, which adds to the appeal of the P4 program.

In addition to the public health benefits of reduced air pollution, the public has benefited by learning more about how the permitting process works and how to evaluate a permit application. Environmental groups, however, are still unsure about the effects of P4, and are waiting to see whether the facilities' revised P4 permits will actually lead to reduced emissions.

VII. Advice and Lessons Learned

Albuquerque has learned a number of lessons in implementing the P4 program. First, it is important to work within the standards of existing regulations and to carry out their basic intent. Second, it is necessary to identify key players and keep the rule-revising group small in order to enable the group to work together on all the details, make progress, and document its decisions. Third, it is important to keep the group focused and moving forward so it can respond to, but not be distracted by, public comments. Fourth, having a knowledgeable public is important so citizens can participate in the early stages of particular sources' permit revisions.

The city advises other localities considering a similar permit-streamlining project to be open to the possible need to re-think and re-invent a regulatory program. Officials believe that such a comprehensive re-evaluation can be a positive motivator for adopting changes that have widespread benefits. A similar initiative probably would work in other areas, perhaps with minimal adaptation to adjust for specific differences in the air permitting requirements of other localities.

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REGIONAL CLEAN AIR INCENTIVES MARKET
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT,
CALIFORNIA

I. Background

Because the Los Angeles air basin is an extreme non-attainment area, California's South Coast Air Quality Management District (SCAQMD) has very stringent command and control regulations for NO_x and SO_x. Historically, SCAQMD has required the most advanced pollution control technology in order to achieve needed emission reductions. Given the expense associated with this technology, it has not typically been cost-effective for pollution sources to achieve any further emission reductions beyond the required level. SCAQMD found, however, that certain sources in the area could institute process changes that would achieve further reductions more easily and cost effectively than others. Industry in the area asked SCAQMD to put together a program that would set an overall target for reducing emissions but would allow pollution sources to take advantage of more cost-effective ways of achieving the needed reductions. In response, SCAQMD developed its Regional Clean Air Incentives Market (RECLAIM).

II. Program Description

RECLAIM is a market incentives program designed to achieve emission reductions from facilities which emit at least four tons per year of either NO_x or SO_x. Each facility in the program has an annual allocation of NO_x or SO_x emissions. If a particular facility is able to reduce emissions below its allocated annual level, it may sell its surplus reductions to another RECLAIM facility that expects to exceed its allocated emission level that year. Each facility's annual allocation automatically declines from year to year. The declining allocations replace and subsume SCAQMD's command-and-control type rules and emission limits for specific equipment, which otherwise would apply to the facilities included in RECLAIM.

Regulation XX, which created the RECLAIM program, was adopted on October 15, 1993, and implementation of the program began in 1994. Almost all facilities within the Los Angeles air basin emitting at least four tons per year of NO_x or SO_x are automatically included in RECLAIM. Additionally, facilities below the four ton per year threshold can voluntarily enter RECLAIM. The 330 facilities now in RECLAIM include oil refineries, power plants, water treatment facilities, cement plants, aerospace facilities, food manufacturers, fabric dyeing facilities, and rendering plants. These 330 facilities represent only 6% of permitted sources for NO_x-emissions and 4% of permitted sources for SO_x-

emissions, yet they account for 65% of NO_x emissions from SCAQMD-permitted sources and 85% of SO_x emissions from SCAQMD-permitted sources.

RECLAIM is innovative because it is designed to achieve the same emission reductions as the equipment-specific, command-and-control rules that it replaced, but at lower cost to the facilities. Instead of requiring sources to achieve pollutant concentration limits and to install specific technologies for controlling emissions, RECLAIM relies on market forces to identify the most cost-effective methods to achieve the required emission reductions. This regulatory flexibility translates into reduced implementation costs. At the time of the RECLAIM's adoption, the estimated annual cost of implementing SCAQMD's source-specific technology requirements was \$138.7 million, while the corresponding estimate for RECLAIM to replace those requirements was \$80.8 million. Industry's actual implementation costs during the first two years of RECLAIM were below \$80 million per year. By operating an open market for emission trading, RECLAIM gives participating facilities extra flexibility to purchase credits from area sources or mobile sources, depending on which type of reduction is most cost-effective for each facility.

At the same time as it provides flexibility for industry, RECLAIM also provides an enhanced level of certainty to SCAQMD and the public that projected emission reductions will actually be achieved. The prior command and control system of source-specific technology rules did not always achieve the same level of certainty, because, in most cases, it limited emissions by specifying pollutant concentration levels (typically in parts per million for NO_x and SO_x). Under the source-specific rules, if a facility increased its production, it could still comply with its concentration limits, but the total amount of emissions would increase as production levels rose. RECLAIM, on the other hand, sets an absolute limit on emissions from each facility and requires an annual decline in total emissions from all participating sources, regardless of their production levels.

The use of continuous emissions monitoring (CEM) software has been critical to measuring emission credits and achieving certainty about emission reductions. All RECLAIM facilities transmit to SCAQMD on a daily basis, via electronic data transfer, the emissions data from each piece of equipment covered by its RECLAIM permit. SCAQMD's software automatically calculates if an exceedence has occurred and whether the data were obtained properly. SCAQMD can then target its enforcement on facilities that are experiencing problems. If a company is missing CEM data for one day, it is required to substitute the highest emissions level for that particular process. Each facility has to develop its own CEM software that is compatible with SCAQMD because the system must be able to monitor such a variety of processes and equipment covered by RECLAIM permits. SCAQMD helps all the RECLAIM facilities to set up their CEM software.

The RECLAIM regulations require an annual audit of each facility, and a review of the program after three years. The RECLAIM Advisory Committee Task Force is currently conducting this audit of the program to determine cost-effectiveness, socio-economic

impacts, and air quality impacts, among other things. SCAQMD is working with the committee on this review. These follow-up activities are necessary for the program to be credible. In addition, continuous staff training and CEM updating is also required.

III. Authority, Funding and Staffing

The SCAQMD governing board established RECLAIM by adopting Rule XX based on its authority under California law. During startup, the RECLAIM budget was roughly estimated at \$4 million for both the enforcement and permitting staffs, including salaries, benefits, and ongoing staff development. A major cost of the program has been development of the CEM software. SCAQMD had to invest about \$1 million in permitting and enforcement software development, and it costs about \$40,000-\$70,000 annually to maintain and upgrade the software. Most of the RECLAIM funding comes from emission fees and permit fees. In addition, whenever emission credits are bought or sold, facilities must register trades at a cost of \$50 per transaction. Eventually the program should pay for itself. While initial costs of program development have been high, fees paid by RECLAIM facilities still cover the majority of the costs.

To start the RECLAIM program, SCAQMD needed approximately 20 full-time staffers to assist the regulated community and to review and audit the facilities' CEM data to determine actual emission levels, subsequent reductions, and credits. These staffers had to have an understanding of technical issues, monitoring, and computer software. After the first few years of operation, the staff working on the regulatory aspects of RECLAIM was reduced by about a half. In addition to these personnel, RECLAIM requires the equivalent of about 50 FTEs, combined from the time spent by many staffers, to issue permits and conduct ongoing air quality inspections. Each facility's initial RECLAIM permit covers the entire facility in order to calculate its facility-wide emission cap, so SCAQMD's permitting staff have had to devote additional effort to reviewing permit applications for new sources. Once all RECLAIM permits are issued, however, fewer staff will be needed for that aspect of the program. Nevertheless, SCAQMD believes the current amount of staff, which covers about 350 sources, is necessary to assure the integrity of the program.

IV. Barriers Encountered

It took SCAQMD four to five years to adopt RECLAIM. The major opponents were the environmental community and citizens groups, who were skeptical about "selling clean air." They did not believe that a company should be able to buy the right to emit pollution and argued that command-and-control rules should still be used to require all sources to reduce air pollution to the maximum degree. Many small businesses were also opposed to the program because they thought CEM would be too costly and burdensome for them

to develop. While most large industries were in favor of RECLAIM, a few opposed it because they thought it would adversely affect their interests. There were also some EPA officials, particularly enforcement personnel, who expressed concerns about the program. They were concerned with the protocols, penalties, ability to obtain valid data, restrictions imposed, and the banking of credits. The program had to be designed to overcome these concerns and obtain EPA endorsement and agreement. Fortunately, most local politicians supported RECLAIM because it was introduced as a way to help businesses meet air quality standards at less cost.

V. Evaluating Program Effectiveness

SCAQMD measures the effectiveness of RECLAIM through its rigorous monitoring and facility auditing. The CEM system uses real time data, so SCAQMD can analyze a facility's emission levels on a micro- or macro-level. Currently, SCAQMD audits every RECLAIM facility every year to determine compliance with its permit and emission cap. There have been two comprehensive audits of the RECLAIM program since 1994, which have helped to measure its effectiveness. The results of both audits indicate that RECLAIM is performing well with a high rate of compliance, and actual emissions are below the facilities' allocations. In 1994, the first year of program implementation, RECLAIM facilities were allocated a total of 38,288 tons of NO_x and 9,453 tons of SO_x, and actually emitted 25,477 tons and 6,935 tons, respectively.

Some of the key findings from the second (February 1997) audit of RECLAIM include:

- * Implementation of RECLAIM has resulted in a number of facilities implementing emission controls earlier than they would have under the technology-specific rules. For example:
 - Eight facilities (five asphalt batch plants, a wall board manufacturer, a roofing insulation manufacturer, and a naval facility) have already lowered their emissions to the level of their final NO_x allocations.
 - Three facilities (a cement kiln, a malt manufacturer, and a secondary oil refinery) were retrofitted to reduce their SO_x emissions to the level of their final allocations.
 - Many facilities have replaced combustion equipment, particularly internal combustion engines and cogeneration equipment, with electric devices.

- One firm is developing a project which will achieve significant SOx reductions (on the order of a couple of tons per day) in conjunction with on-site polypropylene manufacturing.
- * Ninety-two percent of facilities complied with their annual allocations during the second compliance year, and SCAQMD anticipates the compliance rate will be even higher for the third compliance year.
- * The cost-effectiveness of the program can also be measured by the amount of trading occurring and the price of the credits. More than \$20 million in RECLAIM Trading Credits transactions have occurred. The average price credits for the 1996 compliance year was \$154 per ton for NOx and \$142 per ton for SOx.

The biggest obstacle to measuring the program's success was finding a way to overcome the problems associated with the rigorous monitoring and reporting requirements, which tend to be highly technical and very costly. There have been many unique situations that have been difficult enough to require individual attention. For example, in the steel industry the process for manufacturing long steel sheets encompasses the entire building and, thus, provides a large open space for fugitive emissions. SCAQMD's challenge was to develop a method for monitoring all these emissions with a high degree of accuracy. Finding the appropriate emission measurement system is often an impending obstacle to an open market program. It took SCAQMD and CEM about three years to solve most of these problems.

VI. Program Impacts

Some RECLAIM facilities complained initially about the cost and burden imposed by the rigorous CEM requirements, which forced them to hire specialized personnel to implement the monitoring system. Now most participating firms, including small businesses, understand RECLAIM and view CEM as routine.

The general public has benefitted from RECLAIM, because emissions of NOx and SOx have been greatly reduced. Some community groups still have environmental justice concerns about localizing "hotspots" for SOx and NOx emissions. For example, if a company in a rich area traded its credits to companies in low income areas, emissions in low income areas would increase. In response to these concerns, SCAQMD is monitoring trends in credit trading by grids or zones within its jurisdiction and is able to predict emission trends into the year 2010. If SCAQMD finds a predicted "hot spot," it could enact a regulation to prohibit trades in that zone.

VII. Advice and Lessons Learned

In implementing RECLAIM, SCAQMD learned the following:

1. It takes a long time to implement a credit trading program; SCAQMD initially thought it would only take a year to get the CEM system in place, but it took three years.
2. Such a program requires more resources, both financial and staff, in the implementation phases.
3. Unique cases should be planned for and handled before implementation of the program; instead of taking up time during the implementation stage, these cases can be anticipated and taken care of beforehand.
4. More time and resources should be allowed for staff training because there is a major shift in the type of inspections for a command-and-control approach to emission credits. Agency enforcement and permitting staff need to be trained about these major differences.
5. Businesses will not invest in emissions trading if the government does not assure that credits generated are real and quantifiable. Thus, SCAQMD has placed a high priority on building the program's credibility. SCAQMD recently received a grant from EPA for \$70,250 to develop an enforcement guidance workbook for state and local market trading programs. SCAQMD plans to share enforcement experience with other states in an effort to develop strategies that will ensure the accuracy and viability of credits generated. In addition to improving enforcement activity, SCAQMD has bolstered RECLAIM's credibility by investing in software for the CEM system.

SCAQMD advises other air agencies interested in adopting a similar credit trading program to emphasize the importance of CEM and enforcement to assure that a trading program is viable and credible. A market incentive program would work in areas with serious problems reaching attainment that need to adopt more stringent requirements to reduce emission levels. SCAQMD found that there has to be a demand for lower emissions before there can be a demand for trading emission credits. Even though a market incentive program offers flexibility to industry in achieving emission reductions, industry may not be interested in purchasing credits if there is no need for emission reductions.

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FLEXIBLE PERMITS PROGRAM

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

I. Background

Texas has one-fourth of the nation's oil refineries and two-thirds of the chemical industries. Many of these facilities, which use older technologies, are grandfathered under the federal and Texas Clean Air Acts, and thus have never been subject to permit review. The Texas Natural Resource Conservation Commission (TNRCC) estimates that there are at least 700 grandfathered sources in Texas. Because it is politically difficult to repeal their grandfathered status, TNRCC has had difficulty controlling their air emissions. Thus, the TNRCC prefers to offer them incentives to reduce air pollution, especially since, on a dollar per ton basis, Texas believes it is more economical to reduce pollutants at some sources than at other sources.

II. Program Description

Texas has had an air permitting program since 1971. The new flexible permit rules came into effect December 1994 and apply to any air pollutant. Participation in the flexible permits program is voluntary. In all cases, the flexible permit provisions must comply with the federal Clean Air Act, and the TNRCC can only offer these flexible permits to facilities that are not subject to federal permit requirements. So long as a facility does not increase its emissions by an amount that triggers the federal Clean Air Act's significance levels -- for SO₂, it is 40 tons per year -- TNRCC can approve a flexible permit.

Under the new rules, TNRCC evaluates each piece of a facility's equipment that is covered by its air permit and calculates what the emissions from the equipment would be if the best available control technology (BACT) was used instead of the grandfathered equipment. TNRCC then adds up the individual emission amounts from each piece of equipment to calculate a total air emission cap for the facility. The facility then tells TNRCC how it will keep its air emissions within the cap. It can choose to implement the control strategies it prefers as long as the cap level is achieved; it might choose to meet the lowest achievable emission rate (LAER) for one piece of equipment and use lesser degrees of control on others, depending upon which is most cost-effective. Under this approach, the facility can "bubble" more than one source and, if it desires, can bubble the entire site as long as its total emissions do not exceed the facility cap.

In addition to operational flexibility, timing is a major incentive for facilities to enroll in the flexible permit program. TNRCC gives companies with flexible permits a longer time to implement the necessary changes. For example, an oil refinery that would like to

utilize crude with greater sulfur content would normally have to comply with BACT, and all the necessary control technology would have to be installed before the facility could start refining the new crude. Under TNRCC's flexible permit program, the refinery could start refining the higher sulfur crude before all the control technology is installed. The theory behind granting this time extension would be to allow the refinery to generate revenues to help pay for the new control technology. This provision creates a significant incentive for participation, because technology costs can be as high as \$36 million for a single refinery. TNRCC has discretion in determining the period of time that a permittee is allowed to phase-in new control technology. The period depends on the size of the generator and the level of emission reductions. For a small reduction (5,000 tons per year), TNRCC typically allows a two to three year phase-in. The longest period granted was ten years for revamping a 1906 refinery that reduced its emissions by 25,000 tons per year.

Staff from the U.S. EPA participated in the Task Force that designed the flexible permits program. After TNRCC staff used the Task Force's proposal to develop draft rules, EPA provided comments on the draft rules before TNRCC began its rulemaking. During the rulemaking process, EPA submitted comments raising three concerns: (1) the need to coordinate with Region VI's New Source Review Reform committee about future permit rule revisions to assure consistency with federal regulations, (2) the need to expand public health and welfare protection to ensure that there will be no exceedences of national ambient air quality standards or increments for the prevention of significant deterioration (PSD) of air quality in clean air areas, and (3) the need to assure consistency between public health protection and what is considered a "significant" emissions increase.

III. Authority, Funding and Staffing

The Texas Legislature passed legislation with a brief phrase allowing TNRCC to issue "flexible permits." TNRCC's rules implemented under this authority are in the Texas Administrative Code and describe the details of the flexible permit program (30 TAC ch. 116, subch. G). All facilities applying for a flexible permit must: (1) protect the public health and welfare; (2) measure emissions of air contaminants; (3) use BACT; (4) comply with NSPS, NESHAPS, and PSD standards; (5) demonstrate they can achieve these levels of performance; (6) include adequate air dispersion modeling or ambient monitoring; (7) identify all air contaminants emitted, all equipment causing emissions, and all sources of emission reductions; (8) specify the proposed control technology; and (9) demonstrate compliance with all emission caps (30 TAC 116.711).

No new resources or funding were necessary because TNRCC incorporated the flexible permit program into its existing air permit program. Both programs require the same skills and personnel, and the current 120 air permitting staff have been able to handle the flexible permits as well. Because the flexible permit program is part of its overall air permitting program, it does not have a separate budget. The program uses existing

funding sources, namely EPA's Title V grants and state permit fees. TNRCC assesses air permit fees based on each permittee's total allowable emissions of all pollutants at \$25 per ton (30 TAC 116.750), and imposes a fee no less than \$450 and no more than \$75,000. In the last two years (since the inception of the flexible permit program), the permit fees have generated more than half a million dollars.

IV. Barriers Encountered

The rulemaking process necessary to adopt the flexible permit program was difficult. TNRCC had never done anything like this before and had to start from scratch in drafting the rules. The first step was for TNRCC to establish an air permitting workgroup, which was drawn from another air quality task force that consisted of various industry representatives, environmentalists, EPA, local agency staff and TNRCC staff. The group held numerous meetings in Austin over a period of six to seven months. The workgroup worked on a number of difficult issues, such as degree of flexibility and delay in implementing BACT controls at renewals. Accommodating the various interested parties' concerns was challenging, and reaching consensus was impossible on several items. In the end, staff prepared a proposal and presented it to the members of TNRCC who instructed the workgroup to proceed. During various stages in drafting the rule, TNRCC received comments from individual workgroup participants.

The most difficult obstacle to the program's success is creating an incentive attractive enough for facilities to participate. Most sources like the status quo and see little reason why they should change. The Texas Legislature tried to encourage participation by directing the TNRCC to start a voluntary reduction program. This conveyed the message that the Legislature wants to reduce the air emissions and that they want it done voluntarily. So far, TNRCC has not been very successful at drawing facilities into the flexible permits program. For example, less than 30% of the VOC emitters have permits, approximately the same number that had permits before the flexible permits program started two years ago. For the facilities that do participate, however, TNRCC has been very successful at reducing air pollution. As such, the commission is now focusing on attracting more facilities to the program. To increase participation, Governor Bush has capitalized on his business connections and has been calling the CEOs of oil and chemical companies with Texas facilities to encourage them to participate.

V. Evaluating Program Effectiveness

TNRCC measures the program's success by tracking both the number of participants and the extent of emission reductions. Since the program began in December 1994, Texas has reduced air emissions by 116 million pounds a year. This amount is significant but still only a small percentage of the state's air pollution inventory:

POLLUTANT	Flexible Reductions (tons/yr)	Total State EI (tons/yr)	Percent Reduction
TSP		100,200	0
PM10	202	13,340	1.5%
SO2	14,073	899,540	1.6%
NOx	17,550	946,700	1.9%
NMOC	13,764	315,170	4.4%
CO	4,498	498,600	0.9%
Pb		28	0
H2S	81		--
Total	50,167	2,773,578	1.8%

Currently 17 companies have flexible permits. Of those 17, 12 are authorized sources where grandfathered equipment was included in the permit. For those sources that are not grandfathered and have already installed emission control equipment, the issuance of flexible permits has entailed either a consistent level of emissions or an increase. For those companies that brought grandfathered equipment into control through the flexible permits program, the reductions have varied from 10% to 66%.

VI. Program Impacts

Participating facilities have enjoyed the opportunity to use flexible permitting as a strategy for air quality control. Originally, environmental groups were extremely skeptical about whether flexible permits would reduce air emissions. Since the program has been in operation, however, they have not voiced any concerns. The media has been generally supportive.

VII. Advice and Lessons Learned

Enforcement is the most difficult aspect of the flexible permit program, because it relies on an emission cap. When a facility has multiple emission sources that are subject to a total emissions cap, it is often difficult to accurately measure the combined emissions in the absence of continuous emissions monitors (CEMs), which are rare in Texas. Because CEMs are very expensive, often the TNRCC and permittees must estimate emissions levels,

especially in the case of smaller sources that cannot afford to install CEMs. In general, this type of program is more effective for larger sources because they have a greater variety of emission sources, seek more flexibility to control those emissions, and are better equipped to take advantage of the various options offered by flexible permits.

For other states or localities that want to implement a voluntary program like Texas's flexible permits program, TNRCC staff advise that it is absolutely necessary for the parties who will participate to be heavily involved in development of the program. This participation is important not only during the rulemaking, but also in the preliminary stages when the agency develops the fundamental concepts, such as what constitutes an appropriate incentive. TNRCC does believe that flexible permits have the potential to reduce air pollution in many other areas. According to staff members, one of the more interesting possibilities for adopting flexible permits relates to the new ozone and particulate standards. If an area or facility is currently in attainment with the old standards but will violate the new standards, it might look to this type of flexible permitting program might as a way to achieve further emissions reductions voluntarily and in a cost-effective manner.

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Chapter Three

*** Innovative Technologies**

"SMART SIGN"

COLORADO DEPARTMENT OF TRANSPORTATION

I. Background

Because Denver is classified as a moderate non-attainment area for carbon monoxide (CO) under the 1990 Amendments to the Clean Air Act, Colorado had been conducting research to determine how to measure CO levels. The University of Denver spent several years researching applications of remote sensing technology for this purpose. Once the technology was proven effective, the University brought it to the attention of the Colorado Department of Transportation (CDOT) and proposed that it be used along the highway to measure CO from cars.

II. Program Description

The first of its kind in the world, CDOT's "Smart Sign" is an electronic billboard installed along the roadside and connected to remote sensing technology. The sign measures CO emissions from passing vehicles and gives individual drivers real-time readings of CO emissions from their cars. The goal of the sign is to encourage drivers whose cars have high emission levels to repair their vehicles voluntarily. The sign also has a camera attached and can periodically take pictures of vehicle license plates. CDOT does not use the pictures for enforcement, but to contact vehicle owners as part of a survey on the effectiveness of the Smart Sign.

The "Smart Sign" is an informative and appealing display with a likeable cartoon caricature of a car that illuminates different messages depending on the emission readings from passing cars. Along with the cartoon car, the words "Your Car's Health" appear above an electronic display that provides each car's CO emission reading. If the emission level is low, the grille of the cartoon car turns green and smiles and the sign flashes "GOOD" in green letters. If the emission level is only fair, the car grille turns yellow and gives a slightly alarmed expression and the sign flashes "FAIR" in yellow letters. If the emission level is too high, the car grille turns red and frowns and the sign flashes "POOR" in red letters.

CDOT placed the Smart Sign at the exit ramp from I-25 to Speer Boulevard, a one lane exit with the potential to measure emissions from 12,000 vehicles per day. The sign has delivered approximately 3 million individual readings of CO levels to more than 1 million different drivers. The only follow-up activities needed have been conducting surveys of drivers to solicit their reactions to the sign and performing preventive maintenance on the sign.

Construction of the Smart Sign began in April 1996 and the sign has been operational since May 1996. For several years prior, the University of Denver worked under contract with CDOT to develop remote sensing technology for the sign and to devise conceptual ideas for how to make the display useful to drivers. CDOT also worked with the Colorado Department of Public Health and Environment (CDPHE), the Federal Highway Administration, the University of Denver, Conoco, Remote Sensing Technologies, and Skyline Products to develop and create the sign. Conoco assisted CDOT by contributing the services of their marketing agency, which helped to refine the project team's ideas. CDOT then convened focus groups to gauge public reactions to various options.

III. Authority, Funding and Staffing

CDOT implemented this project using its existing authority under Colorado law and the Clean Air Act. The total budget for the Smart Sign was approximately \$500,000. The project received a grant of \$304,000 from the Federal Highway Administration, and CDOT spent \$65,000 of its own funds. The remainder of the support came from in-kind contributions of CDOT's other partners. The project manager spends roughly 10% of his time on this project. Although other CDOT staff assist from time to time, the manager puts in most of the CDOT staff time devoted to this project. Design of the sign also required assistance from Conoco's marketing firm and the use of focus groups, which were donated as an in-kind contribution.

IV. Barriers Encountered

Problems arose between CDOT and the Colorado Department of Public Health and the Environment (CDPHE) that almost caused the project to be terminated. After several months of executive level negotiations, the two agencies were able resolve their differences. This hurdle might have been avoided if CDOT had involved CDPHE earlier on in project development.

V. Evaluating Program Effectiveness

Using the pictures of license plates from the camera on the Smart Sign, CDOT has asked the Department of Motor Vehicles for drivers' phone numbers and addresses. With this information, CDOT has conducted surveys on the effectiveness of the Smart Sign. These surveys have asked drivers a number of questions about the sign, including whether or not a fair or poor reading on the sign prompted them to repair their vehicles. 474 drivers responded to the survey. CDOT has used these results to project that 16,000 drivers have voluntarily repaired their cars. As a result, CDOT conservatively estimates that the Smart Sign has lowered CO levels in the Denver area by about 13 tons per day.

The only difficulty in evaluating the success of the Smart Sign has been generating enough driver response to the survey to ensure a truly representative sample. CDOT is concerned that a small enough sample size might create significant statistical problems that would, in turn, prevent accurate projections of emission reductions. The fact that the lowest response rate came from drivers whose cars registered "poor" emissions levels is of particular concern. Nevertheless, CDOT believes that the survey data is reliable and its estimates of CO reductions will hold up with further study, because previous research using remote sensing technology has shown similar results.

VI. Program Impacts

Since the Smart Sign measures emissions from a completely random sampling of drivers who pass the particular ramp where it is located, and all repairs made as a result of the Smart Sign are purely voluntary, there is no regulated community per se under this program. The sign has not been perceived as very intrusive, yet the general public has benefitted from reduced CO emissions.

VII. Advice and Lessons Learned

CDOT learned that inter-agency cooperation is essential from the start of a project like this, particularly between transportation and environmental agencies. CDOT believes that deployment of smart signs on a wider scale, possibly through the development of a mobile sign, might provide even greater reductions of CO. Also, more active use of cameras to record cars with high emission levels could reduce the number of vehicles needing IM-240 emissions testing. A similar approach to remote sensing could also be used in other localities for measuring cars with high emission levels of NOx and hydrocarbons.

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MOBILE AIR MONITORING LABORATORY

JACKSONVILLE, FLORIDA

I. Background

A few years ago, in response to an odor problem resulting from sulphur compounds released by local industries, Jacksonville developed a methodology for using a mobile air monitoring laboratory built into a van to measure air pollution. After the sulphur monitoring program ended, the city's Air & Water Quality Division (AWQD) still needed to collect data on more than 140 air toxic compounds in response to the Clean Air Act Amendments of 1990. As such, Jacksonville decided to adapt its mobile lab to monitor for air toxics and various volatile organic compounds (VOCs). Tracking these pollutants is particularly important due to a high incidence of lung cancer among Jacksonville's white males. The city is currently in attainment for ozone but, because EPA is lowering the ozone standard, officials are unsure if Jacksonville will continue to meet attainment.

II. Program Description

The mobile monitoring lab is housed in a 20-foot Ford F700 van with an internal generator. Its primary function is to measure known and suspected carcinogens and halogenated organic compounds that react with air to form ozone. The lab is also used to detect hotspots that might necessitate fixed monitoring sites in the future. Because the air quality standards are based on an eight-hour average, AWQD uses the mobile lab to obtain eight-hour average measurements of pollutants that are used to determine if applicable standards are being met. At this point, there is no enforcement aspect to the program. The objective is simply to gather the data in order to determine the levels of the various air pollutants that are in the environment.

Specifically, the lab data tells AWQD the precise locations of various concentrations of ozone precursors and a number of HAPs. In most places, there is very little data for the 188 HAPs now regulated by the Clean Air Act even though EPA has issued standards for some of those pollutants. AWQD hopes that the monitoring data from the mobile laboratory will give the agency better insight into the types of chemicals to which people are exposed. The data will also make it easier for AWQD to ask the Jacksonville County Environmental Protection Board to adopt rules regulating these HAPs.

At this point, the city's goal is to take samples at a minimum number of sites each year. Fire stations are used often due to their 24-hour security systems. AWQD tries to visit a different site every two weeks for an annual total of 20 around the county. Every Monday morning, the lab chemist drives the truck to a fire station. An onboard weather

station monitors the weather 24 hours a day, and the chemist is there eight hours a day through Thursday afternoon. Friday is used for fleet maintenance, so the total monitoring time is 3.5 days per week.

There are only a few similar mobile air labs in the United States. According to EPA, Jacksonville has the only system that uses a computer program that is able to integrate an air sample over a period from less than a minute to more than 72 hours. The samples are collected in a SUMMA canister and subsequently analyzed by GC/Ion Trap spectrometry. The lab uses EPA's measurement and quality control method TO-15, which calls for the use of a gas spectrometer and specifies the method of collecting and analyzing samples. It has capacity for continuously variable sample integration times with subsequent unattended analysis. Because there are so few data of this type available, EPA recently requested data from AWQD for its own purposes. The city expects to continue operating the lab for years to come.

II. Authority, Funding and Staffing

The mobile lab is a local initiative guided by no particular mandate other than EPA's urging states and local agencies to undertake air quality initiatives. Most of the original funding to set up the van and equipment came from a consent agreement between a local cogeneration facility and the city, that arose from citizen concerns about the facility degrading local air quality. The chemist's salary is paid by the city's air pollution fund, which is derived from a \$1.00 fee every vehicle owner must pay to register his/her car. \$0.75 of each fee imposed goes to AWQD to address air toxics, mobile sources, and other air quality issues. AWQD also receives Title V funding from EPA, which constitutes about 40% of its total budget. Some state funds have also been used.

The van and the laboratory equipment cost about \$250,000. Operating expenses such as fuel for the truck, glassware, and standards cost at least \$10,000 per year. Of this, AWQD spends a couple hundred dollars on helium and two thousand dollars on liquid nitrogen a year. The salary for the full-time chemist is about \$42,000 plus about \$12,000 in benefits. The start-up costs for the mobile laboratory and its equipment (purchased in 1994 and 1995) included:

- o \$23,373 for the van, a 20-foot Ford F700 Low Profile Cab and Chassis with a 225-inch wheel base;
- o \$92,780 for the 20-foot van body (i.e., laboratory) that included benches, cabinets, a gasoline-powered Onan 12.5 JC generator, the electrical system, an air conditioner and heater, and laboratory support equipment;
- o \$75,000 for a Finnegan Magnum ion-trap mass spectrometer;

- o \$48,945 for their sample interface equipment, including an Entech 7000 Preconcentrator, an Entech 4560 Standards Generator, and an Entech 16-position Auto-sampler (which they no longer use, since they are doing real-time sampling); and
- o \$6,700 for miscellaneous costs including calibration gases, meteorological data station, and a back-up camera on the truck so no one would be hurt while backing up.

All of these costs, totaling almost \$247,000, include installation of the equipment.

A pollution control chemist directs all AWQD laboratory operations within the city's Regulatory and Environmental Services Department. A senior bio-environmental engineer is responsible for the funding and operation of the agency's air programs. During the six month design phase when the mobile lab was set up, one and one-half full-time chemists were needed to staff the program. Now, one full-time chemist is needed to operate the program, and another staff person spends about 20% of his time managing the project. The full-time chemist operates the lab, moves it among different fire stations, parks in Jacksonville, and does data reduction on location. There are no support staff, although the city's fleet management provides maintenance for the van just like any other city vehicle.

IV. Barriers Encountered

AWQD encountered a few obstacles while developing the mobile monitoring program. At one point, officials thought they might have to have the truck built elsewhere. They needed a builder who could install complicated, sensitive electronics, perform general sheet metal work, construct cabinets, and who was very proficient with on-board power generation, because the power supply needs to be uninterruptible. They knew of one qualified company in California and another in West Virginia that makes mobile systems for stack monitoring. Has AWQD chosen to use one of these builders, the most difficult aspect of the project would likely have been managing the distance and related communication problems while the van was being built. Eventually, AWQD found a local builder who had experience constructing mobile remote broadcasting units for television stations, mobile dental offices, and portable mammogram units. By employing a local builder, AWQD was able maintain constant contact and visit the contractor often to resolve questions. In the end, AWQD also saved money by eliminating the need to ship the vehicle from California.

The cost of the program was also a significant obstacle. AWQD does not believe that the program would have materialized without the settlement from the cogeneration facility. Fortunately, in the process of negotiating the settlement, local citizen groups expressed a desire for the city to have this sort of analytical ability. This public support

eliminated any potential political barriers, and as a result, the city's administration allowed the project to proceed. Questions about implementation were largely a matter of degree -- how much, where, etc. -- rather than whether to build the mobile van.

During the two years in which the program has been operational, AWQD has spent a great deal of time debugging the equipment. Only in the last six months has the laboratory expanded from one- and two-minute grab samples to one-hour samples, and very recently to eight-hour samples. Until now, AWQD has had no data to compare to the eight-hour regulatory health-based air quality standards (based on eight hour averages). Unfortunately, there does not seem to be a uniform national standard for the length of samples for HAPs. For instance, non-methane organic compounds require three-hour samples.

V. Evaluating Program Effectiveness

The monitoring data from the mobile lab will ultimately give AWQD the information necessary to reduce ozone concentrations in the county. Equipped with data on the distribution of various pollutants all around the city, AWQD expects to be able to design more effective ozone control strategies. AWQD believes that having area-specific data will be particularly useful if and when the Division begins to develop regulations to reduce ozone and hazardous air pollutants (HAPs).

Due to the newness of the program, there are not many ways to measure its effectiveness. Two qualitative measures of success have been recognition by EPA at an international symposium and EPA's recent request for AWQD's monitoring data. From a practical standpoint, the mobile lab is successful because it can take as many samples as AWQD desires.

So far, the mobile lab has not been used to reduce pollution. AWQD is currently developing a database of emissions, monitored by the lab, that will be used to determine future action. Officials are finding that most emissions of HAPs and ozone precursors (benzene and toluene) come from vehicles, so the information from the mobile monitoring might be used to support the creation and development of carpooling lanes or other strategies to reduce vehicle miles traveled.

VI. Program Impacts

The regulated community has not had any particular response to the mobile lab because AWQD has not yet used the data for enforcement. Furthermore, AWQD's focus

on monitoring ambient air quality and not individual sources has kept the van away from industries, so the regulated community does not perceive the program as targeting them. However, AWQD might eventually use the lab to monitor specific facilities, because when meteorological conditions are right, people can smell industries 10-15 miles away and consider them a significant source of air pollution in Jacksonville.

Much to AWQD's dismay, the public is not very aware of the mobile lab. Officials have found it difficult to talk about air toxics to the public due to general alarm over the word "toxics." Because AWQD no longer has a full-time public relations person, the program has not received any public exposure. Clean Air Month was in May, and AWQD had displays on the mobile monitoring laboratory. Two years ago, a local television station covered the program. Otherwise, there has been no significant publicity or public reaction to the program.

VII. Advice and Lessons Learned

The city's experience with an earlier mobile laboratory helped AWQD quite a bit with this program. Based on experience with the earlier truck (a Chevy step van), officials knew to get a larger truck, one large enough to carry a generator that would handle an uninterruptible power supply.

If another air agency wishes to develop a mobile lab, it should try to have it built locally so that agency staff can communicate daily with the builder during construction. By building the mobile lab locally and working closely with the builder, Jacksonville was able to have the construction and installation of equipment done correctly and did not have to re-commission the builder aside from maintenance work and tune-ups. Also, the agency should talk with another agency that has experience with mobile laboratory facilities to avoid potential pitfalls.

The mobile air monitoring lab could work anywhere, certainly for measuring HAPs and ozone precursors. With some changes to the equipment, an agency could conduct other analyses as well. For instance, a mobile monitoring program could measure ethylene oxide from hospitals, monitor emissions from landfills, or conduct water sampling for organics. An agency could also use the same equipment for indoor air samples. The SUMMA stainless steel spheres used to take air samples could be taken to the monitoring site, left to collect the air sample, and then carried to the van for analysis. This methodology would work well, because the flow control regulator on the SUMMA canister allows the lab to determine the length of time over which the sample should be averaged.

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CLEAN FUELS AND ENERGY PROGRAM

SANTA BARBARA COUNTY, CALIFORNIA

I. Background

In 1988, Exxon and Chevron wanted to install more oil and gas drilling facilities off the coast of Santa Barbara County, but the county was a non-attainment area for ozone. During the process of negotiating for their permits, the companies agreed to contribute \$5 million to a county-managed fund dedicated to promoting installation of innovative, low-emissions technologies at facilities in the non-attainment area. The companies agreed to this arrangement in order to offset some of the emissions of ozone precursors that would result from the construction and operation of their offshore facilities. Following this agreement, the Board of the Santa Barbara County Air Pollution Control District (SBCAPCD) authorized the inception of the Clean Fuels and Energy Program in late 1988.

II. Program Description

The Clean Fuels and Energy Program supports over 30 projects to develop, test and apply new technologies that reduce toxic air emissions, carbon monoxide and greenhouse gases released from both mobile and stationary sources in Santa Barbara County. With participants from over 100 different agencies, businesses and other organizations, the Program actively encourages cooperative partnerships between the private and public sectors to facilitate all phases of project development. Through the Clean Fuels and Energy Program, SBCAPCD seeks to increase the availability of, and infrastructure for, low-emission technologies. The projects funded cover a wide spectrum of sources and applications and reflect SBCAPCD's strategy to diversify its emissions control innovations and not "keep all its eggs in one basket."

Mobile source projects include purchasing several classes of compressed natural gas (CNG) vehicles, constructing CNG fueling stations, purchasing four types of electric buses, developing and testing two different hybrid vehicles, retrofitting four types of heavy-duty vehicles with low-polluting diesel engines, and buying back and scrapping old cars. Stationary source projects include developing and testing ultra-low NOx gas turbines, reducing emissions from industrial flares, operational testing of fuel cells for co-generation at powerplants, developing demonstration projects for emission reductions in the residential, agricultural and commercial sectors, and developing demonstration projects for emission reductions in industrial combustion equipment. Funds from the Clean Fuels and Energy Program also support SBCAPCD's air quality databases, studies, and a comprehensive planning initiative.

To receive funding from the Clean Fuels and Energy Program, one must submit a proposal outlining the intended project. The proposals most likely to be approved are projects for advancing clean fuel vehicles and clean energy production technologies, especially those targeting previously unregulated air emissions. Projects selected by the Clean Fuels and Energy Program are all in a fairly advanced stages of technology testing, which virtually assures some degree of success in achieving emission reductions. Proposals requiring substantial research and development are discouraged.

After SBCAPCD approval, a successful demonstration of the technology, usually by its original manufacturer, must be performed before it can be deployed in the field. By involving the original technology manufacturers, SBCAPCD hopes to promote acceptance of new technologies and offer them increased opportunities for commercialization. SBCAPCD supervises the actual operation of these new technologies and encourages wider use of those which prove successful.

Most of the specific projects in the Program would not have been possible without the technical, financial, operational, and equipment contributions of many different project participants. For example, in the Electric City Transit Buses project, the California Energy Commission provided funding, APS Systems built the buses, and the cities of Santa Maria and Solvang agreed to deploy the buses. In the Ultra-low NOx Gas Turbine Combustor project, General Motors provided the technology, the Gas Research Institute and the U.S. Department of Energy provided technical support, and Chevron and Vandenberg Air Force Base are field testing the turbines. In the Solid Waste Transfer Trucks CNG project, Acurex provided the fuel system, Navistar provided the tractors, Bus Manufacturing, Inc. installed the engines, Cummins provided the engines and technical support, Southern California Gas Company and the Southwest Research Institute provided technical support, Exxon provided funding, and the Santa Barbara County Public Works Department operates the vehicles. These projects emphasize the indispensable cooperation these various private sector partners bring to the program.

Most of the Program's follow-up efforts involve finding promising new technologies, recruiting new private sector participants, and reviewing, approving and implementing new projects. The Clean Fuels Database, which was established by SBCAPCD to collect data on emission reductions, fuel consumption, and costs from every project in the program, is very helpful in this respect. These data allow the district to conduct a thorough analysis on a project by project and/or programmatic basis. Collecting data from all the projects in the program enables SBCAPCD to perform thorough analyses of the emissions reductions, technical feasibility, and costs of any project and the program as a whole.

III. Authority, Funding and Staffing

The Clean Fuels and Energy Program did not require any additional legislation, regulations, or appropriations. In addition to the original \$5 million from the two oil companies, a number of agencies and businesses have provided grants or donations to fund specific projects under the Program. SBCAPCD has used the original \$5 million to leverage an additional \$25 million of other funding and, thus far, has financed specific projects costing over \$22 million. Program participants have provided additional support through cash donations, in-kind contributions, equipment purchases, and volunteer services. The remainder of SBCAPCD's funding for the Program comes from the county's surcharge on motor vehicle registration fees. When vehicles are registered in California, this county surcharge can be earmarked to provide funding for an air quality management district's programs to improve air quality. Staffing requirements vary between projects.

IV. Barriers Encountered

Even though barriers have differed from project to project within the overall Clean Fuels and Energy Program, many projects have experienced minor technical problems such as those normally associated with field trials of new technologies. A few projects have had problems with changing needs or lack of funding. One notable example of a barrier was the technical difficulties encountered by SBCAPCD with the Light-Duty CNG Vehicles. Several retrofit kits experienced problems with varying fuel composition; one variety of kit had to be removed from some of the vehicles, and one particular vehicle model was recalled as a result of problems with CNG programs in other locations. For these CNG projects, SBCAPCD also had to address the lack of infrastructure for CNG vehicles. Five CNG fueling stations were built using Program funds. Still, quality control problems caused several stations to shut down temporarily while technical specifications were modified. Another project for a CNG crew boat to service Exxon's offshore oil platforms was canceled when Exxon's needs changed, and no suitable technology could be found to meet their new needs. A mobile source pollution prevention project was also canceled for funding reasons.

V. Evaluating Program Effectiveness

Projects funded by the Clean Fuels and Energy Program agree to active supervision by SBCAPCD. As part of this supervision, SBCAPCD collects data on the emission reductions achieved by each technology. Given the variety of projects funded under the Program, no single data collection method is used across all of the projects; but SBCAPCD evaluates all of them for reductions of ozone precursors, toxic emissions, carbon monoxide, and hydrocarbons. SBCAPCD has not encountered any significant obstacles in evaluating

the Program's success, largely due to the active supervision and involvement of SBCAPCD staff in the process of measuring project results.

The program does not have specific numerical goals for emissions reductions. However, using data collected by the Clean Fuels Database, SBCAPCD can document that the program has reduced ozone precursors by ≈ 300 tons per year, toxic emissions by ≈ 1.5 tons per year, greenhouse gases by $\approx 3,000$ tons per year, and carbon monoxide by ≈ 70 tons per year.

VI. Program Impacts

The Clean Fuels and Energy Program actively seeks to reduce the burden on the regulated community by developing alternatives to the command-and-control approach for reducing air pollution. As a result, the program's impacts on the regulated community have been primarily positive. Technology manufacturers receive support in developing markets for their products. Users receive financial support to purchase new equipment and technologies, and some firms realize additional savings from the reduced operational expenses of the innovative technologies. Since its inception, the program has facilitated the creation of two new businesses and 20 new jobs and has provided assistance for several former defense contractors to convert their technologies into civilian applications. The general public has benefitted from significant improvements in air quality, as well as from the economic benefits mentioned above.

VII. Advice and Lessons Learned

SBCAPCD learned that every project should be a cooperative effort involving everyone from original technology manufacturers to end users, as well as regulators from federal, state, and local governments. SBCAPCD also learned the importance of leveraging funding. While the initial donation from the two oil companies was substantial, SBCAPCD would not have been able to accomplish so many objectives without procuring additional funds from a wide variety of sources. Although the initial donations made by Exxon and Chevron provided SBCAPCD with a unique opportunity to fund an extensive emissions reduction program, the basic principals underlying the Clean Fuels and Energy Program should be applicable in other air quality districts and on a smaller scale.

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Chapter Four

Financial Incentives

ON-ROAD VEHICLE INCENTIVE PROGRAM

SACRAMENTO, CALIFORNIA

I. Background

In 1995, the California Legislature passed a law prohibiting any state agency from requiring employers to implement trip reduction plans. At that time Sacramento was a federally designated severe ozone non-attainment area, where mobile source emissions caused 70% of ground level ozone. Given the region's need to reduce emission from mobile sources, the Sacramento Metropolitan Air Quality Management District (SMAQMD) decided to adopt several voluntary, incentive-based programs for preventing pollution from mobile sources. Although heavy-duty vehicles were a small percentage of mobile sources, they were responsible for a disproportionately high share of ozone precursors, such as volatile organic compounds (VOCs) and nitrogen dioxide (NO_x). As a result, SMAQMD instituted programs that offer financial incentives for the purchase of low emission heavy-duty vehicles. The On-Road Vehicle Incentive Program is one such initiative. A case study on SMAQMD's companion incentive program for retrofitting heavy-duty off-road vehicles is also included in this report.

II. Program Description

SMAQMD's On-Road Low Emission Heavy Duty Vehicle Incentive Program provides financial support for qualified entities to purchase new low emission vehicles, new low emission engines, or retrofit technologies that significantly lower NO_x emissions. The goal of the program is to provide economic incentives strong enough to convince vehicle owners to replace or upgrade heavy-duty vehicles so as to reduce ozone pollution in Sacramento.

To qualify for replacement or upgrade incentives, vehicles must have a gross weight greater than 14,000 pounds, and they must operate at least 75% of the time or travel at least 75% of their vehicle miles within the Sacramento Federal Non-Attainment Area during a period of at least five years from the date of application. Replacement engines must either be certified for sale or be under experimental permit for operation in California.

Replacement engines must also achieve at least a 40% reduction of NOx emissions compared to the applicable standard for that engine year and job, as demonstrated by California Air Resources Board (CARB) or USEPA certification testing or by emission testing at a laboratory approved by the USEPA, CARB, and/or SMAQMD. Retrofit technologies must be CARB certified or be warrantied by the original engine manufacturer/authorized dealer. The purchase of replacement engines cannot be otherwise required by any local, state, and/or federal rule or regulation. In the case of public agencies, the purchase cannot be required by any other legal authority.

Participants are eligible for incentives up to \$100,000 per vehicle. Incentive amounts awarded to qualified applicants are generally the lower of the incremental cost associated with implementing low-emission technology or the initial incentive amount. The initial incentive amount is calculated by multiplying the vehicle's annual NOx reduction by \$10,000 per ton and then dividing the result by a capital recovery factor. The figure of \$10,000 per ton represents the initial NOx reduction value set by the Air Pollution Control Officer (APCO) and can be raised or lowered by the APCO as the costs of emission reduction technology change.

Incentive awards may be adjusted to accommodate changes in fuel costs associated with implementing low-emission technology. Adjustments may be made to cover increases or decreases in fuel costs over a three-year period, after which point participants become responsible for any further increased costs and benefit from any further savings. To encourage certification of vehicles to CARB's low-emission standards, applicants for incentives may also receive a \$1,000 increase for each engine that is certified. The total incentive, including fuel adjustments, cannot exceed the initial NOx reduction value. Applications exceeding that NOx value may be submitted but will be evaluated and funded separately from the On-Road program. Similarly, applications for purchases above the \$100,000 maximum are encouraged but will be evaluated and funded separately.

SMAQMD often has the opportunity to assist unqualified applicants find alternative funding sources. For example, SMAQMD awarded Raley's Supermarkets a \$600,000 grant toward their purchase of ten liquefied natural gas (LNG) vehicles and the construction of a LNG fueling station. When appropriate, SMAQMD will attempt to leverage funds through inter-agency cooperation. For example, the Sacramento area school bus consortium received funding from the state and SMAQMD to purchase new buses fueled by compressed natural gas.

III. Authority, Funding and Staffing

The budget for this program is \$300,000, which covers cash incentives awarded to qualifying applicants, SMAQMD staff overhead expenses, and technical support from Accurex Environmental. Funding is obtained through a \$4.00 surcharge imposed on motor

vehicle registration, which is earmarked for air quality management and improvements throughout Sacramento County. The only authority needed to establish the program was SMAQMD Board approval.

In some cases, implementing new on-road engine technologies has required the development of supporting SMAQMD regulations. For example, in the case of Raley's Supermarkets, inspection and licensing procedures had to be developed for the LNG fueling station to ensure adequate protection of public health and safety, worker health and safety, and the environment. While this posed difficulties for SMAQMD, the need to enact supporting regulations is likely to diminish as low-emission technologies and the regulatory procedures they require become more commonplace.

One SMAQMD staff person has primary responsibility for this program, but applications that have been reviewed by agency staff must be sent through the district's chain-of-command to obtain final approval. Additional assistance is sometimes required from professional accountants when calculating incentive amounts, and technical support has been provided by Accurex Environmental. Otherwise, one SMAQMD air quality control engineer has proven sufficient to manage the program.

IV. Barriers Encountered

The lack of infrastructure available to support alternatively fueled vehicles deters qualifying entities from participating. Furthermore, because there are few alternatively fueled vehicles on the road, there is little incentive to build supporting infrastructure. In order to overcome this hurdle, the City of Sacramento is building a LNG fueling station and purchasing city-owned LNG vehicles under this program. Nevertheless, federal funding may be required to overcome this barrier.

V. Evaluating Program Effectiveness

SMAQMD calculates the tons of NO_x reduced per year by each participating vehicle through simple audits, which ask for vehicle miles traveled (VMT) and fuel consumption over a five year period. These figures are used to calculate each vehicle's emission rate, which is then compared against the emission rate of the vehicle that it replaced. The difference in these two figures represents the tonnage of NO_x pollution reduced by that vehicle's participation in the incentive program. The sum of all participating vehicles' emission reductions equals the total tonnage of NO_x pollution eliminated from the atmosphere by the program. The program's ultimate goal is to reduce NO_x emissions by five to seven tons per day by 2005. To do this, four out of ten trucks on the road must meet low emissions standards. This goal has not yet been reached.

VI. Program Impacts

The citizens of Sacramento benefit from cleaner air as a result of the on-road incentive program. Because participation in the program is voluntary, it does not impose any constraints on the regulated community. As for those who choose to become involved, the burden of participation is minimal, because vehicle owners' only ongoing duty is compliance with auditing, which relies on information already kept by vehicle owners for other purposes.

VII. Advice and Lessons Learned

Progress in reducing NO_x and ozone will be slow due to the lack of infrastructure available to support an increase in low-emission vehicles on the road. In order to avoid a "chicken and egg" infrastructure problem, government agencies, air quality districts, industry, and the public will have to commit to making the technological advances necessary to accommodate the program. Cost sharing with the federal government would be especially effective in this respect. In order to obtain industry support, the program should be presented as business-friendly with emphasis on the fact that it is voluntary and does not entail enforcement.

The program may not achieve its full potential for emission reductions because there are few new heavy-duty engines available on the market that reduce emissions by 40% over the standard diesel engines in use. Agencies developing similar programs should beware not to set mandatory emission reduction levels too high, because overly strict standards may be technologically infeasible. Standards can always be adjusted later to accommodate improvements in technology.

SMAQMD's on-road program has also suffered from excluding non-Sacramento based vehicles from participation. Although mobile sources are responsible for 70% of the region's ozone non-attainment problem and 40% of ozone is produced by 4% of vehicles, a significant percentage of the vehicles contributing to this problem do not operate exclusively in the Sacramento Air District and, thus, cannot qualify for the program. It would therefore be preferable, from an air quality standpoint, to develop a similar program in nearby air districts so that owners of heavy-duty vehicles throughout the entire region could participate. SMAQMD advises that programs similar to this one be implemented over entire transportation corridors instead of in isolated districts.

As for administrative concerns, SMAQMD advises that similar programs be streamlined as much as possible to avoid delays in granting incentive awards. An expeditious process for reviewing and approving incentive applications is critical to getting low emission vehicles on the road, and, thus, to the program's ultimate success. Provided

these guidelines are followed, this type of program should work well in other areas, and particularly in communities that are environmentally conscious.

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OFF-ROAD VEHICLE INCENTIVE PROGRAM

SACRAMENTO, CALIFORNIA

I. Background

Metropolitan Sacramento is among the worst areas in the United States for ground level ozone. It is presently designated a severe ozone non-attainment region by the U.S. Environmental Protection Agency (USEPA), but must severely undercut its current pollution level to meet its obligatory ozone attainment date of 2005. One major area calling for air quality improvements is the mobile source sector, which is responsible for the majority of the region's emissions. In particular, heavy duty off-road vehicles, which are used primarily in agriculture, construction, and mining, mandate attention. Modeling by the Sacramento Air Quality Management District (SMAQMD) indicated that 70% of ozone precursors emitted by mobile sources in the region were released by heavy duty off-road vehicles. Lacking any direct ability to regulate ozone pollution from these vehicles, SMAQMD turned to voluntary, incentive-based methods for reducing their emissions.

II. Program Description

In November 1996, the SMAQMD Board of Directors adopted the Off-Road Motor Vehicle Repower and/or Motor Vehicle Engine Retrofit Incentive Program to provide financial incentives for owners of heavy duty off-road vehicles to repower (engine replacement) or retrofit their vehicles with lower emission technology. By lowering the costs associated with repowering and retrofitting, this program gives vehicle owners an incentive to reduce their emissions. The reason for focusing on the replacement or retrofitting of old engines, rather than the purchase of new vehicles, is that heavy duty off-road vehicles typically have their engines rebuilt multiple times before being replaced. Program strategy, therefore, reflects the reality of what changes vehicle owners are actually likely to make. The decision whether to replace or retrofit an engine depends primarily on cost. When the cost of rebuilding an engine reaches 50% of the cost of purchasing and installing a new engine, buying a new engine becomes the economical choice for an upgrade due to fuel savings and the warranty, which reduces operational expenses and risks.

To qualify for an incentive award, a vehicle must be self-propelled and must operate within the Sacramento non-attainment area at least 75% of the time for five years from the date of the application. The engine must be attached to the drive wheels and rated at over 50 horsepower. New engines must be USEPA certified for sale in California and replace a non-certified engine. Installed retrofit packages must provide at least a 40% reduction in NOx emissions, with no significant increase in particulate emissions. All engines,

whether new or retrofitted, must be under warranty from the original engine manufacturer or an authorized dealer. Purchases required by another regulation do not qualify for an incentive. Additionally, the owner must waive the rights to any emission reduction credits accrued through participation in this program.

SMAQMD calculates the incentive award for vehicles based on horsepower for repowers and horsepower and percentage emission reduction for retrofits. Incentives range from \$1,000 to \$7,000 for repowers and from \$1,000 to \$14,000 for retrofits. An award may not be greater than the total incremental cost of participation, which is defined as the initial installed cost of the new equipment minus the estimated hardware and labor costs that would have been incurred if the engine had been rebuilt. If the maximum allowable award is greater than the incremental cost, the vehicle owner will receive an award equal to, but not exceeding, the incremental cost.

III. Authority, Funding and Staffing

The SMAQMD Board of Directors appropriated \$100,000 for the Off-Road Vehicle Incentive Program. The funding comes from a \$4.00 dollar surcharge exacted on each vehicle registered in Sacramento County. California law provides that these funds be used to fund mobile source emissions reduction programs.

In order to maximize the amount of incentive funding available, SMAQMD operates with a lean staff. One full-time staff person is specifically assigned to the Off-Road Vehicle Incentive Program, and a supervisor splits time among this and several other programs. Their staff time is supported by SMAQMD general operating funds. Others in SMAQMD's Mobile Source Division help with the program as needed.

In addition to the daily operations of the incentive program, SMAQMD staff must stay in contact with vehicle manufacturers, dealers, and owners to stay abreast of technological changes and overhaul schedules. SMAQMD staff also operate a new marketing campaign that places brochures about the program on counter tops at vehicle dealers to raise awareness about the program among vehicle owners and dealers.

IV. Barriers Encountered

The vehicle owners targeted for these incentives are generally suspicious of any government program. Thus, earning their trust was key to the successful implementation of this initiative. Another barrier has been the difficulty of installing new engines in old vehicles. Engineering a new engine into an old chassis can be very challenging, and sometimes impossible. As a result, some vehicles have not been able to participate.

Because most heavy duty off-road vehicles perform seasonal work, starting the program in November created some initial difficulties by putting SMAQMD out of sync with most vehicle owners' maintenance schedules. Companies generally perform major equipment overhauls in the winter months, and they plan such overhauls six or more months ahead. However, if an engine fails during the work season, most owners cannot afford to wait for a new engine to arrive and must overhaul their engines immediately. Aware of these factors, SMAQMD has learned to make the most of the limited opportunities presented by seasonal work patterns.

V. Evaluating Program Effectiveness

USEPA and CARB have good baseline emissions data for most old and new engines. Retrofit packages must also provide emissions data from tests on engines with the retrofit installed, and the tests must be either done or approved by CARB, USEPA, or SMAQMD. To determine the environmental benefits associated with the program, SMAQMD compares these test results to the baseline emissions data for a particular make and year of engine. SMAQMD then calculates the difference between the baselines of the old and the new, or retrofitted, engines to measure the amount of emissions reduced. These comparisons and calculations are made easy by the fact that new engines must be roughly the same size and have a nearly equal horsepower ratings to old engines in order to be suitable replacements. Because old engines only have one or two potential replacements, choosing which baseline data to use is simple. SMAQMD calculates the cost effectiveness of the awards by dividing the incentive amount, in dollars, by the emissions reduction, in pounds, with a capital cost recovery factor figured into in both. The cost effectiveness for projects funded so far ranges from \$1,200 to \$4,650 per ton of NO_x reduced.

VI. Program Impacts

The off-road vehicle incentive program has increased awareness of the air pollution problems affecting the Sacramento region and has taught many vehicle owners how to reduce their emissions. As such, the public has benefited from improved air quality as a result of the program. Vehicle and engine dealers have also benefited from increased orders for new engines and retrofit packages.

VII. Advice and Lessons Learned

SMAQMD advises other agencies adopting similar incentives for reducing air pollution from off-road vehicles to ascertain the specific needs of the vehicle owners and to design their programs based on those needs. As such, SMAQMD suggests involving equipment owners in the initiative from the early stages of program development and all

throughout program execution. Instead of limiting their roles to program team members, agencies should allow them to form the core program team and use agency staff as their consultants. Involving vehicle and engine dealers would also serve agencies well, because these sectors have a vested financial interest in such a program's success and, thus, might take active steps to ensure that it works. This same type of program could be used anywhere to reduce air pollution from both industrial and agricultural equipment.

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TELECOMMUTING INCENTIVE PROGRAM

SACRAMENTO, CALIFORNIA

I. Background

In 1995, state and federal regulators shifted away from employee trip reduction regulations as a method of minimizing vehicle miles traveled (VMTs). At that time, Sacramento had a severe ozone problem and could not afford to overlook the air pollution resulting from employee commuting. As such, the Sacramento Metropolitan Air Quality Management District (SMAQMD) began to look for other ways to reduce emissions from mobile sources used to transport employees to and from work.

II. Program Description

In 1996, SMAQMD launched the Telecommuting Incentives Program (TIP) to encourage businesses to allow their employees to use home-based telecommuting to decrease the number of commuter trips. Under TIP, businesses receive \$250 per employee who forgoes commuting to the office to work from home for one day per week over the course of an entire year. Employees may earn multiple awards for telecommuting on more than one day per week over the course of an entire year, but businesses may not earn more than \$1000 per year for any single employee. Businesses are also limited to a total award of \$5000 per year, even if their total employee-days telecommuted would earn an award in excess of that amount at a rate of \$250/employee/day telecommuted. Employers can earn the \$5000 maximum by having 20 employees telecommute one day per week, by having five employees telecommute four days per week, or by any other combination totaling 20 days telecommuted per week. Awards are only given for the first year of each employee's telecommute. By operating TIP, SMAQMD hopes not only to reduce ozone pollution, but also to increase public awareness of telecommuting and the need to reduce VMTs.

To qualify for TIP, a place of business must be located in Sacramento County, but participating telecommuters need not reside there. Private businesses are the primary recipients of TIP awards. Local government agencies are also eligible for awards, but program policy is to limit the percentage of program funds awarded to public sector participants to 20%. Neither home-based businesses nor state or federal agencies are eligible for awards. TIP will continue to grant awards to eligible applicants as long as funding remains available.

Those awarded incentives must sign a memorandum of agreement stating that they will participate in annual audits and surveys. Both surveys and audits are one page long.

Surveys ask telecommuters to provide information about their VMTs on telecommuting days, and audits require employers to provide information on the status their employees' telecommuting efforts and how they have used their awards. Businesses are not required to get SMAQMD approval for how they use their awards, but they must maintain records of award-funded expenditures for three years.

III. Authority, Funding and Staffing

The only authority needed to establish the TIP was approval by the SMAQMD Board. The Board also allocated \$150,000 for TIP. This budget came from funding SMAQMD receives through a local sales tax called Measure A. Under Measure A, SMAQMD receives one half of one percent of the tax to fund air quality related projects. Now that the budget has been appropriated, the program will continue until all funds have been depleted. In order to preserve as much funding as possible for incentive awards, SMAQMD has sacrificed a formal marketing budget for TIP. As a result, SMAQMD must continually work to publicize the program through as many different sources as possible. Staff mostly rely on press releases and business contacts to publicize the program. Funds for SMAQMD personnel time and other indirect costs come out of SMAQMD's general overhead.

TIP does not require a large staff. An Air Quality Planner is the only SMAQMD staff specifically assigned to the program. An undergraduate intern provided further support during the distribution, collection, and tabulation of the first audits and surveys. Support of this nature will be needed again for future auditing and survey work. With this support, the TIP staffing level has been adequate for the most part, but sometimes additional SMAQMD Mobile Source Division staff members are needed.

IV. Barriers Encountered

SMAQMD faced several program design questions concerning the types of businesses, government agencies, and commuters who should be allowed to participate. SMAQMD knew that employers often reject the idea of telecommuting when first presented for fear of decreased productivity, increased costs, or both. So TIP needed to provide a strong enough incentive to mollify employers' fears. SMAQMD also struggled with the question of whether or not to require participants to provide proof of telecommuting expenditures before disbursing awards.

V. Evaluating Program Effectiveness

SMAQMD uses the data collected through employee surveys and employer audits to estimate the reduction of VMTs. These estimates are then used to calculate emission reductions. Using VMT and emission reduction data, SMAQMD is able to measure the cost effectiveness of the program by calculating the cost per pound of emission reductions.

Estimated Emission Reductions Over Life of Program (5 years)	
Total emissions reduced	16.7 tons (3.3 tons/yr)
Ozone precursors reduced	4.6 tons (.9 tons/yr)
Miles NOT driven (avg.)	1,800,000 miles (362,000/yr)
Incentive Disbursement	
Total amount remitted	\$76,750
Percentage of total program amount remitted	51%
Approximate Cost Effectiveness	
Cost per pound of reductions	\$8.35

This data may be slightly skewed, because SMAQMD only obtains about a 75% response rate to the surveys and audits. As such, the available data may not comprise a perfectly representative sampling. Nevertheless, SMAQMD does not find this problematic, because even the most conservative estimates indicate that TIP has significantly reduced VMTs and ozone precursors and has proven to be cost effective.

Anecdotal information also indicates an increase in productivity on the part of telecommuters. This trend may lead to further success of the program, because employers may choose to have their employees continue telecommuting after the first year in order to maintain high productivity levels. Employers may even elect to increase the number of employees who telecommute. This pattern could work especially well in SMAQMD's favor if employees who have the desire to telecommute bring TIP to the attention of their employers. In such cases, the economic incentive combined with the propensity for high productivity could entice more and more employers to participate in TIP.

VI. Program Impacts

The voluntary nature of the program means that no business is adversely impacted by TIP. Those businesses that elect to participate have done so based on overwhelmingly positive impacts. Those that do not associate benefits with TIP simply choose not to be

involved. Many employees have enjoyed the opportunity to work from home for some part of the week. The public has also benefitted through lower emissions and slight decreases in traffic congestion.

VII. Advice and Lessons Learned

SMAQMD is considering whether even better results might be achieved by increasing the amount of each incentive award to \$500 per employee per day telecommuted or by changing the system for calculating awards all together to make awards on a mileage saved basis. Another option might be to offer smaller awards to employees who already telecommute and to home-based businesses. Agencies wishing to implement a telecommuting program should, therefore, pay significant attention to designing an appropriate awards package. Technicalities that should be addressed include: the exact amount of incentives to be awarded; whether to build in the opportunity for award renewals; and if a two-tiered program -- one for current telecommuters and another for new telecommuters -- would suit that area.

SMAQMD also advises other localities considering a similar telecommuting incentive program to start off by accruing active support of the local business community. Agencies should work with the local Chamber of Commerce and other business associations to build the political support necessary to carry the proposed program through the political process. Agencies should also communicate with telecommuting experts, including computer experts, telephone companies, and transportation specialists, to understand the technical aspects of such a program. Lastly, if the necessary resources are available, an agency should aggressively market the program and provide assistance to employers with telecommuting assessment and policy development.

Although Sacramento does have several unique qualities that predispose its businesses and residents to support TIP, a similar program should work in most areas. Other agencies should simply recognize the different dynamics that could arise when implementing a program elsewhere. For example, other populations could lack the basic understanding of air quality issues that Sacramento residents have because air quality problems regularly make the local news. Agencies should also be aware that SMAQMD had the active support of the area's five local Transportation Management Associations.

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BICYCLE COMMUTING INCENTIVES

SACRAMENTO, CALIFORNIA

I. Background

In 1995, the California Legislature passed a law prohibiting any state agency from requiring employee trip reduction plans. Because Sacramento is a federally designated severe ozone non-attainment area, the Sacramento Metropolitan Air Quality Management District (SMAQMD) decided to substitute voluntary ozone reduction programs for the newly prohibited regulations. Because most of the region's ozone precursors come from mobile sources, SMAQMD decided to create incentives to encourage bicycle commuting as an alternative to driving cars.

II. Program Description

SMAQMD set up three separate incentives for bicycle commuters: Bike Rack/Locker Rebates which lasted from 1995 to 1996, new Sacramento Area Bikeway Maps, and Bicycle Carriers for Buses which just started in 1997. All three programs are designed to increase bicycle commuting and to encourage those who already use their bicycles for transportation to do so more frequently. These programs address the most common obstacles to bicycle commuting: the challenge of navigating metropolises safely; difficulty using buses for segments of commutes that are too far or hard to bike; and bicyclists' fear of theft due to a scarcity of safe bike storage space at work places, retail locations, and other destinations.

The Bike Rack/Locker Rebate program provided businesses with financial assistance to purchase and install bicycle racks or lockers. Provided businesses agreed to maintain the equipment for at least one year, SMAQMD paid 90% of the original equipment costs. SMAQMD performs follow-up inspections to ensure compliance and conducts surveys to determine how much the racks and lockers are used. SMAQMD has also established a database to ensure accurate tracking of the rebate program.

The Sacramento Area Bikeway Maps program replaced an outdated bikeway map previously in circulation. In 1996, SMAQMD worked with the Sacramento Area Council of Governments, the city and county of Sacramento, the Sacramento Area Bicycle Advocates, and an advertising agency to develop new, updated bikeway maps. In addition to officially designated bike routes, these maps highlight streets commonly traveled by bicyclists. The working group designed a brochure with pockets that contain six individual maps, so as to facilitate periodic updates without the need to redesign and republish the entire packet. This format also allows surrounding areas to be added later

on. The maps are free and are widely available throughout the Sacramento area, on the Internet, and in the Yellow Pages.

Under the Bicycle Carriers for Buses program, SMAQMD and the Sacramento Regional Transit District (RT) are pooling their resources to purchase and install bicycle carriers on all of RT's 200 buses at the same time. The carriers will allow bicyclists to use busses for portions of longer commutes and to travel safely on major thoroughfares and during occasional weather extremes.

Although each program has its own unique qualities, SMAQMD's true innovation lies in the integration of the entire effort. The program is not designed simply to sustain linear growth of bicycle commuting by making it somewhat easier, but rather it represents an attempt to create exponential growth in bicycle commuting by simultaneously eliminating as many barriers as possible.

III. Authority, Funding and Staffing

None of the three programs required additional legal authority. Approval of the RT Board of Directors was needed to transfer \$145,000 from an existing RT grant to SMAQMD for the Bicycle Carriers for Buses Program. Funds for the Bike Rack/Locker Rebates, totaling \$300,000, came from Measure A, which provides SMAQMD with one-half of one percent of the proceeds from a local sales tax. \$30,000 was spent printing the bike maps, and any further funding needed for additional Bikeway Map sections will likely come from Measure A funds. Funding for staff time comes from SMAQMD's general operating budget. All three programs are run primarily by a single SMAQMD employee, with the help of one assistant. SMAQMD management has provided advice and made policy decisions at various times.

IV. Barriers Encountered

The Bike Carriers for Buses Program had to overcome several concerns of bus drivers. In order to do so, SMAQMD launched a pilot project that outfitted a few buses with bicycle carriers and allowed bus drivers to test the equipment on the streets. Having sampled the carriers, many bus drivers became much more receptive to the program.

V. Evaluating Program Effectiveness

SMAQMD measures the cost effectiveness of these programs in dollars per pound of emissions reductions (total program dollars/total emissions reductions in pounds). The district's goal is to spend under \$10 per pound of emissions reduced. Though few

supporting data exist, SMAQMD firmly believes that all three programs meet or exceed this cost effectiveness goal.

Quantifying cost-effectiveness is extremely difficult, because it is very hard to define the level of emission reductions resulting directly from these three programs. One reason for this is that it is very challenging to measure how much bicycle commuting has increased because of the new Bikeway Maps. SMAQMD could attempt to collect such information through a detailed survey of bicycle commuters, but it would still be difficult to isolate all the variables and determine the specific effect of the Bikeway Maps on bicycle commuting.

Given SMAQMD's inability to definitively quantify emission reductions attributable to the program, officials are using participation levels to gauge program success. For example, SMAQMD will survey the businesses receiving rebates through Bike Rack/Locker Rebate program to calculate usage of the bike racks and lockers. Officials expect to have tabulated these results by early 1998.

VI. Program Impacts

Given the voluntary nature of all three programs, their impacts on the business community have been minimal. The Bike Rack/Locker Rebates only require limited caretaking by host businesses. As demonstrated by the pilot project for the Bike Carriers for Buses program, this specific initiative has no detrimental impact on the transit service. The Bikeway Maps are a free service to the public and entail no impacts on business. Both bicyclists and citizens who do not ride bikes benefit from all three programs, because they improve air quality in Sacramento and reduce traffic congestion.

VII. Advice and Lessons Learned

These programs have taught SMAQMD the importance of developing cooperative relationships with other local agencies and the business community. SMAQMD found that coordinated efforts can facilitate public participation, create political support for a bicycle commuting program, and allow for the leveraging of various funding sources. A similar program could work in another area of the country, although Sacramento is ideally suited to bicycle commuting due to its favorable climate and flat topography.

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Chapter Five



Training

UNIFORM AIR QUALITY TRAINING PROGRAM

CALIFORNIA AIR RESOURCES BOARD

I. Background

Shortly before the inception of the Uniform Air Quality Training Program (UAQTP), the California Air Resources Board (CARB) evaluated each air quality district in the state and discovered that enforcement policies and practices were inconsistent among the districts. Both EPA and CARB recognized a need for consistent training that would be affordable and available to small districts as well as large districts in California. Local air districts and enforcement managers also recognized the need for uniformity statewide. The UAQTP was developed to meet this need for consistent compliance and enforcement education in all districts.

II. Program Description

The Uniform Air Quality Training Program provides standardized air quality compliance/enforcement training to inspectors, as well as staff from other government agencies and private industry in California and throughout the United States. The program is divided into a series of three courses that progressively become more advanced and more specialized. The 100 series is a basic introduction to air pollution control, which is mainly video-based so that a consistent message is transmitted to all participants. The 200 series offers more process-specific courses and includes field inspections at actual facilities. There are over 35 different 200 series courses, each concentrating on a different type of process or facility, such as a drycleaner. These courses explain both the type of equipment used and what to look for during an inspection. The 300 series features more advanced topics and is taught by experts in the field of study. Course take the form of workshops or symposiums and include workshops on specialized topics such as mutual settlements, hearing boards, and Phase II vapor recovery. There is no test at the end of the 300 series, as there is in the 100 and 200 series.

Classes generally cost industry participants about \$100 per day, but small businesses receive a discount of 50% (or more if needed). Courses are complimentary for California's

air pollution control district personnel, but they must pay for any travel expenses incurred. Typically travel costs are low, because courses are offered in 15 different locations around California, and when taught in other states they are offered where most of the participants are located.

The Uniform Training Program is innovative because it establishes a standard curriculum for compliance and enforcement training among air quality control jurisdictions. By standardizing this type of education, CARB has been able to provide participants with a consistent knowledge base and set of fundamental procedures to use in enforcing and adhering to air pollution laws and regulations. The 200 series is especially unique in its emphasis on field inspection, which helps participants connect academic information with the practical aspects of compliance and enforcement. The program is also unusual in its focus on convenience for participants. By eliminating the need for extensive travel to training courses, CARB has decreased the cost of participation and made the program more attractive to potential participants.

CARB began the program in November 1986 with the 100 series taught solely in California. After two years, at which point the audience for the 100 series was fairly saturated with information, CARB introduced the 200 series in California. Then, in 1992, under an EPA grant, CARB began a pilot program to offer the courses to other states. In order to render course material useful outside of California, the 100 series was modified to make it generic to all states. Prior to delivering a 200 series course in a state, the state or local agency provides CARB with its set of rules so that they can be included in the course. The 200 series offered to other states includes a field inspection component as in California.

In the beginning of the program, the course was offered only to regulatory officials. Soon industry managers expressed a desire for their employees to participate so they would be knowledgeable about the regulations to which they are subject and would be able to recognize and resolve potential problems before they become unmanageable. Pursuant to this request, CARB made training courses available to industry as well.

III. Authority, Funding and Staffing

No legislation or regulations have been needed for the program. CARB has received EPA grants for various stages of the program, including the development and production of the original video for the 100 series and for delivery of training sessions in other states. CARB spends approximately \$500,00 each year on course instructors and spends approximately \$80,000 a year to update the video used in the 100 series and to create new videos for the 300 series. Some of CARB's operating budget has also been spent on CARB staff time.

In the beginning of the program, not much staff was needed; only one person was required to develop the video for the 100 series. As more courses have been added, staff resources dedicated to the program have increased. For the in-state training program, CARB employs seven full-time staff instructors. In the national program, the courses are delivered by the equivalent of two full-time employees. All of the out-of-state instructors are retired air pollution control officials who work part-time for the training program. At present there is sufficient staff to run the training program, but CARB is always looking for former air pollution control officials to serve as faculty for the national program.

IV. Barriers Encountered

The main barrier to the program has been convincing district managers to endorse the training program and to send their personnel to the courses. At the beginning of the program, CARB obtained a commitment from the major districts in California to send their staff so that courses would be well attended. Even though participation has escalated significantly, CARB must continually maintain an outreach effort to convince supervisors to release their employees for training purposes.

V. Evaluating Program Effectiveness

In Evaluating Program Effectiveness, CARB looks to two main indicators of success: participant satisfaction with the courses, and the extent to which improved training reduces the frequency of air quality violations. In order to gauge satisfaction with the program, CARB asks participants to complete evaluations for each course attended. The board relies on this feedback to determine if the program is working or if changes need to be made. Popularity can also be judged by attendance levels. The fact that course attendance has burgeoned over the past five years indicates that participants have been pleased with the experience. As a result of wide-spread attendance, California's enforcement policies for air pollution laws have become standardized state-wide.

The program's effectiveness will ultimately depend on the extent to which government and industry participants are able to apply course material to reduce air pollution in their jurisdictions. Theoretically, inspectors' performance should improve from a greater understanding of the rules and regulations in place. CARB has heard from supervisors who have noticed an increase in staff competency and knowledge resulting from the courses. Industry personnel who take the courses should also be better prepared to prevent and halt violations in their facilities.

CARB has found it logistically difficult to measure the success of the training course given the lack of concrete and quantifiable indicators of effectiveness. The most

challenging aspect has been determining whether emissions actually decrease as a result of inspectors' and industry personnel's improved knowledge and expertise of topics covered. CARB has considered doing a study to determine if there is a difference in emissions between facilities where inspectors and industry personnel have been trained and where they have not, but no funding is available for this project. A similar study which was done to determine the effectiveness of compliance assistance manuals for specific categories of air pollution sources found a 34% decrease in emissions for those using the manual.

VI. Program Impacts

High attendance rates by industry personnel suggest that the regulated community has enjoyed the opportunity to take CARB training courses. Members of the public and citizens groups also benefit from the program, as evidenced by their desire to attending training courses to learn more about air pollution problems. Although public participation is not a standard component of the program, CARB has allowed interested citizens to attend training courses. Lastly, the retirees who instruct training courses for the national program benefit from the chance to work part-time in their area of interest.

VII. Advice and Lessons Learned

It is important to build widespread support for a training program from the start. CARB believes there should be a top-down commitment to devote the resources necessary for a quality training program. Supervisors need to be reminded that training is important so they will allow and encourage their employees to participate. Historically, the first budget cuts that are made are to training. Agencies wishing to implement a program similar to UAQTP should be aware of this fact and make efforts to prevent limited resources from undermining the program's success.

Agencies wishing to offer similar courses should also focus on designing up-to-date and innovative programs. Material for ongoing courses should be updated consistently so that it remains current. CARB's course catalog indicates which courses have been updated so as to remind former participants to come back for further instruction.

Rather than hiring independent contractors as course instructors, agencies should have qualified teachers on staff to conduct training. While many contractors are qualified to teach courses on air pollution control, using a variety of independent teachers would detract from the consistency of the course material being offered. Using in-house staff as instructors ensures that courses are given in a uniform fashion. Hiring retired air quality control officials as instructors has worked well for CARB because the retirees have the necessary expertise and ample time to devote to the program. Provided agencies maintain

a team of trainers on staff and secure widespread management commitment to supporting uniform training, this type of initiative should work well in other areas.

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ASBESTOS TRAINING

PUGET SOUND AIR POLLUTION CONTROL AGENCY

I. Background

A few years ago, many members in the contracting community, including property managers, project designers and architects, were unaware of even the most basic asbestos requirements. This lack of understanding combined with enforcement actions for failure to comply with asbestos regulations led to such ill feelings that the Associated General Contractors (AGC) lobbied the Washington State Legislature to stop funding for the Puget Sound Air Pollution Control Agency (PSAPCA). The (then new) agency director established lines of communication with the AGC and, building on his credibility with the AGC established in a former capacity, pledged to improve working relations with them. As a result, PSAPCA and the AGC agreed to work together to educate and inform general contractors, building owners, property managers, and project designers about asbestos requirements, regulations, and potential pitfalls in asbestos treatment and removal.

II. Program Description

To start this program, PSAPCA and the AGC agreed to a contract with three primary elements: (1) to develop a training curriculum designed for non-asbestos contractors, architects, building owners, and people who manage every type of property from private buildings to institutional managers, including university campuses; (2) to teach courses throughout the four-county area where PSAPCA has jurisdiction; and (3) to revise the outdated asbestos pamphlet providing general contractors with a field manual on dealing with asbestos.

Involving trade organizations in this manner is a hallmark of how the PSAPCA likes to deal with the regulated community. PSAPCA has found that general contractors and other trades people usually perceive their trade organizations as much more credible than regulatory agencies. Thus, the PSAPCA prefers to undertake major projects through partnerships with trade organizations, using them to as a conduit to get relevant information to their members.

A. Asbestos Field Manual

Under the contract with PSAPCA, the AGC significantly revised and updated the asbestos information pamphlet that had previously been available. The new "Guide to Handling Asbestos-Containing Material" is a 14-page field manual with explanations for non-asbestos contractors on how to deal with asbestos encountered in renovation projects. The basic message of the pamphlet is leave the asbestos alone and let a specialized asbestos

contractor handle it. The AGC put their logo and seal on the cover of the pamphlet, to clarify that it is the trade organization who is advising general contractors (their members) on how to deal with asbestos. The pamphlets cost \$1.10 to \$1.25 each, depending on the number printed in a particular run. In total, PSAPCA and the AGC have ordered over 1000 brochures for classes, agency personnel, and one-on-one compliance education.

All class attendees receive a copy of the brochure. PSAPCA also sends copies to people who request one over the telephone, and the AGC sends the manual to its members with a letter explaining how easy it is to run afoul of asbestos regulatory requirements. The field manuals are used in a variety of ways by the different recipients. In one case, a well-known retailer doing store renovations was cited \$1,500 for asbestos violations. Because of its environmentally sensitive image, the company welcomed a settlement whereby it paid the AGC for a tailored mailing of brochures to 500 smaller contractors and individuals in the area who were less likely to know about the classes or the asbestos regulations. Thus, the brochure allowed the company fund asbestos education in lieu of paying the standard civil penalty.

B. Asbestos Training

Using a subcontractor, who is a premier asbestos trainer in the Seattle area, the AGC offered 37 sessions of three-hour long asbestos education classes. Classes were held in AGC conference rooms and other public facilities, such as public libraries. In the beginning, there were about four classes a month but, in the last six months, there was only about one class per month because most target audiences had been reached. Although funding has largely ended and the original intent of the program (to teach classes, produce pamphlet, and deliver information) has been fulfilled, PSAPCA budgeted to provide five additional classes as needed during the 1998 fiscal year.

While the typical audience size was about 25 people per class, attendance was better in large areas (Seattle, Tacoma, Everett) than in the outlying small communities. To increase attendance in the smaller communities, the AGC lowered the "cut rate," the level at which attendance was deemed insufficient and class was cancelled, from the 10 or 12 to 6 people. The AGC Education Foundation also promoted the classes in small communities, using direct mail, foundation newsletters, and newsletters of other organizations. Because the AGC provides continuing education classes for industry, it already had a target list of people to contact. Staff also solicited advice from other organizations concerning who should be invited to the classes. In doing so, the AGC attracted subcontractors from a variety of trades, as opposed to general contractors. In order to obtain the best participation possible from the industry, the AGC tried not to put too much of a personal stamp on the course.

Anyone was welcome to attend the classes. Some asbestos contractors attended to see what the AGC and PSAPCA were telling non-asbestos contractors. PSAPCA also

utilized the classes in a number of ways. Some agency staff attended the classes to heighten awareness among of asbestos issues, to provide them with additional compliance and enforcement tools, and to increase consistency in their enforcement actions. Sometimes, the agency even offered the classes in lieu of monetary penalties for contractors who violated regulations. This alternative has been especially appropriate for first-time violators. The compliance division, customer service personnel who answer phone inquiries, and the legal staff have all been encouraged to use the training classes in lieu of penalties, where appropriate. PSAPCA is now trying to incorporate the classes into its existing regulatory system.

The program ran from July 1995 through June 1997, when the contract between PSAPCA and the AGC ended. Although the asbestos education program has nearly come to a halt, the AGC is looking for on-going opportunities to offer the training, particularly at larger contracting firms that experience a high turnover rate of construction personnel. This decision is partially budgetary, because there are more pressing air quality issues in the Seattle area, such as fugitive dust, that deserve attention. However, due to the success of the asbestos education program, PSAPCA and the AGC have now started working together on reducing fugitive dust from construction sites. Thus far, they have involved the Washington State Department of Ecology and other local agencies in the state of Washington. A contract has been signed for the AGC to deliver classes and written materials statewide.

III. Authority, Funding and Staffing

PSAPCA needed no new authority for the asbestos education program. Most funding came from "notification" fees (similar to permit fees) required of contractors to remove asbestos. The remaining funds came from a \$15 fee for attendance. The AGC charged this fee because they knew from prior experience that, when there is a nominal fee for a training course, the no-show rate is almost halved. The AGC often waived the \$15 fee, particularly when a class was provided for an association that guaranteed a minimum of 20 people would attend. Fees collected were used to fund unforeseen promotion and advertising costs, as well as refreshments and rental space.

The entire program budget was \$50,000. \$10,000 was used to develop the course, curriculum, overhead, and related expenses; the other \$40,000 was used to deliver up to 40 classes at \$1,000 per class. Of the \$1,000 spent on each class, \$450 was for course preparation (including collecting the materials) and delivery (teaching). Because the AGC had a good working relationship with the instructor, who had taught other AGC courses, they were able to hire the trainer at \$95 per hour, rather than the normal \$125 per hour. Of the remaining \$550, approximately \$200 was spent on publicity, \$100 on materials (including coffee and donuts), and \$250 on overhead (general and administrative). When there was an off-site class, renting a class room pushed the costs above \$250.

Staff expenditures were low. One PSAPCA staff person spent about 10% of his time on this project, and a few other people worked on it or attended the courses themselves. In all, the agency has spent the equivalent of less than one FTE on the program. If the PSAPCA had decided to teach and market the course, rather than work through the AGC, it would have required much more agency personnel time.

IV. Barriers Encountered

The earlier strained relationship between PSAPCA and the AGC was both a huge hurdle to, and a strong catalyst for, starting the asbestos education program. Prior to the program, the PSAPCA had little credibility among contractors, and there was doubt whether the agency could work in harmony with the AGC. While this dynamic posed a significant constraint, both the need to overcome poor relations and the need to impart credible asbestos information became rallying points for a successful relationship with the AGC. The two groups managed to overcome strained relations and credibility problems because the AGC trusted and respected the new PSAPCA director. A series of meetings where PSAPCA and the AGC staff worked together to develop the program also helped to relieve the strain. While PSAPCA was the program manager, the agency was flexible worked with the AGC as though they were partners. Early in the process, PSAPCA staff made themselves available for consultation and encouraged AGC staff to communicate ideas and issues. Before long, the communication was respectful, open, and friendly.

V. Evaluating Program Effectiveness

After an intensive two year effort, the various parties -- including general contractors, property owners, and PSAPCA staff -- have all become more aware of asbestos regulations and how to improve compliance. Based on the demand for the information (attendance at classes) and the attendees' response to information at the classes, PSAPCA staff believe that the information disseminated will be used by contractors and property managers to ensure that more asbestos is removed by asbestos contractors rather than general contractors. This, in turn, will result in lower exposure to hazardous material.

PSAPCA expects that this program will produce a much higher compliance rate within the contracting community on asbestos issues, because those who want to comply will have the information and resources available to do so. By raising the level of voluntary compliance, the program should also allow PSAPCA inspection and compliance staff to streamline their attention to focus on violators. However, there are no data to confirm these hypotheses, because there is no monitoring or evaluation component in the program.

PSAPCA has attempted to measure the effectiveness of the program using statistical surveys that solicit compliance, enforcement, and penalty data. The surveys yielded mixed results. However, no conclusions can be drawn, because the data was skewed by PSAPCA's focus on enforcing large contracts, as opposed to small projects such as single-family dwellings. Class attendees also filled out a questionnaire about their perception of the class and its value. Of approximately 500 people who attended, at least 75% reported that they found the class extremely useful. However, since neither survey produced definitive results on program effectiveness, PSAPCA will probably wait a year to see if the contractors who went to a class avoided trouble more those who did not attend a class.

VI. Program Impacts

The education program has reestablished and strengthened the working relationship between PSAPCA and the AGC. As a result of this effort, the government better understands the constraints on the private sector and the private sector better understands the requirements it must meet. Already, the PSAPCA has observed dramatically improved relations with the AGC. Many of the participating contractors of the AGC have also noted the improved relations.

Because there has been little citizen feedback on the program, PSAPCA has not been able to gauge the program's impacts on the public. However, intuition says that informing people about asbestos regulations and hazards should make property owners and contractors of all types less likely to conduct improper or negligent asbestos removal. As a result, it is less likely that the general public will suffer harmful exposure to asbestos.

VII. Advice and Lessons Learned

Asbestos can be a very volatile issue, due to high removal costs and skepticism that it is a real problem. As a result, PSAPCA advises other agencies interested in launching similar asbestos education and compliance programs to look for opportunities to partner with professional and trade associations who have credibility with target audiences (i.e., the regulated community). By partnering with those who are well received by target audiences, agencies can earn the trust necessary to impart valuable information. In this particular case, having the AGC teach the asbestos course and distribute the field manual was fundamental to the acceptance of PSAPCA's efforts to improve compliance with asbestos regulations. PSAPCA learned both the importance and challenge of recognizing potential allies through the initial adversity with the AGC and the major turn-around leading to a successful working relationship.

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Chapter Six

*** Education and Outreach**

OZONE MAPPING PROGRAM

MARYLAND DEPARTMENT OF THE ENVIRONMENT

I. Background

The Ozone Mapping Program grew out of the Maryland Department of the Environment's (MDE) belief that the state's success with plans to reduce ground level ozone would depend on a better-informed public. Past experience with resistance to mandatory controls on individual actions had led MDE to doubt the public's understanding of the link between individual actions and the abatement of an impending public health risk. MDE believed that the public needed to recognize ozone as a serious health hazard in the state and to understand that individuals could help to solve the problem. As a result, MDE was looking for ways to use voluntary educational programs to reduce activities that cause emissions of ozone precursors. MDE also believed that economic incentives for individuals to prevent pollution would help to strengthen such programs. While MDE's ultimate goal behind the Ozone Mapping Program was to reduce pollution, the immediate objective was to overcome the public's lack of understanding of ground level ozone as a hazardous air pollutant that can be controlled through individual actions.

II. Program Description

In 1993, MDE meteorologists began forecasting ozone levels for the Department's use in developing an ozone education campaign. By 1994, MDE was able to use the meteorologists' data to issue color-coded ozone forecasts throughout the Baltimore area. Shortly thereafter, these forecasts evolved into ozone maps, MDE's unique public education tool that tracks the location and timing of high ozone occurrences. In 1995, MDE continued to issue ozone forecasts throughout the Baltimore/Washington, D.C. region and launched the Ozone Mapping Program in cooperation with the American Lung Association of Maryland. MDE has administered the ozone mapping program for the past two summers (1996 and 1997).

MDE's ozone maps use real-time, monitored data to show the movement of ozone

throughout the Baltimore/Washington area. A powerful visual tool, they send two messages to the public: (1) that unhealthy ozone levels exist; and (2) that ozone is not just an urban or local problem. The maps are intended to achieve two goals: (1) to make sure that sensitive individuals, such as asthmatics, receive pertinent information on a timely basis so they can modify their behavior to avoid exposure to unhealthy levels of ozone; and (2) to educate the public so people will change their behavior to prevent bad ozone days. Ozone maps are particularly innovative in their ability to translate data on ozone, which cannot be seen, into a graphic format comprehensible by the public. Because of their user friendly appearance, ozone maps are an excellent tool for television meteorologists. Maryland was the first state to offer this kind of information on television.

In 1996, MDE began working with the Northeast States for Coordinated Air Use Management (NESCAUM) and the Mid-Atlantic Regional Air Management Association (MARAMA) to expand the use of maps to all the Northeastern and Mid-Atlantic states. This move is now taking place. Instead of providing the information directly to the television stations and working with them to individualize the map display, MDE publishes ozone data on its website. That way, weather service providers can use the data to generate customized graphics that are provided to individual stations as part of a package with other weather information. During the first two years of the ozone mapping program, the MDE had to make software modifications. Now, the follow-up involves the move from the local/state partnership program to one that will be privatized and run by weather service providers. NESCAUM will also help MDE by providing considerable modifications in the air monitoring data as the program expands to the entire east coast.

To take advantage of the public's increased ozone awareness resulting from the mapping project, MDE established two other ozone education programs. During 1995, MDE offered "Cash for Clippers" rebates of \$75 for people who turned in their gasoline-powered lawn mowers and purchased electric or manually-powered mowers. This program not only gave the public an economic incentive to reduce air pollution, but also educated Maryland residents about the importance of individual actions to reduce ozone. The next phase of MDE's ozone education campaign was an Ozone Action Days program, which is part of a regional initiative called "ENDZONE--Partners to End Ground-Level Ozone." In May 1996, MDE and ENDZONE launched Ozone Action Days to advocate and facilitate air pollution prevention on days when meteorologists predict that weather is conducive to forming high levels of ozone. Over 120 businesses and organizations in the Baltimore/Washington region participate in Ozone Action Days program in some respect. During the summer of 1996, one gas company offered \$5 rebates to individuals in the Baltimore area who refueled their cars after dark on five ozone action days. Montgomery County offered free mass transit on Code Red (especially high) days.

The ozone map, combined with MDE's other education and outreach activities, has helped the public to understand the role that individuals play in causing ozone. When the mapping program first began, MDE focused on teaching people that high ozone levels are

bad for health. With the introduction of the other phases of MDE's ozone education and outreach programs, MDE has been able to focus attention on the role of the individual and concrete steps the people can take to prevent ozone alert days. As public understanding has progressed, the media have shifted away from merely announcing that the air is bad to telling people what they can do to prevent or reduce pollution.

III. Authority, Funding and Staffing

The cost of the ozone mapping pilot project was approximately \$100,000, including technical support arranged through the American Lung Association of Maryland. MDE received several grants through different EPA mechanisms to fund various steps of the pilot project. An EPA grant is also funding MDE's current initiative to implement ozone mapping along the entire east coast in cooperation with NESCAUM and MARAMA. Further support for the mapping project came from private and public donations made through the ENDZONE partnership program. No special authority was needed to establish the ozone mapping program.

For the pilot phase of the ozone mapping program, MDE needed the equivalent of about one full-time employee working from April through October. In the beginning, the staff provided concentrated training at the television stations for the meteorologists who broadcasted the ozone map. The agency also had to provide air monitoring data every day during the ozone season. MDE's staff who worked on the pilot project needed public relations skills, computer programming skills, and expertise in ambient air monitoring. Now that the project is moving from the pilot to east coast implementation through a contract with a weather service provider, MDE's data base system will become more automated and will only require one person to maintain it.

IV. Barriers Encountered

Getting the television stations interested in showing the ozone map was a challenge, because MDE was asking them to work with information supplied through an unfamiliar source. Usually weather graphics are supplied as a package from a weather service provider. Because the ozone map was not part of the package, it required extra attention on the part of participating stations. As a result, MDE and the American Lung Association had to convince stations to use the ozone map. A second challenge was getting the process in place before a high ozone occurrence. TV stations tend to wait until something is front page news before they incorporate it into their programming. Because the stations did not become interested until the first bad ozone alert day, the program was initiated later in the season than MDE would have liked.

These problems should be resolved now that the agency is using a weather service

provider to disseminate the ozone map and related information. Because stations will receive ozone data on a daily basis as a package to which they are accustomed, they will not have to institute a new mapping system or expend extra effort to incorporate unfamiliar data into their programming. However, the use of the weather service provider to disseminate the ozone mapping presents new challenges that MDE has never faced. In particular, MDE is concerned about protecting its property rights to the data. Because the agency will no longer control how the data are given to the stations, making sure the data are not be used for purposes other than the ozone map will be difficult.

V. Evaluating Program Effectiveness

According to MDE, there are at least two ways to measure the success of the ozone education campaign. One way is to conduct surveys among the general public tracking awareness of the ozone problem and resulting pollution prevention efforts. Another way is to work with Ozone Action Day participants to measure awareness and involvement among employees and customers.

An air pollution awareness survey conducted by the Gallup Organization in 1995 indicated that air pollution was perceived as the number one environmental problem in both the Washington and Baltimore areas, and that nine out of ten residents would be at least somewhat willing to take individual actions to reduce air pollution if they knew what to do. In this survey, more than 85% of Washington area residents claimed to have heard of the Air Quality Index, and 44% of Baltimore residents were familiar with an Ozone Alert. MDE plans to continue monitoring public awareness of the ozone problem through additional surveys.

MDE is beginning to work on methods to quantify emissions reductions attributable to Ozone Actions Days. Very preliminary estimates indicate that the campaign may achieve emission reductions approaching or exceeding reductions resulting from core control programs such as the Stage II vapor recovery program. One estimate contributing to this hypothesis is that if 20% of Maryland residents refrain from mowing their lawns on Ozone Action Days, VOCs will be reduced by an amount equal to the emissions that would be released by more than one million new cars driving 20-30 miles a day.

Based on the information currently available, MDE believes that the ozone map has reached the two main goals it was designed to achieve. However, pinpointing the exact role of the ozone map in raising public awareness is very difficult, because the map is part of an integrated program. MDE realizes that these surveys and emission reduction estimates measure the effectiveness of the entire outreach campaign, not just the ozone mapping program. MDE tried to work with the TV stations to calculate the market share watching their programs during the times when the ozone map was shown, but isolating the exact percentage was not possible. Nevertheless, MDE does receive many compliments

on the ozone map through its Ozone Hot Lines, and it receives favorable comments for its displays at state fairs and other public events. Channel 13 in Baltimore, which carries the map, has also received much positive feedback on the map and has been recognized for its outstanding work in the air pollution area.

VI. Program Impacts

The regulated community has been very supportive of the ozone education campaign in the hope that it may alleviate more restrictive mandatory actions. Some businesses have taken voluntary actions as a result of the program. For example, certain facilities now shift their dirtiest operations to other days or to nighttime on ozone alert days. The general public has also responded favorably, as evidenced by positive feedback to MDE and Channel 13.

VII. Advice and Lessons Learned

MDE has learned five lessons in setting up its ozone mapping program:

1. It is important to start working on the project early in the year and not wait until the beginning of the ozone season to start working with TV stations;
2. It is important to use the appropriate mix of partners to help sell the program; for example, the American Lung Association was much better at convincing TV stations to use the map than MDE was initially and, as a major television advertiser, Baltimore Gas and Electric was also very helpful in convincing the station to use the map;
3. TV stations have to be educated on how to use ozone mapping data; initially the station wanted a year-round air pollution map to show "Bad Air Days," instead of just the ozone map, because they didn't understand the difference in the pollutants.
4. It was critical to have management support from the top-down; the pilot would not have happened but for the support of the Governor and the secretary of MDE because the Governor had learned from the adverse public reaction to the enhanced vehicle emissions treadmill test that a regulatory program does not work unless the public realizes that there is an air pollution problem and a need for changes;
5. The support of EPA Region I has also been very important, particularly in the move to an east coast program because Region I has provided technical support for the MDE website and has provided grant money for the NESCAUM/MARAMA/MDE project.

Top-down support would be critical for any other state or region considering adoption of a similar ozone education campaign.

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OZONE ALERT DAYS

NORTH RICHLAND HILLS, TEXAS

I. Background

Located between Dallas and Fort Worth, the city of North Richland Hills is polluted by ozone precursors emitted by traffic flowing between those two cities. As a result, the local government was concerned that the area would be classified as an ozone non-attainment region, like Houston. Officials feared, among other things, that local businesses would be forced restrict their employees' commuting habits and would lose the ability to use air credits. Both the Environmental Services Department (ESD) of North Richland Hills and local businesses decided that, to protect the community's economy and public health, they needed to reduce ozone levels before they were forced to do so by EPA. The North Central Texas Council of Governments helped them to develop the concept of ozone alert days, and ESD tailored the program to suit its own situation.

II. Program Description

The Ozone Alert Action Program began as a partnership between North Richland Hills ESD and local businesses in May 1995. Each year a few more businesses have joined the program. It is designed to increase public awareness of high ozone level days through timely dissemination of information, and to encourage people to modify their activities on those days to reduce harmful ozone levels. The program works by publicizing statewide predictions of high ozone levels prepared by the Texas Natural Resources Conservation Commission (TNRCC). Using predicted temperatures and atmospheric and wind conditions, TNRCC determines if the following day should be declared an "ozone alert day." By 2:00 p.m., information is faxed around the state alerting agencies that the following day is predicted to have high ozone levels. When ESD receives this information, it immediately activates a fax and phone system to notify all city buildings and local businesses who are its "environmental partners."

These environmental partners operate large Ozone Alert Day signs installed by ESD at strategic locations around the city. The signs, which were specially designed and purchased by ESD, contain information on both sides and can be flipped over to display the appropriate side. On normal days, the signs display a blue and white advertisement for the Ozone Alert program. On the afternoon before an ozone alert is predicted, ESD asks its business partners to flip over the signs to display a red and white "Ozone Alert" notice. The day of the week for which the alert is predicted is attached to the sign to avoid any confusion. Thus, commuters traveling home have an opportunity to arrange for carpooling, know to obtain gas that evening instead of the next day, and know to mow the

grass before the predicted alert day. Except for one sign that is mounted outside a city building, all the signs are manned by private businesses who are near major thoroughfares with maximum exposure to commuters. Two large car dealers at major interchanges have offered to use their moving board signs for ozone alerts, which helps to notify commuters who are on the interstate highway between Dallas and Fort Worth. The local television cable company contributes to the program by advertising high ozone alert days.

In addition to the ozone alert signs, ESD provides its business partners with laminated signs listing "Ten Things to Do" during an ozone alert. Like the Ozone Alert signs, they display the ozone alert symbol and the appropriate day of the week. During an ozone alert, all city buildings display these signs and businesses can elect to hang them on their buildings. These ten things to do are also advertised with a small ESD newsletter in consumers' water bills. Each city department also submitted a plan for changing its operations to reduce ozone levels on alert days. Those plans include: no city meetings before 10:00 am; no park mowing before 10:00 am; installing vapor recovery pump systems; transferring city vehicle fleets to alternative fuels; giving city employees flex-time; allowing for telecommuting; and adopting hike/bike to work programs.

One of the innovative aspects of the program is ESD's partnership with local businesses. Without its environmental partners operating the city-owned signs and informing their employees about ozone alert days, ESD would not be able to marshal enough manpower to notify everyone in a timely fashion (i.e., before rush hour on the day before the predicted ozone alert). The timeliness of this notification system is key to the success of the program. Another innovative aspect of the Ozone Alert Days is the design of the flippable alert sign, which makes program operation much easier. At first there was confusion amongst motorists as to which days were alerts, but this problem was solved by adding the strip indicating the day of the week. ESD continues to work on improving its system of notification and reminders to the public.

III. Authority, Funding and Staffing

No city ordinance was needed to adopt the Ozone Alert Days program, but ESD did ask the City Council for approval and funding. The program is very inexpensive and requires very little agency labor. Involvement by three city staffers has been sufficient for program administration. One city staffer activates the fax system and makes four or five phone calls when an ozone alert is predicted; one operates the sign near the city building; and one handles the advertising inserts for water bills. Staffers are paid from ESD's existing budget, and private donations pay for other expenses.

ESD spends about \$1000 per year on the water bill inserts. The ozone alert signs cost \$165 per sign, but the city sign shop has agreed to mount the signs at no additional cost. At the inception of the program, ESD had three signs. It now has eleven. Some businesses

have requested signs for their establishments and are willing to pay for them. Businesses also donate prizes to advertise the ozone alert program during special events such as Earth Day.

IV. Barriers Encountered

ESD originally anticipated to encounter difficulty convincing private businesses to accept the commitment to install and operate the signs, which requires freeing an employee for the task. However, ESD discovered that businesses were delighted to help. Thus, the only barrier to program commencement was the need to find someone to make the signs. They had to be specially designed, because ESD wanted them to be round, like the ozone symbol, and flippable. ESD did find a local company that could make them according to these specifications. The major obstacle associated with ozone alert days lies in changing people's behavior. Already, businesses contribute to this objective by helping to change employee behavior.

V. Evaluating Program Effectiveness

ESD admits that it is hard to measure the effectiveness of its Ozone Alert Days. The Texas North Central Council of Governments has placed eight monitors throughout the Dallas/Fort Worth area to measure ozone levels, the ultimate indicator of the program's success, but ESD has not yet received the results of this monitoring. Anecdotally, ESD has heard from people who believe the air is cleaner. ESD has also heard from people with respiratory illnesses who appreciate knowing in advance when an ozone alert is coming so they can rearrange their day.

Some degree of program success is evidenced by changes in public behavior. As a result of ozone alert days, people are thinking more about when and how they do things. Schools are educating students about ways to avoid high ozone levels, and kids are coming home and telling their parents to do things differently, such as mowing the grass at night instead of the day. People also appear to be carpooling more.

Businesses seem to be modifying their behavior as well. Some major businesses have travel demand managers and have documented changes in their operations on ozone alert days. The economic development agency has also found that a number of businesses are relocating, in part because of the program. According to ESD, these successes have been sufficient for the city to justify the small expense of the program.

VI. Program Impacts

There have been no negative impacts on the regulated community. In fact, local businesses have benefitted from the management of ozone levels, because they have evaded the consequences of being elevated to a more serious non-attainment category. Local businesses, even the smaller ones, are well aware of the severity of the next non-attainment level and the impact it would have on their operations. They appreciate the city taking a proactive stance to prevent the non-attainment designation and are prepared to help out. The program has also helped to fortify relations between the city and local businesses, as well as within city departments. By forging cooperative efforts, ESD has brought agencies together in an effort to cure a common problem.

VII. Advice and Lessons Learned

ESD has learned that fax machines don't always work, and a backup system is needed for notifying businesses when high ozone levels are predicted. ESD has also learned the importance of advertising the program to the public, because people need to be continually reminded how to change their behavior on ozone alert days. The inserts in water bills have worked well to this end. Any city agency could establish a similar program. Because this type of program is very inexpensive and does not require a lot of employee time, there is no downside to it.

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Chapter Seven

*** Public Participation**

AIR QUALITY POLICY PLAN

FORT COLLINS, COLORADO

I. Background

Prior to the development of the Air Quality Policy Plan, air quality issues were a low priority for the city of Fort Collins and had not received much attention. While the city had a number of air quality control programs in place, they were not coordinated with one another nor with the city's overall planning strategies. Sensing this lack of focus and direction for air quality protection, the City Council became interested in developing a coordinated set of air quality initiatives designed to work in conjunction with one another and to fit into the city's comprehensive planning strategies. In particular, the City Council sought long-term guiding principles by which to make short-term decisions about actions to improve air quality.

II. Program Description

Under the authority of the City Council, the Fort Collins Department of Natural Resources (DNR) produced an Air Quality Policy Plan that provides both theoretical and logistical direction for an ongoing city-wide air quality management regime. The primary goals of this initiative are to determine the air quality objectives sought by the public, to synthesize those objectives into a single community vision for directing the city's air quality control programs, and to prescribe specific city policies designed to achieve that vision. In order to ensure the long-term viability of the city's air quality management scheme, the Plan calls for these policies to be compatible with one another and with the city's comprehensive plan.

The purpose behind basing the Air Quality Policy Plan on the community's vision for air quality management was to ensure widespread public support and willingness to participate in pollution control programs. In order to ascertain the local community's air quality concerns, DNR assembled a Citizen Task Force to solicit comments from Fort Collins residents and local organizations. The Task Force received over 100 comments and suggestions, which it boiled down into 25 "findings" that characterized the community's

interests in air quality management. Based on these findings, the Task Force recommended goals for DNR to use in defining the city's approach to air quality control and suggested specific policies designed to achieve those objectives.

Using public feedback, the Task Force ranked various pollutants in order of their importance to the community. Next, to determine what type of initiatives should be implemented for controlling each pollutant, the Task Force ranked the pollutant sources' proportional contributions to the city's total emissions of high and moderate priority pollutants. The outcome of this ranking was that motor vehicles are the city's highest priority source of air pollution; commerce and industry ranked second; and pollution from residences ranked third. The Plan directs the city to implement action strategies designed to reduce emissions from problem sources according to a hierarchy based on these priority rankings.

In order to provide further guidance for DNR's air quality management, the Task Force prescribed seven specific policy objectives designed to control those sources. They are to:

- 1) Reduce the growth of daily vehicle miles traveled;
- 2) Reduce per-mile motor vehicle emissions;
- 3) Prevent total motor vehicle emissions of high priority air pollutants from rising above the low point projected to occur in 2000;
- 4) Reduce total emissions from commerce and industry;
- 5) Reduce wood smoke emissions;
- 6) Reduce the number of non-certified wood stoves and conventional fireplaces; and
- 7) Increase actions to improve indoor air quality.

In addition to prescribing these immediate strategies, the Plan calls for DNR to release an Air Quality Action Plan Update every two years. These updates are to report on actions taken during the preceding two years, review DNR's progress in meeting established objectives, and outline new strategies that will be implemented during the next two years. In most cases, as new strategies are added under the Action Plan Updates, DNR plans to maintain existing programs.

Fort Collins' Plan is most innovative in its focus on coordinating air quality strategies with the city's long-range comprehensive plan. By developing air quality control

programs that are compatible with the parameters of the city's comprehensive plan, DNR

has tried to increase the potential of those programs to be effective and the likelihood that other city agencies will address air quality objectives in their programs. The Plan's policy recommendations address a broad range of areas affecting air quality, such as budget, land use, staff work plans, various city programs, and the development of elements for the city's comprehensive plan.

The City Council first ordered DNR to develop the Air Quality Policy Plan in 1991. DNR worked on the Plan from that time until early 1993. The plan was adopted by the Fort Collins Zoning Board in February 1993 and approved by the City Council in March 1993. The Action Plan was last updated in March 1996.

III. Authority, Funding and Staff

The Air Quality Policy Plan operates under the general authority of the City Council and the Planning and Zoning Board. It is financed by DNR's general operating funds, and no specific grants have been needed for the program. Preparation of the Policy Plan and the first Action Plan took one-half of a full time employee (FTE) over a period of two years, which cost about \$50,000. Other expenses were about \$2,000, mostly for printing and postage. Keeping the Action Plan updated takes staff time of only 0.1 FTE at a cost of about \$5,000 with no other expenses. On the other hand, the city's actual implementation of the Action Plan during the past year has taken staff time of three FTEs at a cost of \$132,000, plus \$54,000 in expenses.

IV. Barriers Encountered

According to DNR, accruing public support has always been the most challenging component of the city's air quality management initiatives. Cognizant of this obstacle, DNR and the City Council have been careful to obtain extensive public input throughout the process of developing the Plan. In addition to utilizing the Citizen Task Force, DNR has worked with the Chamber of Commerce, environmental groups, and neighborhood groups to develop the Plan. In total, about 400 people have offered comments which are maintained in a DNR log. Other DNR efforts to build public support include outreach talks to explain both the Plan and the process used by the city to develop it.

V. Evaluating Program Effectiveness

The effectiveness of Fort Collins' Plan can be determined by the city's progress in

meeting its seven objectives, which is measured and analyzed every two years in the Action Plan updates. In addition to measuring ambient air quality data, DNR's progress measurements use air quality indicators (e.g., miles driven per day) that focus on various parts of the problem within the city's control. Breaking measurements down in this manner helps the city to examine each piece of the puzzle, whereas ambient air quality data would only show the end result and include factors that are beyond the city's control, such as weather.

DNR believes that the proactive air quality programs authorized by the Plan have been partially responsible for stable and decreasing air pollution levels in Fort Collins. For example, particulate concentrations -- which come mainly from wood burning, wind-blown dust and street sanding -- have been declining since the onset of the initiative. DNR believes that programs such as ZILCH (Zero Interest Loans for Conservation Help) and a wood smoke complaint line and information program also have helped to reduce the number of non-certified wood burning units in the city. Improved management practices for street sanding and sweeping, implemented by the city's Street Department, have further reduced particulate pollution.

DNR has also used public surveys on wood burning and indoor air quality to measure the program's effectiveness. When the wood burning programs first started, 20% of the population said that wood smoke was a serious problem; now only 4% say that it is still serious. Another survey on indoor air quality (IAQ) actions shows that, since 1994 when an IAQ information program began, actions taken by the public to reduce exposure to carbon monoxide and radon have increased, while actions to reduce exposure to tobacco smoke have remained constant. According to DNR, this discrepancy is explained by the IAQ program being focused on radon and carbon monoxide, rather than tobacco smoke.

A final testimony to the program's success is the apparent influence of air quality objectives in a recent revision in the city's land use and transportation plans, which have specific provisions aimed at reducing vehicle miles traveled. According to DNR, the incorporation of these provisions was facilitated by the city's commitment to consider air quality objectives in the comprehensive planning process.

The biggest obstacle to evaluating the Plan has been determining whether the city is reaching objective #4, reduction of total emissions from commerce and industry. At present, the city's emissions inventory is not accurate enough to measure actual reductions from these sources. Colorado's statewide emissions inventory provides limited monitoring to compensate for the shortcomings of the city's inventory, but data collection has been inadequate for the city to perform a comprehensive analysis of progress toward this goal.

VI. Program Impacts

The Plan has had very little impact on the regulated community thus far, because no regulatory actions have been implemented. The only initiative in place that pertains to industry is a voluntary pollution prevention program. With the exception of the initial Plan development, the public's involvement thus far has also been limited to participation in voluntary pollution prevention programs. Actions to reduce wood burning emissions have been particularly popular. DNR is currently engaged in efforts to educate the public about reducing vehicle miles traveled and will measure the impact of this education push during the next two-year progress review.

Given the Plan's heavy reliance on public input, it largely represents the interests of the citizens of Fort Collins. Thus, any associated impacts are, to some extent, mandated by those whom the Plan affects. Thus far, actions taken by the City Council and DNR under the Plan have been well received by the public. The public will also benefit from the consistency of decisions required by the Plan. Because any local action must be evaluated in the context of the plan, citizens will always have access to documented, logical justification for the city's choices concerning air quality issues. DNR hopes to improve community involvement and information sharing as new programs are developed that entail more restrictive impacts on the public.

VII. Advice and Lessons Learned

DNR believes strongly in the importance of active public support for air quality initiatives. By allowing the public to define the city's priorities for air quality management, DNR alleviated the burden of convincing the people of the Plan's legitimacy. For example, asking citizens to identify the pollutants they deemed most problematic spared DNR the responsibility of proving their harmful effects. On a similar note, because the community cared about visibility problems, there was no need to justify the scientific basis for actions taken to improve visibility. DNR also found public education and involvement very useful in turning around some last minute opposition to the Plan.

Another key aspect of the Plan has been its emphasis on providing clear guidance and direction to other city agencies on air quality goals and objectives. DNR has already seen how this provision helps to promote air quality improvement in Fort Collins. For example, when land use and transportation officials revised their long-term plans, they were required to address the objective of reducing vehicle miles traveled. DNR believes strongly that this attention to air quality objectives and their successful integration into other agencies' programs resulted directly from the Air Quality Policy Plan.

Fort Collins had certain local advantages when it developed the Plan which probably contributed to the initiative's success. In particular, it benefitted from having a well-educated and environmentally-minded community and extensive political support for the program. Despite these factors, DNR believes that this type of initiative could work

well in other areas and recommends that agencies implementing similar programs should try to keep their goals and objectives as simple as possible.

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GRAND VALLEY AIR QUALITY PLANNING COMMITTEE

MESA COUNTY, COLORADO

I. Background

In the late 1970's, Mesa County was in violation of the national ambient air quality standard for total suspended particulates (TSPs). Due to changes in the air quality standard during the 1980's, Mesa County was reclassified as in attainment with a particulates standard of less than 10 microns (PM10). Nevertheless, during the decade of non-attainment status, the seeds of community interest in air quality were planted. A number of local committees began dealing with air quality issues on an *ad hoc* basis, but few of their activities were coordinated or sustained. Under the direction of the Mesa County Board of Health (MCBOH), the Mesa County Health Department (MCHD) became involved in efforts to establish a preventive program for air quality protection, to avoid future air pollution increases, and to improve visibility in the Grand Valley.

II. Program Description

In August 1992, MCHD formed an advisory committee, called the Grand Valley Air Quality Planning Committee (GVAQPC), to help municipalities and county commissioners coordinate air quality improvement actions. The Committee objectives defined during a goal-setting session include educating the community on air quality issues, soliciting public input on air quality issues, interacting with local governments and planning agencies, and compiling data on air quality in the Grand Valley. Using information accrued through these activities, GVAQPC also develops specific recommendations for control measures designed to address a wide variety of air quality problems. The GVAQC is particularly innovative in its emphasis on bringing small local governments together and providing them with the resources, research, and support necessary to address air quality issues that will affect the entire county. Rather than waiting to react to federal mandates, these four local government bodies are voluntary, pro-active measures to improve air quality. This approach is unusual for small communities, particularly in the western states.

GVAQPC is comprised of 14 members, whose terms each last two years. After passing resolutions of support for the GVAQPC, each municipality represented -- the City of Grand Junction, the City of Fruita, the Town of Palisade, and the Mesa County Commissioners Office -- was given one reserved seat on the Committee. The ten remaining positions are appointed by MCBOH, and are used to represent a broad cross-section of community interests. Positions are often filled by individuals from the medical, business, environmental, education, real estate, legal, and industrial sectors.

In 1993-1994 GVAQPC conducted a survey to assess public awareness of air quality issues in Grand Valley and took an emission inventory of particulate sources. Using the results of the emission inventory, other communities have been able to address how they handle similar air pollution control problems. In late 1994, GVAQPC developed a workbook on air quality improvement strategies to provide guidance and options for action by the four local governments. GVAQPC presented these strategies to the municipalities and to various service and community organizations. In February 1996, GVAQPC organized a regional conference to bring planning experts together with air quality experts.

Also in 1996, Mesa County adopted a resolution for air quality protection that established a number of air quality protection goals, many of which have been implemented. Paving regulations in the County were upgraded, sanding and de-icing practices of the road department were revised, and a wood stove regulation was passed which bans non-EPA wood burning stoves in new construction. The latter provision works in conjunction with a number of other initiatives taken to reduce pollution from wood burning. At the time this resolution was passed, the City of Fruita had already passed a ban on all wood burning stoves (passed in 1995). While no other municipality in the county has done the same, MCHD has adopted a No Burn Program to alert all four jurisdictions when the potential for a weather inversion makes the wood burning unacceptable. Upon receiving the alert, the jurisdictions publicly announce No Burn advisories asking residents to refrain from burning wood. In 1997, the City of Grand Junction and Mesa County approved an incentive program for the purchase and replacement of non-EPA certified wood burning stoves from low-income families.

Now that the issues of wood burning stoves and road sanding have been addressed by the jurisdictions, the Committee priorities have shifted to other visibility concerns, such as open burning, residential household trash burning and the adoption of visibility standards. As a result, MCHD staff has to focus attention on new issues of concern to the public. MCHD recently purchased a camera to photograph visibility in the Grand Valley. Using the resulting information, MCHD will address the community and poll the public to determine what people are willing to do to improve valley visibility. For example, they may ask if the public will pay more money to buy back dirty wood burning stoves, to change the chemical used to de-ice the roads, or to hire more street sanding crews. MCHD recently approved the hiring of a transportation management consultant to study vehicle-related air quality issues. This study will assist the GVAQPC in determining if transportation controls should be recommended.

III. Authority, Funding and Staffing

While no special authority was needed to establish GVAQPC, the Committee did require each municipality to pass a resolution of support as a condition of becoming a

member. Of the \$15,000 program budget, \$5,000 was procured from the MCHD general fund, and a grant of \$10,000 was awarded by the Colorado Department of Public Health and Environment (CDPHE) to fund MCHD staff support of GVAQPC, public surveys, public forums, and office supplies. Part of the grant comes in the form of in-kind contributions from a CDPHE facilitator who facilitates the GVAQPC monthly meetings.

Three MCHD staff members dedicate a portion of their time to facilitating Committee activities. A technical secretary keeps the minutes at meetings, sends out agendas and brochures, finds potential grant money, and prepares grant applications. The MCHD Environmental Health Director acts as GVAQPC's technical coordinator, providing technical and administrative oversight of the Committee and acting as liaison between GVAQPC, MCHD staff, and MCBOH. A MCHD air pollution control specialist also provides technical support, acts as the primary air quality community spokesperson for the media, and is responsible for the daily air quality advisory.

IV. Barriers Encountered

The main barrier was convincing all four municipalities to take interest in air quality issues and to support the concept of GVAQPC. The Town of Palisade, for example, was wary of the idea due to the lack of sustainability of many of the previous *ad hoc* committees in the community. As a result, GVAQPC had to establish a level of credibility before the Town Council would get involved by appointing a member. Once the Committee was established, barriers continued to arise; examples include members' lack of basic understanding of local meteorology and the basis for local air pollution problems, a lack of readily available air quality data, a lack of public opinion information, the lengthy process involved in enacting regulatory changes, and the delay between the adoption of incentive programs and the point at which the public begins to participate. Most of these barriers have been, or are being, resolved with education and special projects undertaken by MCHD and funded by grants.

V. Evaluating Program Effectiveness

The Committee has succeeded at providing an impetus for the adoption of air quality control strategies in all of the participating jurisdictions. Furthermore, it has led the four governments to cooperate and devise a unified strategy and a support system for their actions. Committee actions have also focused the community's attention on air quality issues and raised public awareness of problems such as visibility. In order to gauge GVAQPC's effectiveness in generating public concern, MCHD conducted two surveys that measure the public's awareness of the Committee and the public's awareness of the No Burn program. GVAQPC's ability to heighten public interest has, in turn, generated support for government actions to improve existing air quality and prevent future

problems. This achievement is especially significant in an attainment area, like Mesa County, where the air quality is not typically a prominent concern.

While there are no quantitative mechanisms in place for measuring program success, the extent to which local governments have been able to adopt ordinances and resolutions serves as an indicator of the Committee's effectiveness. Three of the four jurisdictions have adopted regulations to control air quality based on the recommendations by GVAQPC. The City of Palisades has only recently joined GVAQPC and has not yet passed any regulations. While Committee initiatives have addressed a number of air pollution concerns, there are still many potential sources of TSP that could be eliminated. The challenge will be accruing enough public support to further reduce TSP emissions.

Another indicator of success is be the difference in air quality since the creation of the Committee. In theory, if Committee recommendations are able to decrease sources of TSP, such as the dirty wood burning stoves, a decrease in TSP emissions should result. It is difficult, though, to determine whether the decrease in sources of particulates has actually caused a decrease in TSP emissions. Right now, the County's PM10 levels are 50% of the federal threshold for nonattainment, and its ambient particulate levels have been fairly consistent over the past few years.

In order to evaluate the program's effectiveness, GVAQPC conducted a self-assessment prior to the 1997 goal setting. Through this process, six criteria were identified as essential tasks that should be addressed by any group involved in air quality monitoring and improvement. They are: information collection and discussion, technical support, ambient data, source data, educational programs, and general goals and tasks. The program's success in meeting each of these criteria was evaluated and assigned a letter grade. The areas of strength were in technical/professional access, citizen surveys, educational/information programs, and in general goals of organization and goal setting. The lowest marks were in local meteorological data collection, and in GVAQPC membership understanding of air quality data. The results of self-assessment are reflected in the 1998 goals for MCHD, which are to develop a local forecasting model and to search for community (and Committee) educational funding for workshops on the local meteorology and its effects on air quality.

VI. Program Impacts

For all intensive purposes, the public is the regulated community under the GVAQPC program. As such, local residents have experienced both positive and negative impacts of the programs and regulations adopted by the four jurisdictions. Take, for example, a Grand Junction ordinance that requires the removal of any non-certified wood

burning stoves when houses are sold. At the same time that this ordinance constrains the buyer, the seller and realtor by imposing an expenditure, it benefits them by improving air quality in the region.

VII. Advice and Lessons Learned

MCHD staff has learned that by continuously presenting meaningful and interesting issues, they are able to ensure that GVAQPC will work hard and remain committed to its objectives. Any agency interested in adopting a similar program must be willing to commit the staff and resources necessary to jump-start the committee's activities. Agencies must also be willing to provide the technical support necessary for committee members to obtain and understand the needed meteorological and air quality information. Without this information, and the public surveys, GVAQPC would not have been able to effectively state their case to the local governments. In order to ensure the financial viability of the program, agency staff should be skilled at procuring funding from grants and other sources. The staff must also be interested in, and committed to, supporting the objectives of the committee.

When working on a multi-jurisdictional committee, committee members must be willing to give each individual government the latitude to discern which recommendations best serve their constituents' needs and to adopt those recommendations. For example, the four municipalities each adopted different policies on wood stoves. By customizing the legislation to serve their constituents, they were each able to contribute to a coordinated effort that has improved air quality county-wide.

Because ozone attainment areas, like the Grand Valley, are not required by EPA or state mandates to improve air quality, it can be difficult to generate interest among government agencies to form a multi-jurisdictional group and to keep it going. However, since communities in attainment must rely on voluntary actions to reduce air pollution, a program like this can be an ideal tool for improving air quality.

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OZONE STAKEHOLDER INITIATIVE

PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION AND PENNSYLVANIA DEPARTMENT OF TRANSPORTATION

I. Background

Pursuant to the 1990 Clean Air Act Amendments, the Commonwealth of Pennsylvania devised a number of programs designed to bring the state into attainment with the national air quality standard for ground-level ozone. The programs varied in nature and scope, with some affecting only industrial polluters and others affecting the general population. By 1994, several of those programs were in effect and numerous others were in their final stages of development. While it was too early to tell how well they would work to improve air quality in Pennsylvania, pressure from interest groups made it clear that the restrictions affecting the general public were very unpopular.

In 1994, the state legislature voted to overturn these programs based on the evident lack of public support. During the same year, a new governor was elected. He sought advice from the Department of Environmental Protection (DEP) and the Department of Transportation (DOT) about how to develop a new strategy for meeting the Commonwealth's air quality needs. At the governor's request, state administrative officials and DEP representatives came together repeatedly over a six month period to address these concerns and to devise a new regime for air quality control in Pennsylvania. The concept of a stakeholder process grew out of those meetings. When Pennsylvania launched the ozone stakeholder initiative in 1995, five counties in the Philadelphia area and seven counties in the Pittsburgh region were in violation of the national ambient standard for ozone. During 1995 there were 17 exceedences of the 0.12 ppm limit in the Pittsburgh area and 12 in the Philadelphia area.

Because the preceding air quality improvement regime had failed to garner public support, both DEP and DOT recognized the need to focus on developing a new strategy that would serve the interests of the regulated. In order to define those interests and determine how they are impacted by air quality standards, the departments chose to work directly with those constituencies to devise an effective and widely supported strategy for reducing ground-level ozone. They believed that soliciting stakeholder perspectives early in the process of developing new policies and programs would eliminate the public resistance that had made the previous ozone attainment programs so unpopular.

II. Program Description

A. How the Program Operates

The Pennsylvania stakeholder initiative is a partnership effort between DEP and DOT, but DEP's Bureau of Air Quality has primary responsibility for administering the program. In order to develop strategies designed to bring Pennsylvania into attainment for ground-level ozone, DEP and DOT assembled two regional stakeholder working groups based in Philadelphia and Pittsburgh, the two areas posing the greatest threat to the state's ambient air quality. The groups were asked to identify key problems affecting air quality in their regions and to recommend regulatory and programmatic solutions to these problems. Each stakeholder group consisted of 27 representatives from government, industry and environmental interest groups.

Both stakeholder groups used a consensus process to reach decisions. Only recommendations that earned the active support of all participants were passed on to the DEP and DOT for implementation. The underlying rationale behind this strategy was to ensure that no recommended action would pose unmanageable problems for any constituency. In some cases, stakeholders consented to recommendations that would impose constraints on their constituencies, but none were considered so cumbersome as to deter them from supporting the policy or program.

In order to maintain objectivity throughout the process, DEP funded the hiring of independent consultants, selected by the stakeholders, to provide relevant data on subjects such as geomodeling and air pollution control technologies. Participants found that using unbiased professional consultants enabled them to trust the information being presented to them and to base their decisions on sound, credible science. In order to facilitate the integration of consultant expertise into the consensus process, certain stakeholders served on technical advisory committees along with independent contractors and brought knowledge and ideas back to the working groups for consideration. Occasionally, individual stakeholders were asked to provide expertise rather than independent consultants, but selecting the type and source of expert input was left to the discretion of the stakeholders.

In order to ensure proper representation by the stakeholder participants, DEP chose to open the entire process to the public. That way, various interested constituents would have the opportunity to monitor their "delegates" and to comment independently on any stakeholder proceedings. The press provided yet another degree of public scrutiny by attending stakeholder meetings and reporting to the public throughout the process.

This stakeholder initiative was particularly innovative in its reliance on grassroots efforts to prescribe emissions control measures that Pennsylvania should implement to

meet ozone standards. The rationale for using this process was to empower representatives of the sectors most significantly affected by ozone standards to develop ozone attainment policies and programs that would work well for them and their constituencies. By allowing representatives of these groups to voice their concerns and to work cooperatively to forge amenable solutions DEP hoped to eliminate unreconcilable problems early in the regulatory process. While government officials also participated in the stakeholder process, they voluntarily ceded a great degree of authority by equating the weight of their voices with those of other stakeholders. The fact that government representatives were strongly outnumbered by other constituencies in both stakeholder groups gives evidence to their willingness to share control over regulating air quality.

B. Program Timeline

Development of the stakeholder initiative began in July 1995, but the first stakeholder meeting was not held until March 1996. The interim period was dedicated to preparatory activities for the program, including securing funding, hiring a contractor to select stakeholders and act as a facilitator, and selecting the participants to represent key constituencies. DEP hired CDR Associates, a firm based in Boulder, Colorado, as the program facilitator.

In order to select stakeholder participants, CDR worked with DEP and DOT to screen over 127 individuals nominated by the public. Nominations were solicited through DEP's weekly "Update" newsletter and the department web site. Because the initiative was publicized through these media, most nominees were already knowledgeable and active in environmental matters. DEP also found the pool of nominees to represent a fairly balanced cross section of interested constituencies. In addition to the standard nomination process, DEP recruited two participants from the medical community because their expertise would be particularly valuable for understanding the health effects of ozone pollution. In the end, 27 stakeholders were chosen to serve on each regional working group and alternate participants were identified to fill in if necessary.

The final stakeholder meetings were held in December of 1996. A recommendation signing ceremony was held in January of 1997 along with a recognition ceremony for the stakeholders. Since that time, DEP has been working on implementing the policies and programs recommended by the working groups. A total of 37 recommendations resulted from the stakeholder process, of which 16 came from the Pittsburgh group and 21 came from Philadelphia. The recommendations vary in scope, with some affecting isolated regions and some pertaining to constituencies statewide.

Once this process ended, DEP and DOT began translating the stakeholders' recommendations into action. Both departments are highly committed to implementing each and every recommendation and intend to do so according to a priority schedule

established by DEP. Since the conclusion of the stakeholder process, DEP has focused initially on implementing seven high-priority recommendations. Three are for the Southwest; two are for the Southeast; and two are for both regions:

- o Installing Stage II vapor recovery systems for gasoline stations (Southwest);
- o Selling cleaner gasolines during the ozone season (Southwest);
- o Establishing a decentralized enhanced vehicle inspection and maintenance program (Southwest);
- o Implementing the national low-emission vehicle (NLEV) standards (Southeast);
- o Reducing VOC emissions from automobile and truck body repair and refinishing shops (Southeast);
- o Adopting 55% reduction of NO_x from utility and other large industrial boilers (both Southwest and Southeast); and
- o Requiring the used of citric and water-based solvents to replace those containing VOCs for commercial and industrial degreasing operations (both Southwest and Southeast).

Implementing the stakeholders' various recommendations entails different provisions and activities depending on their nature. Some may call for new legislative authority or minor adjustments in existing legislation, and others may require DEP to adopt new regulatory requirements. Some may require development and funding of educational programs, and others may result in enhanced enforcement activities. In many cases, the recommendations are broad in scope and require additional efforts to fine tune them into operational programs or regulatory language. In doing so, DEP has had to, or will have to, reconcile the small differences in similar recommendations coming out of the two stakeholder groups into a single program or policy that satisfies the needs and objectives of both regions.

In order to develop the regulatory language for some recommendations, DEP has continued to use smaller stakeholder working groups defined by expertise and facilitated by a single associate from CDR. This process has been much less involved and much less expensive than the initial stakeholder meetings because most of the relevant issues were already hammered out in the previous stage and no independent consultants have been needed to assist the process. DOT also used a smaller stakeholder group to help develop an Inspection & Maintenance program recommended by the working groups, with DOT acting as the facilitator. The smaller working groups have had little trouble reconciling the interests of the two separate regional groups, because their recommendations are highly

compatible. Although most stakeholder participants are no longer involved with the initiative, DEP and DOT continue to keep them abreast of the progress in implementing recommendations through informational mailings.

III. Authority, Funding and Staffing

A. Funding

The majority of funding came from Pennsylvania's Clean Air Fund, which is administered by DEP for air quality improvement initiatives. Revenue for this fund comes from fines and penalties imposed on Pennsylvania's regulated community for air quality violations. In order to use the fund to finance the stakeholder initiative, the Secretary of DEP had to authorize the withdrawal. Because the program was conceived and designed by DEP and DOT, obtaining the Secretary's authorization was fairly simple. Other than the Secretary's approval, no special legal or administrative authority was required for the initiative.

Early in the process, corporate stakeholders also made contributions totalling approximately \$15,000 to facilitate the initial stages of the project. These funds were used for steps necessary to start the program before Clean Air Fund money was available. Apparently no other stakeholders opposed these contributions out of concern that the corporate contributors would gain an advantage from their financial support.

B. Expenditures

The total budget for the ozone stakeholder initiative was \$1.5 million, not including DEP or DOT staff time dedicated to the program. Of the \$1.5 million budget, \$400,000 was spent on CDR Associates, the private contractor hired to select stakeholder participants and facilitate the process. DEP also budgeted for each stakeholder group to spend approximately \$500,000 (totalling \$1 million) on independent consultants to analyze each region's air quality needs. The remaining DEP funds were spent on general operating costs such as facility rental and catering for stakeholder meetings. While some expenses such as catering could have been spared, program administrators believed it was critical to make the process as comfortable as possible for the stakeholder participants.

C. Staff Resources

Active commitment to the stakeholder initiative by DEP and DOT at all levels was integral to the successful operation of the program. DEP estimates that the 21 DEP staff members involved in the initiative contributed a total of 10 work-years of time and effort, and 6 DOT staff members devoted 3 years of work. Due to the intensive need for staff participation in this project, DEP and DOT were often compelled to draw personnel from

other projects to work on the stakeholder initiative. This was made possible by the reordering of priorities within two departments.

The Secretaries of DEP and DOT were charged with responsibility for ensuring the success of the program and for providing leadership throughout the process. To demonstrate their support for the stakeholder initiative and to attest to the Governor's endorsement of the program, they both attended the kick-off stakeholder meetings as well as the concluding ceremonies. While the Secretaries were not present for the interim stakeholder meetings, they did send their Deputy Secretaries to most events to act as liaisons between their departments and the stakeholders and to participate actively as agency stakeholders. When necessary, expert staff were brought in from DEP and DOT to offer their expertise on issues of concern to the stakeholders. They generally made presentations on legal aspects affecting potential strategies to provide stakeholders with a knowledge base from which to form their positions. DEP and DOT provided clerical support for general operating needs of the stakeholder groups, and both departments' public outreach efforts were critical for community relations, press contacts, and editorial board reviews of the program.

IV. Barriers Encountered

The concept of using stakeholders to develop ozone attainment strategies posed a number of challenges that had to be overcome before the program could commence. First, program designers had to invent a stakeholder process that would lend itself to success. While a number of stakeholder groups have been used for various environmental programs, many of them have encountered problems that ultimately caused them to fail. Thus, the need for a process that would work well was a potential barrier to Pennsylvania's efforts.

In determining the key components of a successful stakeholder process, DEP concluded that selecting the right participants was of paramount importance. Therefore, much research and scrutiny of stakeholder candidates and external support services had to be done before the program could get underway. Securing the commitments of selected participants was also an implicit obstacle in the program's commencement.

While these challenges presented real hurdles in the program's early stages, perhaps the most difficult obstacle DEP had to overcome before launching the program was accepting the risk of empowering the stakeholders to determine the direction of air quality initiatives in Pennsylvania. DEP had determined that placing full trust in the participants was critical to both the morale and the success of the program. While DEP officials had the opportunity to contribute to discussions as stakeholders, they relinquished a great deal of control by agreeing to equate their voices to those other stakeholders. They also had to

adjust to the concept of an open process, which was unusual for DEP. In essence, they had to place their confidence in somewhat uncharted territory to get the program off the ground.

Originally, DEP had predicted that Pittsburgh would reach attainment of health based ozone standards by the summer of 2000 and that Philadelphia would reach attainment by 2005 at the earliest. However, since the inception of the program, EPA has lowered the ozone standard to 0.08 ppm from 0.12 ppm. Naturally, this new standard will limit the program's likelihood of bringing Pennsylvania into attainment so quickly.

While DEP officials recognize the need to upgrade ozone reduction measures within state borders, the most serious constraint on Pennsylvania's ability to meet the ozone standard is the migration of ozone precursors from upwind sources across state borders. Modelling in the both the Philadelphia and Pittsburgh areas reveals that interstate pollutant transport is a significant factor contributing to the statewide air quality problems. Without cooperation from upwind sources, Pennsylvania will be hard pressed to meet its own attainment standards.

Cognizant of this problem, the stakeholders recommended that DEP pursue initiatives to reduce migration of pollution from upwind sources. DEP has agreed to adopt responsibility for this task. Thus far, the department has petitioned EPA under section 126 of the Clean Air Act for remedies to reduce interstate transport of air pollution and has served on multi-state groups convened to determine how to solve this problem. EPA has not yet responded to the petition, but has proposed to reduce interstate transport of pollutants into Pennsylvania through section 110 of the CAA. If the results of EPA's proposed section 110 action will match a section 126 action, DEP will accept the alternate strategy. If not, DEP will seek a federal court decree ordering EPA to implement section 126 and thereby reduce ozone transport.

V. Evaluating Program Effectiveness

The greatest testimony to the initiative's effectiveness is the ease with which stakeholder recommendations have moved through the regulatory process. Aside from minor public comments on the fine tuning of details, there has been virtually no resistance from either the public or the state legislature. Because the program was designed to coordinate air quality improvements and constituent interests, the fact that the greater population has been largely supportive of the new regulations speaks for the success of the initiative. In addition to gauging continued support for recommended regulations, DEP will look to measurable air quality improvements for determining the success of the stakeholder initiative. The system for measuring air quality is already in place, so DEP can constantly track the program's progress in meeting ozone standards.

While it is still too early to tell how well the stakeholders' recommendations will actually work to reduce ozone pollution, their reliance on sound science bodes well for their success. Rather than creating policies simply to be politically popular, the stakeholder groups helped DEP and DOT to focus on developing programs that would actually solve the ozone problem. The focus on quality of input throughout the process, both from the stakeholders and from independent consultants, helped to ensure that the implemented recommendations will have the technical correctness necessary to bring Pennsylvania into attainment with the ozone standard.

Extensive support for the recommendations by the regulated community is the other major component contributing to the program's expected success. The fact that the adopted strategies were agreed upon through consensus implies that they are amenable to all sectors represented and that DEP and DOT should experience substantially less resistance during implementation than would normally occur. It is arguable that members of the regulated community who did not participate in the process will fail to support the recommended strategies, but this is less likely to occur given the involvement of the public throughout the stakeholder process. It is hoped that by incorporating as many voices as they did into developing the recommendations, DEP decreased the probability of compliance problems in the future.

VI. Program Impacts

Members of the regulatory community benefitted from the opportunity to participate in the development of the regulations to which they will be held accountable. Because they had the opportunity to block any recommendation that would adversely impact their constituencies, the groups' recommendations should impose only manageable impacts on the regulated community. Undoubtedly some new regulations will hinder certain capacities of the regulated community; but by forging consensus with other stakeholders, members of the regulated community accepted the constraints that would result.

The public gained the opportunity to participate in developing air quality protection initiatives for their own regions. The open nature of the entire process offered them unlimited access to key information as well as a voice to advocate their particular interests. Many individuals who entered the process without much experience in air quality control gained a working knowledge of the problems at hand and helped to develop workable solutions.

The regions in which the stakeholders met benefitted, and will continue to do so, from the unification of their communities. Many adversarial bonds have been broken and replaced with a spirit of cooperation and a successful model for working together on complicated and pressing issues plaguing those communities. Lastly, and perhaps most

importantly, the public will benefit from improved health and cleaner air as a result of the stakeholder initiative.

VII. Advice and Lessons Learned

Using an open process is absolutely critical to building trust throughout the process. By eliminating secrecy, all participants and the public were able to see that decisions were truly being based on the best information available and not being contrived by ulterior motives. Not only did this profoundly impact the morale of the stakeholders, but it also led to greater support of recommendations by a variety of interests.

The use of independent facilitators and consultants is also crucial to a productive stakeholder process. Because DEP provided unbiased consultants, stakeholders were able to trust the information being presented. As a result, they were able to work constructively with the facts at hand rather than argue among themselves. Using a professional facilitator who knew how to lead conflicting interests to reach consensus was also critical to the constructive environment of the stakeholder meetings. While it was costly, the focus on quality of factual information and process management proved indispensable.

Lastly, any agency contemplating a stakeholder initiative should be prepared to dedicate a great deal of staff time and effort to the program. DEP had not anticipated just how time-consuming the process would turn out to be. Having experienced the intensely demanding nature of a well-designed stakeholder process, DEP staff members caution others to ready themselves for about a year of very hard work.

This type of air initiative should work well in other areas, provided those involved in the program commit themselves to empowering the stakeholders and to using an open process, professional facilitators and independent consultants, each of which was critical to the success of Pennsylvania's ozone stakeholder initiative.

VIII. Contact for More Information

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