THE AIR RESOURCES IMPACT WORK GROUP

Report to the
Virginia Department of Environmental Quality (DEQ)

November 19, 2002

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I. Executive Summary

Department of Environmental Quality Director Bob Burnley convened the Air Resources Impact Work Group to develop options for improving air monitoring and options for assessing and addressing combined impacts on air quality from power plants and other permitted facilities. The members of the Work Group, who were not asked to reach agreement about any preferred or prioritized options, developed six sets of options and offered ideas about ways of funding any new initiatives other than by state appropriation. Options are characterized in this report as recommendations, using the word "should" throughout, but because of the nature of the Group's charge the presence of an option does not imply consensus or even majority support.

Objective One: Criteria and Sites for New Monitors - The first set of options address concerns about Virginia's air monitoring system and suggest criteria for selecting additional sites. Additional monitors would close the gaps in air quality data and address concerns that there is not sufficient monitoring data to assess air quality impacts of new facilities.

The Work Group developed a detailed list of possible criteria for selecting new monitoring sites, including areas with dense population, limited data, and new proposed industry. Using the list of criteria, the Work Group identified a need for new ozone monitors. It developed options for the siting of five monitors in more populated areas of central and south Virginia, three new $PM_{2.5}$ mass monitors in the central and south Virginia, and one new acid deposition monitor. Also, if future data indicate a need relative to the quantity and toxicity of particulates, two additional $PM_{2.5}$ speciation monitors should be considered.

Objective Two: Using Non-DEQ Monitoring Information - The Work Group also suggested using data from non-DEQ organizations as a way of increasing the DEQ network at a low cost. Options include requiring industry monitors and using special purpose monitoring sites.

Objective Three: Assessing Combined Impacts - Virginia's air permitting program is approved by the U.S. Environmental Protection Agency (EPA). However, public concern remains that the system may fail to address adequately the combined impacts of multiple new facilities. There is particular concern that "minor" sources - proposed facilities that will emit less than 250 tons per year of any regulated criteria pollutants - are not routinely required to conduct a modeling analysis of their impacts on air quality (an air quality analysis).

The Work Group identified a range of options for DEQ consideration. These include:

1) Continue Using Current Procedures: DEQ should continue to use the present new source review procedures. Current procedures require an air quality impact analysis that includes consideration of existing and previously permitted sources for all electric generation facilities with potentially significant air quality impacts.
2) DEQ should require any proposed facility, regardless of its projected emissions, to conduct an analysis of its own localized impacts, and then, even if its modeled impacts were under the established federal thresholds (significance levels), conduct a multi-source analysis of existing major facilities and other background sources. This approach would apply the requirement for air quality modeling to non-PSD facilities. For purposes of this report, this is called a PSD-type multi-source analysis. DEQ should also periodically perform a more sophisticated analysis of all PSD-increment consuming sources.

3) For major facilities, DEQ should require a project applicant to perform a broader multi-source analysis that could include proposed new sources as well as existing and permitted sources.
4) DEQ should periodically perform regional modeling analyses for ozone and $PM_{2.5}$ impacts, to pollutants causing the greatest health concerns. Participation in regional, cooperative modeling efforts may shed light on the performance of State Implementation Plan (SIP) strategies, such as the implementation of ozone precursor cap and trade programs, and suggest new strategies that could be implemented through SIP revisions or other means.

Objective Four: Appropriate tools to assess these impacts, including models - The Work Group reviewed tools that are available for assessing potential impacts on air quality.

To improve the new source review process, the Work Group recommended three options. First, improvements in the state's emissions inventory are recommended as it provides the necessary data for assessing the impacts of existing sources. To conduct combined impact analysis under PSD, modeling methods require readily accessible and current emission inventory data. An improved emissions inventory database may require increased staffing. Second, DEQ should routinely use the best model available to analyze localized impacts, and this means it should seek EPA approval for programmatic use of the AERMOD model. Third, understanding the combined impacts of facilities on regional pollutants such as ozone and $PM_{2.5}$ needs to be a more consistent part of DEQ's work; DEQ should schedule and conduct a periodic regional multi-source analysis.

For the assessment of future air quality for planning purposes, the Work Group suggested two options. The DEQ should schedule and conduct periodic assessments of both local and regional impacts, for the purpose of determining air quality trends in the state. Also, in situations where there are a large number of applicants, DEQ should conduct an analysis of both the current and future proposed facilities to identify their combined future impacts on air quality. This last option interacts closely with the permitting process in that it suggests that any impacts identified would result in conditions attached to permits for all facilities in the "pool" of applicants.

For assessment of specific proposed facilities, the Work Group identified three options, some of which engendered a significant difference of views among members. The first option suggests that permitting and planning should be interactive; triggers should be established in the permitting process to initiate special modeling assessment efforts that would in turn impact the planning process. The second option suggests that the new facilities should be required to pay for pre- and post-construction monitors; this would enable the state to have more data to supplement the monitoring network and therefore better data for modeling and planning purposes. The third option suggests that, when there is a large number of new facilities proposed, the state should impose a moratorium for planning and assessment purposes; a timeline for the moratorium would be set to enable a combined impacts analysis and to provide the proposed facilities with assurances of an endpoint for decisions.

Objective Five: Appropriate Tools to Address Impacts Once Identified - In the event of discovery of unacceptable combined impacts, what permitting and planning actions can be taken? This issue goes to the heart of the controversy that is likely to occur when a number of new facilities are proposed simultaneously. The Work Group identified five options, some of which engendered a significant difference of views among members. These options are:

1) No change: DEQ would continue to consider projects on an individual proposed basis. Applicants should be required to perform a combined impacts analysis of the proposed facility combined with only existing and permitted facilities. If no significant impacts were found, DEQ would permit the facility. If unacceptable impacts are found, DEQ would either not permit the proposed facility if it was the source of the unacceptable impacts, or permit the proposed facility and redress the problems with whatever existing facility was found to be the source of the air quality problem.
2) Proportional reduction in emissions: DEQ would apply an area-wide emissions reduction for all sources in the analyses based on some pro-rationed percentage basis. This would "spread the pain" and should require changes in existing permits. This option would require additional regulatory authority.
3) Designate Non-Attainment Areas Using Airsheds: In cooperation with EPA Region III, the DEQ should create new borders for attainment designation by developing airsheds based on modeling. After the designation of clusters of local jurisdictions as airsheds, if the central monitor reflects poor air quality, the entire airshed would be designated as a non-attainment area.
4) DEQ should continue to revise the State Implementation Plans to address air quality problems found by the monitoring network and modeling efforts; this option suggests DEQ do so on a more regular basis.
5) DEQ should revise "maintenance plans" to address air quality problems found by the monitoring network and modeling efforts; this option suggests DEQ do so on a more regular basis.

Objective Six: Other Issues - Members of the Work Group suggested other options that did not fit within these categories. These include utilizing the NOx SIP allowance allocation rules to reduce emissions through an output-based allowance allocation methodology under the NOx SIP ; obtaining information about health impacts (specifically $PM_{2.5}$), and ecological impacts; disseminating health information to the public; and conducting combined impacts analysis for ammonia and organic nitrogen deposition. Members also suggested promoting general education about air quality and permitting issues, with particular emphasis on using the permitting process as an opportunity for public education. Lastly, members identified a need for a mobile monitoring unit for use in emergency air quality situations.

Objective Seven: Funding Options - Members suggested options for appropriate fees levied on sources of pollution and users and also identified ways of reducing costs. In addition to this strategy, the state should explore federal and foundation sources of seed money and DEQ should consider shifting its internal priorities so that resources would be freed for these initiatives.

II. Introduction and Charge to the Air Resources Impact Work Group

Deregulation of the electric generation industry has spurred a proliferation of new and proposed power plants in Virginia. Some people support deregulation and the choices it can provide. Some also suggest that these plants can provide economic development benefits in the rural localities in which they are established. Others express concern about the potential combined impacts of these power plants and other facilities on air quality and water quantity and quality. Air pollution in particular engenders concern about health and impacts on agriculture, forestry, ecosystems and buildings. Public concern over these new facilities has led to an evaluation of how the Commonwealth can better assess and understand the impact of new air emissions on air quality or the effect of new water usage on water supply, other economic uses, instream flow, and overall ecosystem health.

This *Report* reflects the direction offered by the Department of Environmental Quality (DEQ) Director Bob Burnley in his February 1, 2002 letter to Senator Mary Margaret Whipple concerning impacts on Virginia's air and water resources. In that letter Director Burnley offered the following objectives related to air quality for the Air Resources Impact Work Group:

1. *Evaluate our current air monitoring system and, in conjunction with EPA's pending air monitoring network assessment, develop criteria for selecting additional sites.*
2. *Evaluate and develop criteria for the use of air monitoring information developed by organizations other than DEQ.*
3. *Explore approaches to the assessment of the combined impacts on air quality from existing and proposed sources.*
4. *Identify the appropriate tools that are available to assess these impacts, including development or refinement of models.*
5. *Identify the appropriate tools that could be used to address these impacts once identified.*

Director Burnley also promised to develop cost estimates for implementation of each of these and identify any non-state funds that may be available for these purposes, including federal funds and private funds.

The Air Resources Impact Work Group was convened on June 18 2002 and held five meetings through October 2002. Director Burnley reported that the 12 non-DEQ members of the Work Group were selected for their technical expertise as well as their representation of diverse interests *(See Appendix B for a list of Work Group members.)*. The members were charged with developing options for consideration by DEQ, which would then consider these options before forwarding its recommendations to Senator Whipple.

With assistance from staff of the DEQ, the Work Group developed the options contained within this Report as a step toward improving the Commonwealth's ability to understand and manage the combined impacts of proposed new power plants and other sources of air emissions. The Report structure follows the objectives Director Burnley outlined in the letter to Sen. Whipple. Throughout each section, cost estimates are provided where possible as well as options for how these costs may be met. A final section includes options that Work Group members offered that do not fit within these categories.

The Work Group members were not asked to reach agreement or to prioritize these options. Rather, they were asked to consider all feasible options and offer their judgment about potential benefits, concerns, costs, and other implications of these options. *Thus, inclusion of any option does not imply endorsement of that option by any member or members of the Work Group.*

III. Options and Costs

Objective 1. Evaluate our current air monitoring system and, in conjunction with EPA's pending air monitoring network assessment, develop criteria for selecting additional sites.

Air quality monitoring provides important baseline data and trends for understanding air pollution in the Commonwealth. Additionally, monitoring provides field data that is used in air quality models and thereby addresses ongoing public concerns about the use of modeling in planning and permitting.

The public has expressed concern that there is insufficient monitoring data for specific air pollutants ($PM_{2.5}$, PM10, ozone). Although the Virginia Air Monitoring Network meets and in some cases exceeds the minimum requirements established by the U.S. EPA, there are still large areas of the state that lack current air monitoring data needed to ascertain air quality and health impacts. These diverse areas range from heavily populated metropolitan areas to sparsely populated rural agricultural areas.

The Virginia DEQ Office of Air Quality Assessment (AQA) is currently working with EPA Region III on the upcoming National Air Monitoring Network Assessment. Background discussions about the wants and needs of Virginia's air monitoring network have occurred informally, while face to face meetings are planned for mid-December 2002, with network finalization in March 2003. One aspect of the Assessment that AQA does agree on is the location of an NCORE 2 Multi-Parameter site in the Richmond area. There are 70 proposed NCORE 2 sites in the nation with one in Virginia. These would be operated essentially as research stations sampling for ozone (O3), sulfur dioxide (SO2), carbon monoxide (CO), oxides of nitrogen (NOx), particulate matter (PM), and volatile organic compounds (VOC). In addition, meteorological data would be recorded. A Richmond location has been tentatively decided on due to the higher levels of ozone and PM2.5 than are recorded in the Tidewater area. The Northern Virginia area will be covered by the Washington, DC NCORE 2 site. While the outcome of the Assessment is still pending, nonetheless the Work Group has developed the options discussed below to address Virginia's air monitoring system. (*For further information about the EPA network assessment, see www.epa.gov/ttn/amtic.)*

The "criteria pollutants" measured by the DEQ are: Sulfur Dioxide ($SO_{2.}$), Nitrogen Dioxide (NO_2), Carbon Monoxide (CO), Ozone (O_3), Particulate Matter (PM_{10} and $PM_{2.5}$), and Lead (Pb)). Of these, the Work Group determined that there is a specific need to increase the number of monitors for Ozone and $PM_{2.5}$ in the air monitoring network to support a more representative air quality data base.

In addition to the monitoring of criteria pollutants there are two programs for monitoring acid depositions, the Virginia Acid Precipitation Network (VAPN) and the National Acid Deposition Program (NADP). There are currently seven acid precipitation monitors in both networks. Data generated from the VAPN and the NADP show, among other pollutants, that sulfates and nitrates are impacting the

Chesapeake Bay and Class I Shenandoah National Park and Class I James River Face Wilderness. Because the VAPN is being consolidated into the national network as part of the National Trends Network, some sites are slated for relocation and one new site is being considered in Hampton. Monitoring equipment would be helpful in the continuing effort to determine deposition in the Bay and Class I Areas.

Further information about the existing air monitoring network may be found at www.deq.state.va.us/airmon.

Option 1.1 Establish Criteria For Additional Monitoring Sites The Work Group identified a number of criteria for DEQ to consider in establishing new air monitoring sites. Areas that should receive priority are:

- areas of population density that have limited air quality data,
- areas facing pending impact due to new industry,
- ecologically sensitive and scenic areas (agriculture, forests, rivers and streams, visibility),
- areas where there are significant sources of air pollution, and
- areas where data is lacking for determination of impact on agriculture and air pollution transport.

Other important criteria to factor into site selection are:

- health-based concerns,
- prevailing winds and topography
- availability of EPA or other monitoring data, and
- existence of other DEQ monitors (co-location opportunities).

Consideration for new monitors should also take into account Class I areas and data available from other states, but monitors do need to be placed where they can track Virginia sources.

Option 1.2 Siting For Five New Ozone (O_3) Monitors. The Work Group identified one option of placing five new monitors for ozone in areas of south and central Virginia. The following list shows possible general locations and rationale for increasing the number of ozone monitors. All of the following areas meet the above criteria. The first three are prioritized, and the fourth and fifth are of equal standing.

- Charlottesville area
- Prince Edward County
- Campbell County area
- Bristol area
- Danville area

Costs for Ozone Monitors

AREAS LISTED IN ORDER OF	Charlottesville Area	Prince Edward County	Campbell County	Bristol Area	Danville Area

NEED					
Initial Installation Cost	63,000[1]	116,000[2]	28,000[3]	63,000[4]	28,000[5]
Cumulative Costs of Installation	**63,000**	**179,000**	**207,000**	**270,000**	**298,000**
Yearly Recurring Cost	42,500	42,500	7,500	42,500	7,500
Cumulative Recurring Costs	**42,500**	**85,000**	**92,500**	**135,000**	**142,500**

- ***Option 1.3 Siting For Three New Particulate Matter 2.5 ($PM_{2.5}$) Monitors*** The following list shows the recommended locations for new $PM_{2.5}$ monitors in order of need, prioritized according to the criteria suggested above. Charlottesville: in 1998 when the locations for the new $PM_{2.5}$ network were finalized, Charlottesville was first on the list for the "second batch" that were to be installed. This second set of monitors was not installed; instead continuous monitors were purchased and installed in the Richmond and Tidewater areas. Data from a $PM_{2.5}$ monitor can be used in conjunction with the data from the existing Charlottesville PM_{10} monitor to better determine health impacts.

- Danville: Danville was on the list of the "second batch" of $PM_{2.5}$ monitors that were to be installed, but never were.
- Prince Edward County: a monitor here would be collocated with proposed ozone monitor.

The Work Group also identified another option for two additional $PM_{2.5}$ speciation monitors, which provide more precise data on the types of particulate matter and therefore enable identification of sources for these particulate matter. These two monitors, if added, should be placed in areas where future data indicate there are problematic particulates in terms of quantity and toxicity.

Costs for $PM_{2.5}$ stations[6]

AREAS IN ORDER OF PRIORITY	Charlottesville Area	Danville Area	Prince Edward County
Initial Installation Cost	49,350[7]	77,150[8]	14,350[9]

[1] Charlottesville area: Initial cost includes a new site and one additional Full Time Employee (FTE) out of the Harrisonburg office.
[2] Prince Edward County: Initial cost includes a new site, one additional FTE out of the Lynchburg office, a vehicle, and one additional FTE out of the Office of Air Quality Assessment.
[3] Campbell County area: Initial costs are for a new site.
[4] Bristol area: Initial costs include a new site in Bristol area, and one additional FTE out of the Abingdon office.
[5] Danville area: Initial costs are for a new site in the Danville area.
[6] Note: The costs in this Table are the best estimate possible given current staffing levels. If staff are added in response to other options and duties could include staffing monitors, then these costs might be lower.
[7] Charlottesville area: Is serviced out of Harrisonburg DEQ office, initial cost includes initial set-up of station and hiring one additional FTE. The cost listed assumes that an ozone monitor (recommended in Option 1.2) is *not* installed. If an ozone monitor is installed, then the installation cost for a PM2.5 monitor would drop to

Cumulative Costs of Installation	**49,350**	**126,500**	**140,850**
Yearly Recurring Cost	39,300	39,300	4,300
Cumulative Recurring Costs	**39,300**	**78,600**	**82,900**

Option 1.4 ***Siting One New Acid Deposition Monitor.*** One new NADP acid deposition monitor is suggested to increase the data coverage area. The siting of this new monitor should be decided at the time funding becomes available and should reflect the area of greatest need.

Costs The first year cost would be approximately $10,000 for equipment and set-up. Yearly recurring costs would be approximately $6,000.

Option 1.5 ***Develop Mobile Monitoring Capacity.*** Create a mobile monitoring capacity that can be used for seasonal and/or emergency air monitoring events. This would allow flexibility and timely responses to immediate emergency needs.

Costs The costs for such capacity, which includes items such as shelter with generator, handheld monitors and detectors, maintenance equipment, and modeling, could range up to $600,000**.**

Objective 2. Evaluate and develop criteria for the use of air monitoring information developed by organizations other than DEQ.

The Work Group explored the possibility of using data from non-DEQ organizations as a way of increasing the DEQ network at a low cost to DEQ. A process for doing this is already in place, whereby any non-governmental organization, university, and industry or private sector group can submit data; if the data meets EPA's Quality Assurance/ Quality Control and is submitted to the Air Quality Standards database (AQS). All data from all agencies across the nation that are submitted to the federal AQS database must meet stringent guidelines. Data generated by the DEQ Air Monitoring Network conform with the regulations set forth in 40 CFR Parts 50, 53 & 58. Everything from the type of monitor that will be used and how it is sited, to the maintenance, calibrations and audits is included in these regulations. Because all data conform to these guidelines, comparisons between data sets and judgements using these data sets can be made.

Within Virginia, in addition to DEQ air monitoring, ambient air data is provided by the United States Forest Service, the National Park Service, IMPROVE (Interagency Monitoring of Protected Visual Environments), and the Fairfax County Health Department.

$13,150 and yearly recurring costs would drop to $4,300.

[8] Danville area: Initial costs are for initial set-up of monitoring station, set up of "clean area" in Lynchburg office.

[9] Prince Edward County: Assumes FTE hired under Ozone option.

An expanded monitoring network through the addition of both official and "special purpose" monitoring sites would close the current gaps in the monitoring network and provide numerous benefits. Enhancing the network would:

- provide a more accurate picture of Virginia's air quality for more informed decision-making;
- inform and educate the public about current pollution levels in their areas, and enable Virginians to determine their own contributions to air pollution problems;
- provide more information for determining non-attainment boundaries;
- provide a basis for the determination of need for new permanent monitoring stations;
- inform local government and the community of the need for taking action to improve its air quality, including making informed decisions about new development;

Option 2.1 ***Require Industry Monitors.*** This option would require major source permit applicants to conduct pre-construction and post-construction air monitoring at or near the proposed facility site. The PSD regulation provides the authority for DEQ to require specific permit applicant to conduct pre-construction air monitoring as part of the PSD permit application or post-construction monitoring as a condition of the permit. This additional ambient air quality data collected by permit applicants could add substantial air quality information about various areas of Virginia, especially for those areas lacking an air monitoring station. Additionally, the monitoring station would be stationed where it would represent the impacts of the newly permitted facility. The permit applicant would fund and operate the required air monitoring station for the required time, and then possibly, transfer the equipment to DEQ for on-going future operation. This option would impose some additional cost and time on both the permit applicant and DEQ, and the cost would be dependent on the number and type of pollutants to be monitored. The permit fee should include not only DEQ's staff time required to review the permit application, but also monitoring costs for the period a facility is in operation. An agreement between the applicant and DEQ would be required on the location of the station, pollutants to be monitored, and a protocol for data handling. There may be concerns that pre-construction monitoring may delay a project because the applicant may have to wait for one year before permitting and construction begins. If these concerns arise and the first months (e.g., 4-6 months) of the modeling analysis demonstrate sufficiently clean background conditions, then permitting and monitoring might be allowed to proceed simultaneously.

Option 2.2 ***Develop Special Purpose Monitoring Sites (SPM).*** Special purpose short-term monitoring sites gather information to assist in making permitting decisions and informing the public. These stations do not need to operate on the same frequency as the "official" monitors and employ potential new monitoring technologies. This should reduce operating costs significantly in the short-term.

Ideas for where SPMs should be placed include:

- Areas where large transportation and/or new facilities are being considered or already underway, such as in the New River Valley, the Central Piedmont, and South Central Virginia. This would provide the public with information on the impacts of these developments and enable more informed decision-making.
- State facilities of higher education where they can be used for educational and data collection purposes.

- Emergency situations where immediate data is needed to protect public health and the environment. For example, the National Park Service implements passive ozone samplers to help decide if a permanent ozone monitor is needed.

Additional benefits of using special purpose monitors are:
- provide field data on emerging monitoring technologies;
- provide field training to environmental technicians and scientists, and provide a rationale for securing grants by universities and colleges to train environmental scientists;
- provide educational opportunities at institutions of higher learning or other places.

Cost Savings For Options 1.1 through 2.2, the Work Group identified several ways in which the costs of enhancing Virginia's air monitoring network might be reduced:
- Use public property preferably on or near state colleges, universities and community colleges.
- Use faculty/student labor to operate and maintain the site under DEQ supervision.
- Use conventional and/or new technology equipment. If possible arrange favorable vendor pricing consideration when using new technology in exchange for evaluation results. This fits well within the construct of a teaching lab or research program at our community colleges.
- Use, create, and encourage public-private partnerships. Cost savings can be expected from vendor concessions, reduced operation run time, and use of public land in combination with partnership with Virginia's colleges.

Objective 3. Explore approaches to the assessment of the combined impacts on air quality from existing and proposed sources.

The current system for assessing impacts on air quality by proposed new sources is complex and requires a detailed understanding of the federal Clean Air Act regulations, the National Ambient Air Quality Standards (NAAQS), air modeling programs, air monitoring systems, and the Virginia permitting and regulatory system. Although this system has evolved to address problems since the adoption of the Clean Air Act in 1970, public concern remains that the system may fail to address adequately the combined impacts of multiple new facilities.

Federal statute says that a new facility shall not cause or contribute to a violation of the NAAQs or an allowable Prevention of Significant Deterioration (PSD) increment. A PSD increment is the maximum allowable increase in concentration above an established baseline for a particular pollutant. The federal PSD increments have been set conservatively such that even if an entire increment is consumed, the NAAQS would not be violated.

The permitting process in Virginia is regionalized, where the application is reviewed within 30 days by the DEQ regional office to determine whether the applicant must obtain a PSD permit. The permitting process generally requires good communication between the proposed facility and DEQ and an open sharing of information.

Minor Sources

Proposed facilities that will emit less than 250 tons of any criteria pollutant per year are considered "minor" sources and are not required to obtain a PSD permit; therefore they are generally not required to conduct a modeling analysis of their impacts on air quality (i.e., a PSD air quality analysis). An exception to the 250 ton limit is that 28 source types need a PSD permit at only 100 tons of pollutant per year (*see Appendix F);* however, by definition these are "major sources." Because some of these facilities might be *capable* of producing more than 250 tons of pollutant, but are not planning to do so, they are issued permits that limit emissions below the 250 ton threshold. This "synthetic" limit on their emissions is why these sources are called " synthetic minor" facilities. With regard to recently proposed facilities in the Commonwealth, there are seven plants meeting this criterion as of September 2002 which operate intermittently in times of peak demand for electricity.

Concern arises that numerous smaller facilities that are not required to undergo a PSD air quality analysis could be installed, but together their combined impacts could have a significant impact on air quality without a full analysis of these impacts having been conducted. Concerns about this situation are exacerbated by the fact that these smaller exempt facilities can set their pollutant level at 249 tons, just below the major source threshold level to avoid PSD permitting requirements. Also, there is a concern that the impacts of these smaller facilities on air quality are not examined even though they come into operation during times of the year when there may already exist the greatest air quality concerns (i.e. summer months).

Major Sources

Proposed facilities that will emit 250 or more tons per year of any regulated pollutants are considered "major" sources and are required to obtain a PSD permit, which is intended to provide a greater level of scrutiny of the proposed facility's environmental impacts. In addition, these "major sources," also known as major stationary sources, include the 28 source types that need a PSD permit at only 100 tons of pollutant per year (*see Appendix F).* The PSD permitting process generally takes from eight months to eighteen months to complete. With regard to recently proposed facilities, those meeting this criterion as of September 2002 are 21 total power plants of which 14 are subject to PSD-permitting.

The PSD permitting process requires the proposed facility to first conduct a modeling analysis of its impact, alone, on air quality and related air values. The first modeling effort is intended to determine whether or not the facility's potential maximum impact will be "significant," meaning that it falls above "Significant Impact Levels" (SILs) established by the federal U.S. EPA. (*See Appendix G)* If the facility's individual impacts are below the SILs, then the impacts are considered insignificant and no modeling of combined impacts upon the local area is currently required for the PSD increment analysis. However, additional modeling may be required to assess impacts on Air Quality Related Values (AQRVs) if the facility is proposed near a Class I area (discussed below). If the facility's individual impacts are above the SILs, then a second modeling effort is required to determine the combined impacts of the proposed facility along with all other major sources (PSD-permitted) and other background sources within a geographical area conservatively extending 50 kilometers beyond the defined "impact area". The impact area is determined by the modeling analysis based on terrain elevations and a worst-case scenario considering 5-years of meteorological data. In either case, whether impacts are above or below the SILs, it may be necessary to conduct a separate assessment of potential impacts to any nearby Class I areas (discussed below).

Experts consider the second modeling scenario to be very conservative because the emissions of existing facilities are addressed both by the combined impacts modeling and, to some extent, by the inclusion of an ambient background pollutant concentration in the analysis. This approach effectively results in a "double-counting" of some emissions and ultimately provides a very conservative or high-biased assessment of potential air quality impacts. The analysis is made still more conservative by the fact that legally allowable emission rates, which tend to be substantially higher than actual emission rates, are required to be used in the analysis used to compare modeled impacts against the air quality standards or NAAQS.

If a violation of the NAAQS is predicted during the modeling effort, the source(s) contributing to the violation(s) are identified. If the new proposed facility contributes significantly to a violation, then the permit will not be issued until either the violation or the significant contribution is resolved. Otherwise, the proposed facility can be permitted. If the cause of the violation is an *already existing* facility, then the DEQ reviews the analysis and may, if appropriate, place new caps on that facility's emissions.

During the PSD permitting process, the facility's proposed technology is also subject to review, which is intended to ensure that the best available control technology (BACT) is used for that specific application. The BACT process contains an economic component that allows a source to demonstrate that certain air pollution control technology may be economically infeasible to install. By accepting production limits, a source can avoid requirements to install air pollution control equipment by demonstrating that the equipment is too expensive measured by the cost per ton of the pollutant emitted. Concerns have been raised about this process, as well, that more stringent controls should be imposed.

Non-Attainment Areas

Certain air pollutants have been designated criteria pollutants through the promulgation of National Ambient Air Quality Standards or NAAQS by the EPA. The NAAQS are ambient air quality standards where compliance is determined through air quality monitoring. In general, when monitored data at a given location shows that the ambient concentration of a criteria pollutant is below the standard, the area is said to be and designated an "attainment" area for that pollutant. An area where monitored data shows ambient concentrations that violate a pollutant standard is designated a "non-attainment" area. There are exceptions to this general rule, depending on the particular situation of an area with regard to its air quality plan. (*See Appendix I for a map of current and proposed non-attainment areas.)*

Non-attainment area boundaries are regulatory designations made by the EPA, in consultation with the state and local areas affected. Generally, the location and geographic extent of individual non-attainment areas is determined by air quality data (where available), along with the evaluation certain other criteria related to the formation of ozone such as ozone precursor pollutant emissions, population, expected growth, and others. Associated with a non-attainment designation are several additional regulatory requirements designed to improve ambient air quality and bring an area back into attainment. These requirements include:

- More stringent air permitting requirements, including emission controls and offsets.
- Transportation planning (conformity) requirements.
- Other mandatory controls based on the severity of the air quality problem.
- Development of an attainment plan that includes these and any additional measures necessary to bring the area into attainment.

Class I Areas

The Clean Air Act also established that special areas deserve additional protective measures; these areas are national parks larger than 6,000 acres, national wilderness areas and memorial parks in excess of 5,000 acres, and international parks. Known as Class I Areas, these are managed by the appropriate federal agencies, which include the National Park Service, US Forest Service, and US Fish and Wildlife Service.

To achieve this additional protection for Class I Areas, Congress established two tests that new facilities must pass during the PSD permitting process. First, they must not exceed the established PSD increment of allowable pollution. Second, they must not adversely impact Air Quality Related Values (AQRVs), some of which are hard to quantify and all which are nevertheless important to the public. These AQRVs include visibility, odor, flora, fauna, and geological, historical, cultural and natural resources. New facilities in or near Class I Areas (within 200-250 km or up to 300 km for very large sources) must conduct a modeling analysis to determine whether they could potentially exceed the allowable PSD increments and to determine their impact on the AQRVs.

Title V

An additional required air quality permit is the federal Title V permit for facilities that have begun operation. This permit applies to any facility that could emit more than 100 tons per year and DEQ assesses the facility with fees based on the specific air pollutants emitted on a per-ton basis. This means that some of the "minor" sources exempt from PSD permits should be required to obtain a Title V permit. Title V permits require extensive federal review and are re-issued every five years, however no modeling for combined impacts is required by Title V. With regard to proposed power facilities in Virginia, all those receiving a pre-construction permit will be required to apply for a Title V permit.

Questions to be Addressed

A number of questions are raised by the current permitting system. When if ever should minor facilities (under the 250 ton level and generally not required to conduct a PSD analysis) be required to conduct a multiple source analysis of impacts? When should major sources (over the 250 ton level) be required to conduct a multi-source analysis of impacts even if they do not exceed the "significance levels" (SILs)? What are the options for assessing the combined impacts of major facilities that have determined that their individual impacts are insignificant (below the significance levels).

Overall, the combined impact of new sources on Virginia's air quality is currently difficult to know and to predict. New sources include both new and modified industrial sources as well as mobile sources (on and off-road vehicles and airplanes). In the absence of predictability, public concerns about the combined impacts on health safety, visibility, and ecological systems continue. A number of different factors contribute to this situation. One factor is that an analysis of the incremental increase in pollution caused by new sources needs to have an accurate air quality ambient background value from which to calculate an increase. That background value is currently based on available monitoring data, but in some cases is provided by monitors in other representative parts of the state.

SUMMARY OF OPTIONS FOR ASSESSING COMBINED IMPACTS IN ATTAINMENT AREAS

Source Type	No Action Alternative	Permitting Alternatives	Planning Alternatives
Minor Sources[10]	VDEQ requires modeling similar to PSD requirements of electric generators; air quality modeling may not be required in other cases. Class I modeling is typically not required. No federal BACT determination.	• **Require air quality and BACT analyses** of all new sources with emissions in excess of 100 tons per year (TPY) • **Require consideration of existing major sources** only when impacts exceed "significance" levels or at a lower threshold • **Require consideration of other proposed sources** within the radius of significant impacts • **Limit** added requirements to select source categories	• Include all appropriate minor and major sources in regional modeling exercises (ozone, PM2.5, Class I cumulative impact analyses) • Review cumulative impact of minor sources only in the planning context • Use modeling results in SIP development to eliminate non-attainment areas
Major Sources[11] with Insignificant Impacts	Federal and Commonwealth requirements include no combined impacts. BACT required. Class I impact analysis required.	• **Require consideration of existing and permitted sources** at a lower threshold • **Require consideration of other proposed sources** within the radius of significant impacts	Review cumulative impact of insignificant major sources in the attainment planning context
Major Sources with Significant Impacts	Federal and Commonwealth requirements include combined impacts of new source and existing and previously permitted sources. BACT is required. Class I analyses are required.	• **Require consideration of other proposed sources** within the radius of significant impacts	Review cumulative impact of significant major sources in the planning context

Option 3.1 ***Continue Using Current Procedures.*** Currently, all proposals for major sources with potentially significant impacts (except non-electric minor sources) must conduct a combined impacts analysis that includes all existing and permitted sources. This option says that DEQ should continue to use the present permitting procedures, analyzing multi-source impacts only when the analysis of the specific proposed facility demonstrates that it exceeds the significant impact levels

[10] Minor sources include listed industrial sources with less than 100 tons of annual emissions of criteria pollutants (Appendix F) and other sources with less than 250 tons of annual emissions of criteria pollutants.

[11] Major sources include listed industrial sources with greater than 100 tons of annual emissions of criteria pollutants (Appendix F) and other sources with more than 250 tons of annual emissions of criteria pollutants.

(SILs) for applicable pollutants (except for ozone) and averaging periods. This procedure addresses impacts within the vicinity of the location of the proposed facility. DEQ presently requires synthetic minor sources to perform an air quality analysis similar to PSD requirements.

Costs This option involves no additional cost.

Option 3.2 Modify Review Procedures for New Minor Sources. The Work Group identified a variety of modifications to the permit review procedures for minor sources that could address noted concerns:

- DEQ should require more minor sources to conduct a "PSD-type" analysis (i.e., an analysis that parallels current PSD requirements). Additional criteria would have to be established to determine which minor sources would be required to conduct an air quality analysis. The source would first conduct an analysis of the individual facility impacts, and then if those impacts are under the SILs, a multi-source combined impacts analysis of existing major and minor facilities over 100 tons and background sources.
- DEQ should consider a 100-ton annual emission threshold for "PSD-type" analysis requirements, or limit the need for this analysis to source categories of particular concern.
- DEQ should require review of Best Available Control Technology (BACT) for minor sources in attainment areas.
- In addition, DEQ should consider requiring that the combined impact analyses include all proposed facilities. Proposed facilities include all those that have had pre-application meetings with DEQ, and for which there is an estimated stack height, emissions, and location.
- Lastly, should DEQ decide to *not* require this "PSD-type" analysis of minor source, it should encourage voluntary submittal of combined impact analyses of proposed facilities so that applicants may address public concerns.

Cost: Processing of minor permits would require more effort, and become comparable to PSD permit reviews or greater for affected sources. Such requirements imposed on minor sources may be considered burdensome and even result in withdrawal of the application. Applicant and agency cost increases may each be on the order of $50,000 to $100,000 per application. Because of the costs, a limited list of applicable source categories may be appropriate.

Option 3.3 Modify Review Procedures for New Major Sources

Option 3.3.a For major sources with insignificant impacts, require consideration of existing and permitted sources at a lower threshold. No need has been identified by the Work Group to change the widely recognized PSD thresholds of single-facility Significant Impact Levels (SILs). However, DEQ has discretion to require a demonstration of multiple-source impacts in response to public concerns related to multiple nearby proposals even if those proposals are individually insignificant. A further option in such a multiple-source analysis would be for the analysis to include proposed facilities as well as existing and permitted sources. Proposed facilities include all those that have had pre-application meetings with DEQ, and for which there is an estimated stack height, emissions, and location.

Costs Applicants can (and often prefer to) prepare the individual analysis for major sources. The cost can range widely from $50,000 to $100,000 (or more, if collecting emissions data) to perform the analysis. The cost range could be much less, in the range of $20,000 to $50,000, if one uses a consultant that has previous experience performing such an analysis for the specific source.

Option 3.3b For major sources with impacts above the SILs, require inclusion of proposed facilities in a combined impact analysis. Proposed facilities would not be limited to those with completed applications, but would extend to all those that have had pre-application meetings with DEQ, and for which there is an estimated stack height, emissions, and location. If this option is followed, then DEQ may need criteria to determine when such an analysis should be encouraged. Options for criteria include:

- A request by a locality;
- Evidence of public concern from public participation;
- Particulars of the application, such as potential annual emissions, preliminary impact analysis, or proximity to other proposed or existing sources;

Costs Applicants can (and often prefer to) prepare the individual analysis for major sources. The cost can range widely from $20,000 to $100,000 (or more, if collecting emissions data) to perform the analysis, depending on who conducts the analysis.

Option 3.3c For any new major source, including those with impacts below the significance threshold (SILs), perform the same level of combined impact analysis as in options 3.3a and 3.3b.

Costs Depending on the scope of the analyses and whether they are conducted in-house or under contract, the modeling costs could vary dramatically. The majority of input information is already available to the Commonwealth (i.e., meteorological data and emission inventory) and they have staff expertise in various modeling technologies. The additional cost born by DEQ in implementing this option is mainly the additional staff time necessary to evaluate and review the multi-source (full impact) analyses; however, if additional technical analyses are conducted by DEQ, a considerable amount of staff time will need to be devoted to the work. This approach is more complex than the preliminary (significance) modeling. The cost will be in the range of at least $50.00 per hour for additional permit writer or technical staff time. The total additional cost will likely range from $2,500 to $10,000 per permit. There will be an additional cost for applicants who would not currently be required to perform this analysis and who will require consulting help with the modeling submittal. The multi-source analysis, because it is more complex, requires more consulting resources and hence requires additional expenditure by the applicant. The additional cost to the applicant will likely be in the range of $50,000 to $100,000.

Option 3.4 Periodically Perform a Regional Modeling Analysis for Impacts on Ozone and $PM_{2.5}$. This option addresses pubic concerns about impacts of new facilities on ozone and $PM_{2.5}$ levels, which are perhaps those most directly linked to health concerns.

This option suggests that DEQ periodically perform regional modeling of ozone and $PM_{2.5}$, using the latest modeling system readily available. Currently, in addition to requiring specific modeling

within the context of permit review for proposed facilities, DEQ performs, as part of its planning efforts and in cooperative efforts with other regional jurisdictions, various analyses of combined impacts. Such large scale modeling efforts may be needed to assess air quality issues impacted by a large number of sources over a very wide region, such as ozone, fine particulate matter, acid deposition as it affects Class I areas as well as water resources, and visibility. Participation in regional, cooperative modeling efforts may shed light on the performance of State Implementation Plan strategies, such as the implementation of ozone precursor cap and trade programs, and suggest new strategies that could be implemented through SIP revisions or other means.

This options suggests that DEQ should conduct and sponsor air quality modeling analyses on a statewide basis for three specific emission scenarios: 1) power plant growth in Virginia, 2) all new source growth in Virginia, and 3) an evaluation of contributors to existing air quality in both Class I and Class II areas. If initiated, this effort should be conducted as a cooperative effort with stakeholder involvement. Some stakeholders have expressed a willingness to participate in supporting and developing such an analysis.

There would be several benefits to the Commonwealth of Virginia if a combined impacts analysis, including but not limited to ozone, were to be performed more routinely:

- Information would be generated to enable the assessment of current and planned new facilities on air quality and air quality related values.
- Information would be generated for periodic assessment of PSD increment consumption.
- Information would be generated that could give early warning of potential NAAQS exceedances.
- The public would have more information about combined impacts of proposed facilities.
- The results of the analysis would facilitate the permitting process.
- More information would be available to support regional modeling such as the MARAMA CALPUFF effort.

A technical advisory committee with volunteer representatives from various stakeholder groups should be maintained to advise DEQ on procedures for implementing this periodic modeling assessments, and to advise on interpreting the results.

Costs Regional modeling efforts can be associated with significant costs, so sharing of costs with other jurisdictions and cooperative efforts are appropriate. Additional resources may be needed by DEQ to conduct the regional modeling analysis. The National Park Service participants in the Work Group have suggested willingness to provide MM4/MM5 caliber meteorological data that is appropriate for such regional analyses and modeling, as well as set-up advice, at no cost to DEQ. Other stakeholders, including industry, may be willing to provide significant amounts technical support as well.

If DEQ performs the modeling the costs associated with this option are staff time, creation or updating of the emissions inventory (stationary, mobile and area sources), development of meteorological data and running the actual regional model. Costs are estimated at $25,000 for each modeled run. Stakeholders from the public and private sectors may be willing to provide technical support as well. The total cost is estimated at $150,000 to $250,000.

Objective 4: Identify the appropriate tools to assess these impacts, including development or refinement of models.

KEY **NP = New proposal; not currently done** **NC = No change suggested to current system** **CP = Change proposed to current system**	**SUGGESTED TOOLS FOR….**		
	PLANNING		**PERMITTING**
TOOLS AVAILABLE:	**ASSESSMENT OF CURRENT AIR QUALITY**	**ASSESSMENT OF FUTURE AIR QUALITY**	**ASSESSMENT OF SPECIFIC PROPOSALS**
Pre-construction monitoring	**NP:** ***See option 2.1 require as condition for permit***		
Post-construction monitoring			**NP:** ***See option 2.1 require as condition for permit***
Emission Inventory	**CP** ***Option 4.1*****: improve EI availability**	**CP** ***Option 4.1*****: improve EI availability**	**CP** ***Option 4.1*****: improve EI availability**
Multi-source Localized Models	**NC**	**CP:** ***Option 4.3 Regularize use of multi-source localized models***	**NC**
Regional Models for ozone and $PM_{2.5}$	**NC**	**CP:** ***Option 4.3 Regularize use of regional models***	**NC**
New source review and engineering analysis	**NC**	**NP:** ***Option 4.4 Create "pool" of applicants to enable combined impacts analysis***	**NC**
Triggers in planning to be interactive with permitting analysis	**NC**	**NC**	**NP:** ***Option 4.5 Create triggers in permitting to initiate combined impacts analysis and planning***
Moratorium with time limit to enable combined impact analysis	**NC**	**NC**	**NP:** ***Option 4.6 Use a moratorium to enable combined impact analysis***

From the applicant perspective, adequate information concerning emissions of existing stationary sources for use in modeling has not been readily available from the DEQ. Without this information, PSD procedures for assessment of combined impacts cannot be completed. Improvement of the State's emission inventory system is needed to make combined impact analysis feasible.

There are two types of models for analyzing combined impacts on current air quality. They are localized and long range or regional models.

Localized models

The localized models are simpler and relatively inexpensive, but have no but have no chemistry or deposition capability. For localized models that address visibility, there are two EPA approved models: PLUVUEII and VISCREEN. Localized models are for distances up to 50 kilometers from a proposed facility. The ISCST3 model has been the workhorse of models for years, yet it is being replaced in the near future by the AERMOD modeling system. The AERMOD modeling system is currently about to be

promulgated and will become the new workhorse of models. Its algorithms represent better, improved science and have been thoroughly tested to show much improvement over performance of ISCST3.

Regional models

Typical regional models are of two kinds--Lagrangian (puff) and Eulerian (gridded). The Lagrangian model allows for meteorology to vary over time and space, and address secondary pollutants, wet and dry deposition, and visibility calculations. CALPUFF is a multi-layer, multi-species non-steady-state Lagrangian puff dispersion modeling system that simulates the effects of time and space-varying meteorological conditions on pollutant transport, transformation and removal. It can be applied on scales of meters to hundreds of kilometers. CALPUFF modeling systems are used for regional type impacts upon Class I areas in Virginia and surrounding states when applicable

The EPA and multi-state organizations generally use Eulerian models for ozone analyses because they address atmospheric chemistry in a more detailed manner and can be used over large geographic regions. The initial model setup costs are very high. This type of model is not conducive to addressing single source contributions for comparison to specific thresholds. DEQ is currently using this type of model to address regional pollutant transport issues and to assess combined ozone contributions from several proposed and existing power plants. Example models are CMAQ, CAMX, MAQSIP, and RADM.

It is important to understand that while there are inherent limitations with models, relative to monitoring data they are usually conservative in their predictions if EPA guidelines are followed, which is considered a positive benefit of the models in that it provides a margin of safety in the results.. Some of the difficulties encountered in applying regional models are that they have difficulty incorporating minor variations in emissions; they require that projections be made about future emissions inventory; they operate on various assumptions which may or may not become reality; and perhaps most important for assessing impacts of specific facilities, they are not generally designed to model impacts due to single-sources. They are designed to examine large regions of sources or to examine the effects of general classes of emissions. The benefits of this type of modeling are that the state will be better able to assess air quality trends, potential future hot spots, areas of improvement, and will consequently be better able to make permitting decisions.

Option 4.1 Improve Availability of Emissions Inventory Data for Modeling Purposes. The DEQ currently has comprehensive emissions inventory data that is stored in the agency's centralized database. Once entered into the database, the data is organized into a report that is sent to the regional offices for confirmation that the data entry was correct. This emissions data is not available for permitting modeling purposes until the regional office performs this quality assurance evaluation. Often delays in this step of quality assurance mean that important information is not available in a timely manner. Additional regional personnel or programming resources are needed to improve the turn-around time in quality assurance, to ensure the availability of the emissions data for modeling needed during the permitting process.

Costs This option would require additional personnel to maintain and enhance inventory information. One possible way to fund this option is through allocating additional Title V fees that are already collected.

Option 4.2 Regularize the Use of Regional Models to Analyze Ozone and $PM_{2.5}$ Levels. A regional analysis is most appropriate for determining combined impacts on ozone and $PM_{2.5}$ levels because these pollutants are usually regional not localized problems. A regional analysis requires collection of baseline information, and continued reliance on OTAG analysis and other regional, cooperative modeling exercises, as well as DEQ in-house modeling.

Currently DEQ performs regional analyses on an ad hoc basis for special studies or as required to address regional transport issues. This option suggests that DEQ should perform the regional analysis periodically, as part of its planning process. Because the model operates on a larger scale than specific projects, it is not proposed that a regional analysis be conducted in response to specific proposed projects. Rather, DEQ would incorporate a regional analysis into a larger air quality assessment that it would schedule and conduct periodically.

Costs The cost for DEQ to run the regional model is estimated at $25,000.

Option 4.3 Use Multi-Source EPA-Approved Local Or Regional Models For Periodic Planning. This option suggests that DEQ seek EPA approval to use AERMOD to analyze localized effects on all projects, programmatically. Currently, to analyze localized effects the DEQ uses the Industrial Source Complex (ISC) model, the EPA-approved model. AERMOD is in the process of becoming an EPA-approved model, and is more sophisticated and state-of-the-art. At the moment, AERMOD is used by DEQ only when specifically requested by the Air Division Director and approved by EPA.

Additionally, this options suggests that DEQ should use available modeling technology to assess general air quality trends on a periodic basis as part of a larger planning effort. Currently the DEQ uses ISCS3, AERMOD, and CALPUFF models for permitting and special studies. The DEQ should schedule a periodic assessment of air quality trends in the state for planning purposes.

Costs Depending on the scope of the analyses and whether they are conducted in-house or under contract, the costs could vary dramatically. The majority of input information is already available to the Commonwealth (i.e., meteorological data and emission inventory). Staff time and workload for periodic assessment of air quality trends would be considerable however.

Option 4.4 Conduct Combined Impacts Analysis of a "Pool" of Facilities Including Current Applicants and Future Proposed Facilities. This option would apply to situations where there are a number of proposed future facilities, some of which might be current applicants and some of which might not have begun the permitting process. The DEQ would conduct a combined impacts analysis of this entire pool of facilities, including all current proposed and future proposed facilities.

This analysis is perhaps most important when there may be a large number of facilities that, individually, may not exceed the significance levels (SILs) but which, together, might have significant impacts. Should the DEQ find unacceptable impacts as a result of its analysis, it would

develop a strategy for moving the entire "pool" toward a defined goal of reduced and acceptable impacts. Should an individual project move toward the established goal faster or slower than others in the group, the DEQ should then remove that project from the "pool" and give it separate consideration.

This option is based on the principle of equal treatment for all proposed projects in the "pool." Responsibility for reducing the combined impacts would be shared by all proposed facilities so that the burden of remedies does not fall on the last applicants in line.

The benefits of this option are that DEQ would examine the combined impacts of all potential projects in a way that citizen concerns could be answered. A concern about this option is that it would require additional regulatory authority and slow the permitting process, given that it would require gathering information from all proposed sources for a combined impact analyses, and that this analysis then be incorporated into a regional plan to determine the full impacts. The delay in permitting may amount to years, although this is unknown.

Costs This option also potentially increases the costs to DEQ and applicants, and risks penalizing the first permit applicants in the group. This option would require additional regulatory authority, as individual applicants not exceeding SILs would be subject to restrictions on emissions.

It is possible that the MARAMA (Mid-Atlantic Regional Air Management Association) and NESCAUM (Northeast States for Coordinated Air Use Management) effort to develop large statewide CALPUFF grids may facilitate this option. Once the grids for Virginia and adjacent states are completed with meteorological data and terrain and source information, the analysis may proceed more easily.

Sub-issue: Tools to Assess a Specific Proposal for a New Facility (Permitting Tools)

The state needs to have all of the above tools in place if it is to have an effective permitting system for new facilities. Additionally, a new source review (engineering analysis) and localized models for specific pollutants should be used to assess the impacts of the proposed facility. These alone, however, may not be sufficient to ensure that the impacts of new facilities are assessed and addressed effectively. The following are additional steps that should be taken.

Options 4.5 Establish Triggers in Permitting That Can Be Interactive With the Planning Analysis. This option builds on Option 4.5 above, and suggests that the DEQ should establish specific criteria in permitting that would trigger the larger planning combined impact analysis for a large number of proposed facilities. Criteria should include a trigger threshold for the number of known and projected proposals, as well as a geographical concentration of proposals. For example, if more than X number of new facilities is proposed in the same year, a larger combined impact analysis suggested in Option 4.4 would be triggered. Or another trigger could be if more than X number of new facilities are proposed in the same region or airshed then a larger combined impact analysis suggested in Option 4.4 would be triggered.

Option 4.6 Suspend Permitting or Impose a Permitting Moratorium Until Combined Impacts are Analyzed. In the event of a large number of new proposals, one option is to stop all permitting

until the impacts of the new proposals can be assessed and understood. (*This option is closely related to Options 4.4 and 4.5)* This option would help address public concerns that the state understand the long-term combined impacts of new facilities before permitting. In this option, a moratorium would be imposed by the state until a combined analysis is conducted for all permitted and currently proposed facilities, including those in the local pipeline. All background sources and proposed sources contributing to any violations found would then have their emissions reviewed and limited, if appropriate, to the degree needed to eliminate violations in the combined air quality analyses. The suspension would require that a definite deadline be set for the analysis to be completed and a time for permitting to resume. Specific criteria would be set for determining problematic proposals, such as those that might impact a non-attainment area. The analysis would lead to recommendations for bringing the impacts into an acceptable range, such as recommendations for best available technologies and ways to mitigate impacts on the NAAQS.

This option is consistent with what some other states have done when faced with groups of proposed projects, such as the States of Washington, Maryland, and Kentucky. The benefits of this option are that the state would be able to make better informed permitting decisions by gaining time to assess combined impacts of all proposed new facilities, and public concerns about uninformed permitting would be lessened. However, this option indicates a failure in planning and would be controversial. It could require legislative authority, and it would engender considerable opposition from industry and other supporters.

Costs Sources determined to cause or significantly contribute to a violation would be asked to perform their own multi-source analysis, with the official Statewide CALPUFF modeling grid (developed through the MARAMA and NESCAUM effort mentioned in Option 4.4), which could require additional costs of $50,000 to $100,000 for each source required to perform the model. There could be additional costs associated with any remediation steps that may be required, as well as substantial increases in construction costs caused by delays.

Objective 5. Identify the appropriate tools that could be used to address these impacts once identified.

In the event of discovery of unacceptable combined impacts, what permitting and planning actions can be taken? This issue goes to the heart of the controversy that is likely to occur when a number of new facilities are proposed simultaneously. The question is, can boundaries be put around the combined impact analyses so that there is some known process and certainty for applicants that are part of a large group of proposed projects? Should there be a difference between the way major and minor sources are handled? Also, can a process can be established that ensures that public concerns about the combined impacts on air quality are adequately vetted and addressed?

This discussion, perhaps more than any other, engendered a difference of views among members of the Work Group. These views are represented by a range of options.

Option 5.1 No Change: Keep Permitting and Planning Separate. One option is to continue the current permitting process in Virginia, which separates the planning and permitting processes. The primary context for addressing the issue of combined impacts is the State Implementation Plan. It

would be inappropriate on this basis to propose major changes to the regulatory scheme of the state. This would mean that DEQ would consider during the permitting of projects only existing and permitted projects in the combined impact analysis. During the planning process, however, DEQ would consider *all* proposed projects and its analyses would, in turn, impact both the pollutant limits and proposed technologies suggested for future projects. That is, the results of the planning process would be fed into the permitting recommendations for any future proposal.

This option argues that there should be no permit denial or negative finding for a project whose impacts are found to be unacceptable when added to *future* permitted but not yet permitted projects. Appropriate focus would instead be brought to bear on the source or sources responsible for the problem or potential problem. This option is based on the principle of first-come first-serve, and is consistent with legal principles and PSD rules, so that current applicants for permits are not penalized or impacted by the projected but not yet permitted facilities.

The benefits of this option are that it enables current applicants to proceed faster, with fewer obstacles, and the DEQ to reduce its expenses for combined impact analyses. A concern is that this option risks leaving citizen concerns unanswered, and may lower public confidence in the DEQ's ability to protect air quality. This option also may penalize the last permit applicants in the group.

Costs There are no additional staff costs for continuing with the current system.

Option 5.2 ***Apply a Proportional Reduction of Sources.*** Another option entails applying a set percentage reduction for all sources in the analyses based on some pro-rationed procedure. That would be followed by remodeling for verification of required resultant reduction and implementation of the reduction through the permitting process. This option is closely related to Option 4.4, and would require additional regulatory authority.

Costs Pursuing this option would represent a large cost to DEQ. It would require additional modeling review time at a cost of $50.00/person-hour. It would also require that DEQ re-run the modeling with the calculated reduction included. To impose an area-wide emissions reduction would require that permits be issued to each source for which the reduction is being imposed which incurs the additional cost of staff time needed to issue the permit. There could also be economic impacts on the sources from any restrictions imposed.

Option 5.3 ***Designate Non-Attainment Areas Using Airsheds.*** The current method for designating non-attainment areas relies on a combination of monitoring data and political boundaries. In cooperation with EPA Region III, the DEQ should create new borders for attainment designation by developing airsheds based on modeling. The DEQ should create a plan to establish centrally located monitors that would cover several counties together. In designating the borders for airsheds, the DEQ should complete modeling to determine similarities in air quality among counties and other jurisdictions and based on the model designate clusters of local jurisdictions that would then constitute one airshed. After the establishment of these clusters, if the central monitor reflects poor air quality, the entire airshed would be designated as a non-attainment area. Using this system, airshed-based monitors would have a broader coverage area than those currently located throughout the state and the number of new monitoring stations needed in the Commonwealth might be reduced.

Costs There are no additional costs for this option in terms of staff time. The costs of monitors to clarify the boundaries of a non-attainment area could vary widely and will be dependent on determining the airshed boundaries with EPA.

Option 5.4 Revise State Implementation Plans (SIP) on a More Regular Basis. When air monitoring or modeling discovers problems with specific pollutants within the state, this triggers a review of the State Implementation Plan by DEQ. Specifically, the DEQ would evaluate the existing State Implementation Plan (SIP) with regard to $PM_{2.5}$ or other problematic pollutants, and change the plan to address the specific pollutant problems. Changes in the plan would then be implemented through regulations or standard permitting procedures. This is already done by DEQ, but this option suggests that DEQ should do so on a more regular basis.

Option 5.5 Revise Maintenance Plans for Ozone and Other Pollutants on a More Regular Basis. Maintenance plans are created for Non-Attainment Areas that have improved their air quality sufficiently to become attainment areas once again; the maintenance plan is intended to ensure that the area continues to attain air quality standards required by federal law. Thus far, Virginia has created two "maintenance plans" approved by the U.S. EPA for maintenance of the 1-hour ozone air quality standard in the Richmond and Hampton Roads areas. No maintenance plans have been needed for $PM_{2.5}$ or other pollutants, because there have been no Non-Attainment Areas for these pollutants.

This option specifies that, when the Virginia air modeling or monitoring efforts identify potential problems with air quality, the DEQ should review and change the maintenance plans to address the air quality impacts. It then would implement the changes through regulations. While this is already being done by DEQ, this option suggests DEQ do so on a more regular basis.

Objective 6. Other Important Issues

In addition to responding to their direct charge, members of the Work Group suggested other options to help Virginia have a clear and accurate understanding of its air and water quality and the activities that may impact those resources.

Sub-issue: Reducing Emissions Through Incentives

Option 6.1 Create Incentives for Emissions Reductions of Multiple Pollutants. The U.S. EPA issued a new regulation in 1998 that requires Virginia and other eastern states to develop State Implementation Plans (SIPs) to reduce the regional transport of ground-level ozone through reductions in NOx. This is known as the NOx SIP call. The rule requires that reduction measures for NOx be in place by May 31, 2004, and also provides for a NOx trading program among states to enable cost-effective reduction of emissions. The NOx trading system is modeled on the success of the SO2 trading system.

The EPA rule does not specify how states allocate allowances under the NOx budget cap and trade provisions of required SIP revisions. However, in Virginia, the DEQ was required by the General Assembly to allocate 95 percent of NOx allowances to existing sources, mostly coal-fired

electric generating units. This option suggests that Virginia should create incentives for reduced emissions from all new and existing power facilities by adopting an output-based allowance allocation methodology under the NOx SIP.

Costs This option would require a regulatory change and EPA approval. Cost to the DEQ of this proposal is limited to the administrative costs of rule revision, but thousands of tons of emissions reductions could be achieved by the shift it would create from coal-fired to gas-fired generation and renewables. Here is a unique opportunity for the Commonwealth to reap a significant environmental benefit from deregulation. There would be fewer emission allowances granted to operators of older, coal-fired facilities, and more allowances granted to new, cleaner facilities and renewable energy sources, but the effect on the electricity consuming public would be negligible in a deregulated wholesale marketplace. Costs and benefits would balance, but actual operation of the units would be shifted toward renewables and cleaner energy units, creating a windfall of collaterally reduced emissions of SO_2, particulate matter, mercury, and greenhouse gases.

Option 6.2 Provide Incentives For Cleaner Plants Through the Permitting System. This option would create incentives through the permitting system for facilities that propose new and/or cleaner or environmentally friendly generation technologies. One example of such an incentive is provided by New Jersey, which allows proposed new facilities that use cleaner technology to be moved to the front of the permitting line. This has reportedly led to more applicants using more of the cleaner technologies in order to obtain faster permitting.

In Indiana, the State Air Board adopted rules under the NOx SIP allocation requirements that similarly encourage combined-cycle and other advanced technology electric generation projects by establishing an efficiency threshold above which new sources receive a greater NOx allowance allocation. These were intended to be technology forcing incentives to encourage efficiency as well as lower emissions. This is another example of how NOx SIP allocations could be used by Virginia to provide an incentive to reduce emissions.

Costs There would be no additional cost for this option.

Sub-issue: Health Impacts of Air Pollution

According to the American Lung Association, there are strong correlations between levels of air pollution and either morbidity or mortality; interventions that lower air pollution reduce morbidity. The adverse effects of air pollution (increased morbidity and mortality) occur at any level of air pollution, and there is no evidence of a threshold below which some level of air pollution is not harmful. Reductions in air pollution (ozone, PM_{10}, $PM_{2.5}$) have been documented in Atlanta, Salt Lake City, and East Germany to result in comparable reduction in morbidity, and reduced morbidity is associated with reductions in medical costs, especially for high-end medical expenses such as emergency room visits and hospitalizations. Savings can also be realized from lower employee-absenteeism.

In parts of Virginia, levels of pollution prevail that have significant negative impacts on health. It is important to note that $PM_{2.5}$ arising from mobile sources and fossil fuels are known to be a more significant health risk than PM_{10}, in terms of increased mortality.

Option 6.3 Obtain Information about Health Impacts and Specifically $PM_{2.5}$. Long-term studies should be made on the effect of reducing air pollution on mortality in Virginia. Additionally, it would be important to identify the components of $PM_{2.5}$ that are especially harmful, and the origination of sources of the $PM_{2.5}$ measured in Virginia. The hazardous and non-hazardous components of $PM_{2.5}$ need to be differentiated so that more specific strategies can be developed for addressing the hazardous components.

Option 6.4 Disseminate Health Information to Public. The state should be more aggressive in its efforts to disseminate information to the public about the implications of air pollutants, so that people can make more informed decisions and as a result become a part of the solution. Specific suggestions for ways the state can accomplish this are:

- Put out health advisories based on $PM_{2.5}$.
- Educate weather reporters, news directors and other media communicators about the proper and responsible way of characterizing the air pollution to the public.
- Develop improved press releases and standard AQ advisories for regular release to the news media and county governments; these should include very specific activities for people to avoid as well as activities/behaviors that would enable people of all ages to be a part of the solution.
- The DEQ should find ways to work collaboratively with the Virginia Department of Health on health-related issues and public education.
- To reach people who do not have access to the Internet, consider a toll-free or commercial information line, or adding an option to an existing information line, regarding ozone and $PM_{2.5}$ forecasting and advisories.

Sub-issue: Need For Education of the Concerned Public on Complex Air Quality Issues.

Work Group members are concerned that the public does not have an adequate understanding of air pollution issues in general and, more specifically, the state's methods for monitoring and tracking air pollution. While some members believe that public concern over new facilities is unwarranted in many cases, others believe that there are health and ecological risks from such facilities that remain unknown to the public. The importance of mobile sources (e.g., automobiles) may not be sufficiently recognized.

These are highly technical issues that require understanding of numerous acronyms, numerous federal and state standards, numerous programs to implement those standards, and numerous ins-and-outs of the state permitting program. There is a sense among some that this situation results from a lack of public education and a lack of access to clear, plain English information describing the various aspects of air monitoring, modeling and permitting in Virginia.

There would be a number of benefits associated with an improved public education and information effort by DEQ include:

- The agency would be better positioned to earn public confidence if personnel who interact with the public were trained in the suggested manner.
- The public and local decision-makers would be better informed about air quality issues, the permitting process, and the meaning of pollution measurements, and more informed decisions would be made.

Citizens would be better able to participate in the permitting process and contribute meaningful comments.

Option 6.5 ***Promote General and Ongoing Education.*** The DEQ plays a major role in educating the public; it needs to be careful to maintain a neutral appearance and impartiality in its education efforts, to maintain credibility with the public. Information on the technical aspects of air quality permitting needs to be a continuing public education process. In addition to DEQ's role, all parties have a role to play in the educational process (state, industry, non-governmental organizations), and all need to be active in fulfilling their respective roles. Mechanisms for general public education and information include the web, newspapers, and other media. All parties should use all means possible to improve public education.

The DEQ should be more proactive in educating the public about the current permitting system and the State Implementation Plan (SIP); it should encourage individuals and others to use the DEQ website information in their outreach efforts. The DEQ should also develop a "handout information package" for individuals or organizations to use in their public education efforts. The DEQ should encourage other parties to be forthcoming in providing information to the public.

The DEQ should use simplified language (plain English) when dealing with the public. The DEQ needs to find a way to translate measurements of the presence of air pollution into Plain English so that the public (including local governments) can understand the implications and make informed decisions. This includes explaining the meaning of specific measurements.

Option 6.6 ***Education During the Permitting Process.*** The DEQ should consider focusing some of its public relations efforts on anticipating public concerns and fears related to air quality impacts associated with major new sources. DEQ personnel have been reticent to discuss the potential benefits of the NO_x SIP cap and trade system due to lack of guidance. The agency's leadership should change this. With a bit of guidance, training, and preparation, agency personnel should participate more effectively in public briefings and hearings.

The DEQ should separate the public information meetings from public comment meetings, to provide citizens with sufficient time to digest the information provided before being asked to provide comment. The DEQ also should elucidate the permitting process, specifically indicating how the public can be involved in the various parts of the process.

Different parts of the DEQ should coordinate their efforts, e.g. the office of environmental education working with the air and water divisions on the issues of public education. As an important part of public education and information, the DEQ needs to post permit-specific information on the web so that this information is readily available by the public. This will enable better decision-making.

Costs By addressing the public relations aspect of the issue in a proactive manner, the state could perhaps avoid diversion of scarce technical resources to issues that are better and more cost-effectively addressed through staff training and public education. This could result in long-term cost savings to the state. To meet some of the costs that would be associated with public education and information, the following are proposed:

To the extent that the needs for public participation efforts are the result of specific proposals for new facilities, it may be appropriate to establish application fees to assure that sufficient resources are available to address public concerns in an appropriate manner.

The DEQ should also review the application fee structures of other jurisdictions and consider adjustments to fees to address the costs of public participation.

There could be a cost associated with possible additional staff support needed for the web, particularly if permit-specific information is to be provided on the web.

Sub-issue: Broader Impacts on Virginia's Resources

Option 6.7 Conduct a Broader Assessment of Cumulative Impacts. DEQ should consider developing a way to conduct a broader assessment of cumulative impacts of air emissions. The combined, incremental effects of human activity can negatively impact other important resources such as water. While some minor point sources may be insignificant by themselves, combined impacts from one or more emission sources can result in the degradation of other localized or distant resources. While different offices within the DEQ address the regulatory requirements for air quality, potential and existing impacts on water quality and other resources need to be considered. Analyzing such cumulative effects can be addressed through the traditional components of an environmental impact assessment: (1) scoping, (2) describing the affected environment, and (3) determining the environmental consequences.

Specifically, the current air monitoring programs should be enhanced for ammonia and organic nitrogen (*see Objective 1)*. Currently, however, there is no approved equipment designed for monitoring ambient ammonia. Until such equipment is available, research would involve hand-held sensors. Ammonia deposition in the tidal Bay and Bay watershed needs an improved monitoring network. Such station monitoring should include regions of the watershed where there are high levels of agricultural use of manures and fertilizers. Additionally, atmospheric deposition of organic nitrogen to water surfaces is not well characterized. Current estimates of nitrogen deposition use only scarce measurements of dissolved organic nitrogen. Particulate organic nitrogen is not considered at all in the nitrogen deposition loads to water surfaces due to extremely sparse monitoring data. A one to two year study would provide more information for Bay protection efforts.

Costs The costs are currently unknown, but would involve supplies, laboratory costs, courier fees, site installations, and personnel.

Objective 7. Identify ways that the options might be funded.

The state should explore federal and foundation sources of seed money. DEQ might consider shifting its internal priorities so that resources would be freed for these initiatives. The options below are based on the principle that the polluter/ user, including mobile sources should pay for costs associated with

protecting the resource. However, additional costs of any kind have an impact on industry and may influence siting decisions.

Option 7.1 ***Establish Appropriate Fees Levied on Sources of Pollution and Users.*** Options for funding the costs of additional monitoring costs include public funding or for costs to be borne by the sources of the pollution, specifically certain industries and mobile sources. There are numerous ways to accomplish this goal.

- Since $PM_{2.5}$, PM_{10} and ozone are the key pollutants of concern, the state should consider raising the operating permit fees on VOC, NO_x, and PM_{10} emissions for point sources. An increase of $1/ton would yield approximately $262,000 per year.
- Consider increasing operating fees to cover monitoring and modeling costs. More information is needed on existing operating fees and how they are allocated.
- Dedicate a portion of, or increase, the user tax on diesel and gasoline sales. Earmark that amount for monitoring and modeling efforts. The State of North Carolina has implemented such a program and has had success.
- Consider establishing facility permitting fees to cover the expanded monitoring network.
- Consider creating a facility tax that would be based on the pollution emitted (type, quantity, and source of pollutant).
- Consider a tax on pollutant emissions from all regulated industry in addition to fees required under Title V.
- More information is needed on possible Federal aid.

Option 7.2 ***Identify Ways to Realize Costs Savings.*** To offset the costs that might be incurred by closing the gaps in Virginia's air monitoring system, it is important to note that there also could be considerable *cost-savings* realized by options noted above. Specifically, for the establishment of the Special Purpose Monitors (SPMs), options are:

- Use public property preferably on or near state colleges, universities and community colleges.
- Use faculty/student labor to operate and maintain the site under DEQ supervision.
- Use conventional and/or new technology equipment. If possible arrange favorable vendor pricing consideration when using new technology in exchange for evaluation results. This fits well within the construct of a teaching lab or research program at our community colleges.
- Use, create, and encourage public-private partnerships. Cost savings can be expected from vendor concessions, reduced operation run time, and use of public land in combination with partnership with Virginia’s colleges.

APPENDIX A

Glossary of Terms and Models

AIR MONITORING

AQRV - Air Quality Related Value

AQA - Office of Air Quality Assessment (also know as Air Monitoring)

AMTIC - Ambient Monitoring Technology Information Center, EPA

AQI - Air Quality Index

AIRNow - EPA air quality website with local AQI forecasts

CAA - Clean Air Act

Class I area - area provided special protection by the PSD regulations because of special or regional values from a natural, scenic, recreational, or historical perspective. Under the CAA, three kinds of Class I areas either have been, or may be, designated---mandatory Federal Class I areas, Federal Class I areas, and non-Federal Class I areas.

The two Class I areas in Virginia are Shenandoah National Park managed by the National Park Service and James River Face Wilderness Area managed by the Forest Service. These areas can never be classified as Class II areas and are afforded the smallest degree of air quality deterioration.

Class II area - all other areas that are not designated Class I areas, which can accommodate normal well-managed industrial growth.

CO - Carbon Monoxide

FRM - Federal Reference Method

IMPROVE - Interagency Monitoring of Protected Visual Environments

Major stationary source - a source that can be: (1) classified in one of the 28 named source categories listed in Section 169 of the Clean Air Act (CAA) and it emits or has the potential to emit 100 ton per year (tpy) or more of any pollutant regulated by the CAA, or (2) is any other stationary source that emits or has the potential to emit 250 tpy or more of any pollutant regulated by the CAA.

NAAQS - National Ambient Air Quality Standards

NADP - National Acid Deposition Network

NAMS - National Air Monitoring Station

NEPA - National Environmental Policy Act

NO - Nitric Oxide

NO2 - Nitrogen Dioxide

NOx - Oxides of Nitrogen

NTN - National Trends Network (acid rain deposition)

O_3 - Ozone

OTC - Ozone Transport Commission

PAMS - Photochemical Assessment Monitoring Station

Pb - Lead

PM - Particulate Matter

PM_{10} - Particulate matter equal to or less than 10 microns in aerodynamic diameter

$PM_{2.5}$ - Particulate matter equal to or less than 2.5 microns in aerodynamic diameter

PSD - Prevention of Significant Deterioration

PSD Increment Analysis - An air quality modeling analysis to determine whether or not the allowable PSD increment has been exceeded in some specific geographic area. *[Increment is defined in text on pg 12]*

SLAMS - State and Local Air Monitoring Station

SO_2 - Sulfur Dioxide

SPM - Special Purpose Monitor

VAPN - Virginia Acid Precipitation Network

MODELS

AERMOD Modeling System - a new regulatory steady-state plume modeling platform that includes: 1) air turbulence structure, scaling and concepts; 2) treatment of both surface and elevated sources; and 3) simple and complex terrain. This platform introduced these state-of-the-art modeling concepts into EPA's air quality models. The three components are AERMOD - air dispersion model: AERMET - the meteorological data processor: and AERMAP - the terrain data preprocessor.

CALPUFF Modeling System - a multi-layer, multi-species non-steady-state puff dispersion model that simulates the effects of time - and space-varying meteorological conditions on pollutant transport, transformation and removal. It can be applied on scales of meters to hundreds of kilometers. It includes algorithms for sub-grid scale effects (such as terrain impingement), as well as, longer range effects (such as pollutant removal due to scavenging and dry deposition, chemical transformation, and visibility effects of particular matter concentrations). The modeling system is composed of CALMET - meteorological data processor, CALPUFF - the actual model, and CALPOST - the post processor for all predicted calculations.

CMAQ - The Community Multi-scale Air Quality (CMAQ) modeling system has been designed to approach air quality as a whole by including state-of-the-science capabilities for modeling multiple air quality issues, including tropospheric ozone, fine particles, toxics, acid deposition, and visibility degradation.

CAMx - The Comprehensive Air quality Model with extensions (CAMx) is a publicly available computer modeling system for the integrated assessment of photochemical and particulate air pollution.

ISC - Industrial Source Complex

MARAMA (Mid-Atlantic Regional Air Management Association) - a voluntary association of air pollution control agencies in the Mid-Atlantic region whose activities center around training, common projects and cooperation for all of its members- Pennsylvania, New Jersey, Delaware, Maryland, West Virginia, Virginia, North Carolina, as well as the District of Columbia, Philadelphia and Allegheny County (local agencies in Pennsylvania).

MAQSIP - The Multi-scale Air Quality Simulation Platform (MAQSIP) is a fully modularized three-dimensional system with various options for representing the physical and chemical processes describing regional- and urban-scale atmospheric pollution.

PLUVUEII - a model used for estimating visual range reduction and atmospheric discoloration caused by plumes resulting from the emissions of particles, nitrogen oxides, and sulfur oxides from a single source. The model predicts the transport, dispersion, chemical reactions, optical effects and surface deposition of point and area source emissions.

VISCREEN - a screening model that calculates the potential impacts of a plume of specified emissions for specified transport and dispersion conditions.

APPENDIX B

AIR Work Group Members

Tom Botkins, Westvaco
Joel Cohn, Malcolm Pirnie
Monica Gibson, Southern Environmental Law Center
Ted Handel, Consultant
Dan Holmes, Piedmont Environmental Council
Greg Kunkel, Tenaska
Tim Lough, State Corporation Commission
Naraine Persaud, Virginia Tech
Sheryl Raulston, International Paper
Dudley Rochester, American Lung Association of Virginia
Mark Scruggs, Holly Salazer (alternate), John Notar (alternate), National Park Service
Cathy Taylor, Dominion Power

DEQ Committee Staff
Kirit Chaudhari, Regional Air Modeling (Ozone and $PM_{2.5}$)
Ellie Irons, Environmental Impact Review (EIR)
Tom Jennings, Air Monitoring Group
Ken McBee, Air Modeling for Permits
Jim Sydnor, Air Planning
Chuck Turner, Air Permitting

Institute for Environmental Negotiation (facilitators)
Tanya Denckla
Frank Dukes
Bruce Dotson

APPENDIX C

AIR Work Group Process

The DEQ convened the Air Resources Impact Work Group by selecting 12 people from a large pool of interested applicants chosen for their technical and professional expertise as well as their representation of diverse interests. The DEQ established dates for five meetings and then contracted with the University of Virginia's Institute for Environmental Negotiation to facilitate the meetings and prepare the Work Group's final report.

The Work Group held it's first meeting jointly with the Water Work Group on June 18 2002 at which time both Committees reviewed their charge, which was derived directly from the letter from Director Bob Burnley to Senator Whipple. Director Burnley specified that the Work Groups were not being asked to develop consensus recommendations, but rather to develop the full range of options for consideration by the DEQ.

At this first meeting, the Work Group also reviewed its proposed work schedule, developed guidelines for discussion, identified information needs and began to identify key issues that would need to be addressed.

At its second meeting on July 18 the Work Group heard presentations on air monitoring, air modeling, and modeling analyses required for the Prevention of Significant Deterioration (PSD) permitting. The Committee discussed the issues identified and decided that it would continue its work by breaking into two subcommittees for monitoring and modeling.

At the third meeting on August 8, the two subcommittees each identified gaps in the current system that needed to be addressed. Specifically, the monitoring subcommittee identified the pollutants that needed additional monitoring, identified criteria for the selection of new monitoring sites, discussed the acceptability of data from non-DEQ sources, and for each criteria pollutant discussed its current monitoring network and needs for additional monitors. The modeling subcommittee identified the triggers in the permitting system for using modeling, identified the current localized models and current regional models, and identified other models coming online. The entire committee was asked to do homework prior to the next meeting; each person should complete a blank table in which a specific issue is identified, a proposed remedy is offered, associated costs are identified, and ways of meeting those costs are also identified. There was no limit on the number of tables that an individual could submit, but one table should be used per problem. The IEN collected these tables and compiled them for the next meeting.

At the fourth meeting on September 9, the Committee reviewed and refined the compiled issues and the options proposed by committee members. Additional options were also identified at this time. Lastly, an outline for the final report was developed. The IEN then developed a draft report based on the issues and options developed by Committee members. The IEN worked closely with DEQ during this phase in developing a detailed structure for the report and obtaining technical information for the report.

At its last meeting on October 9, the Committee reviewed the draft report and proposed changes to its structure and refinements to the issues and options. The IEN completed changes to the draft report, again with technical assistance and information provided by DEQ, and e-mailed the draft to Work Group members for their review. Based on the comments received from the Committee members, a final optional

meeting or conference call was needed. The IEN made final changes and provided the final report to DEQ in November 2002.

APPENDIX D

Lessons from Other States

In support of this Work Group initiative, the Institute for Environmental Negotiation examined the policies of adjacent states and other states whose experiences appeared similar to that of Virginia. Because the energy situation and the political climate change so rapidly, and several states were undergoing transitions in their approaches to assessing (and regulating) combined impacts of power plants and other facilities at the time of this research, it would be misleading to report detailed current circumstances for these states.

However, we are able to report a sample of experiences that other states have had in addressing these issues. Some states report few such applications and no changes. Other states, including Georgia, Tennessee, and Kentucky, have imposed moratoriums ranging from brief temporary suspension of power plant applications to longer periods during which comprehensive studies have been conducted. Kentucky produced a lengthy report detailing air, water, land, and secondary impacts of the new power plants.

Some states are imposing new requirements. Tennessee requires that new plants serve state residents and reduce service to state users last in the event of blackouts. Kentucky has a new state review board. Georgia has a new requirement, where technically feasible, that combined cycle plants make use of graywater.

A number of states noted the attention to combined impacts offered by the Bonneville Power Authority (BPA). The BPA serves portions of Oregon, Idaho, Washington and is undergoing a cumulative impacts study for air quality. BPA is also developing a "Cumulative Impacts Protocol" for a water impact study.

APPENDIX E

Resources

Resources identified during the Work Group process follow:

Tennessee: Governor's Interagency Energy Policy Work Group.
http://www.state.tn.us/environment/epo/hotlist.htm#merchant
http://www.state.tn.us/ecd/energy_policy.htm

Kentucky
http://www.nr.state.ky.us/nrepc/powerplantreport.pdf
http://gov.state.ky.us/pressreleases/2002/energymoratorium.htm
http://www.ekpc.com/news.html#LIFTED

Maryland
http://www.mde.state.md.us/
http://www.esm.versar.com/pprp/ceir11/intro.htm

"**What Are Cumulative Impacts?"** from http://www.epa.gov

Piedmont Environmental Council, http://www.pecva.org/powerplants/powerplants.asp

Air Pollution: Meeting Future Electricity Demand Will Increase Emissions of Some Harmful Substances. GAO-03-49, October 30. http://www.gao.gov/cgi-bin/getrpt

Romieu I. et al. Effects of air pollution on the respiratory health of asthmatic children living in Mexico City. American Journal of Respiratory and Critical Care Medicine 1996; 154:300-307. This shows correlation between air pollution levels (ozone and particulates) and respiratory health events.

Pope CA III et al. Lung cancer, cardiopulmonary mortality and long term exposure to fine particulate air pollution. JAMA 2002; 287:1132-1141. This shows correlation between PM2.5 exposure and mortality from lung cancer and cardiopulmonary diseases.

Friedman MS et al. Impact of changes in transportation and commuting behavior during the 1996 Olympic summer games in Atlanta on air quality and childhood asthma. JAMA 2001;285:897-905. This shows that lowering air pollution by traffic control measures was accompanied by reduction in asthma emergency visits.

APPENDIX F

List of 28 source types that need a PSD permit at only 100 tons of pollutant/year

(a) Fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input.

(b) Coal cleaning plants (with thermal dryers).

(c) Kraft pulp mills.

(d) Portland cement plants.

(e) Primary zinc smelters.

(f) Iron and steel mill plants.

(g) Primary aluminum ore reduction plants.

(h) Primary copper smelters.

(i) Municipal incinerators capable of charging more than 250 tons of refuse per day.

(j) Hydrofluoric acid plants.

(k) Sulfuric acid plants.

(l) Nitric acid plants.

(m) Petroleum refineries.

(n) Lime plants.

(o) Phosphate rock processing plants.

(p) Coke oven batteries.

(q) Sulfur recovery plants.

(r) Carbon black plants (furnace process).

(s) Primary lead smelters.

(t) Fuel conversion plants.

(u) Sintering plants.

(v) Secondary metal production plants.

(w) Chemical process plants.

(x) Fossil fuel boilers (or combinations thereof) totaling more than 250 million British thermal units per hour heat input.

(y) Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels.

(z) Taconite ore processing plants.

(aa) Glass fiber processing plants.

(bb) Charcoal production plants.

APPENDIX G

NAAQS, Increments and SILs for Applicable Criteria Pollutants

(Units: micrograms of pollutant per cubic meter)

Pollutant	Averaging Period	NAAQS	Class II Increments	Class II SILs	Class I Increments	Class I SILs
SO_2	3-hour	1300[a]	512	25	25	1.0
	24-hour	365[a]	81	5	5	0.2
	Annual	80	20	1	2	0.1
PM_{10}	24-hour	150[f]	30	5	8	0.3
	Annual	50[d]	17	1	4	0.2
NO_2	Annual	100	25	1	2.5	0.1
CO	1-hour	40,000[a]		2000		
	8-hour	10,000[a]		500		

NAAQS Only for Applicable Criteria Pollutants

(Units: micrograms of pollutant per cubic meter)

Pollutant	Averaging Period	NAAQS
O_3	1-hour (now)	235[c]
	8-hour (near future)	157[b]
$PM_{2.5}$	24-hour	65[e]
	Annual	15[d]
Pb	3-month	1.5

[a] Not to be exceeded more than once a year

[b] 3-year average of the 4th highest 8-hour concentration may not exceed 157 $\mu g/m^3$

[c] Areas in non-attainment with the 1-hour standard must meet that standard before demonstrating attainment with the 8-hour standard

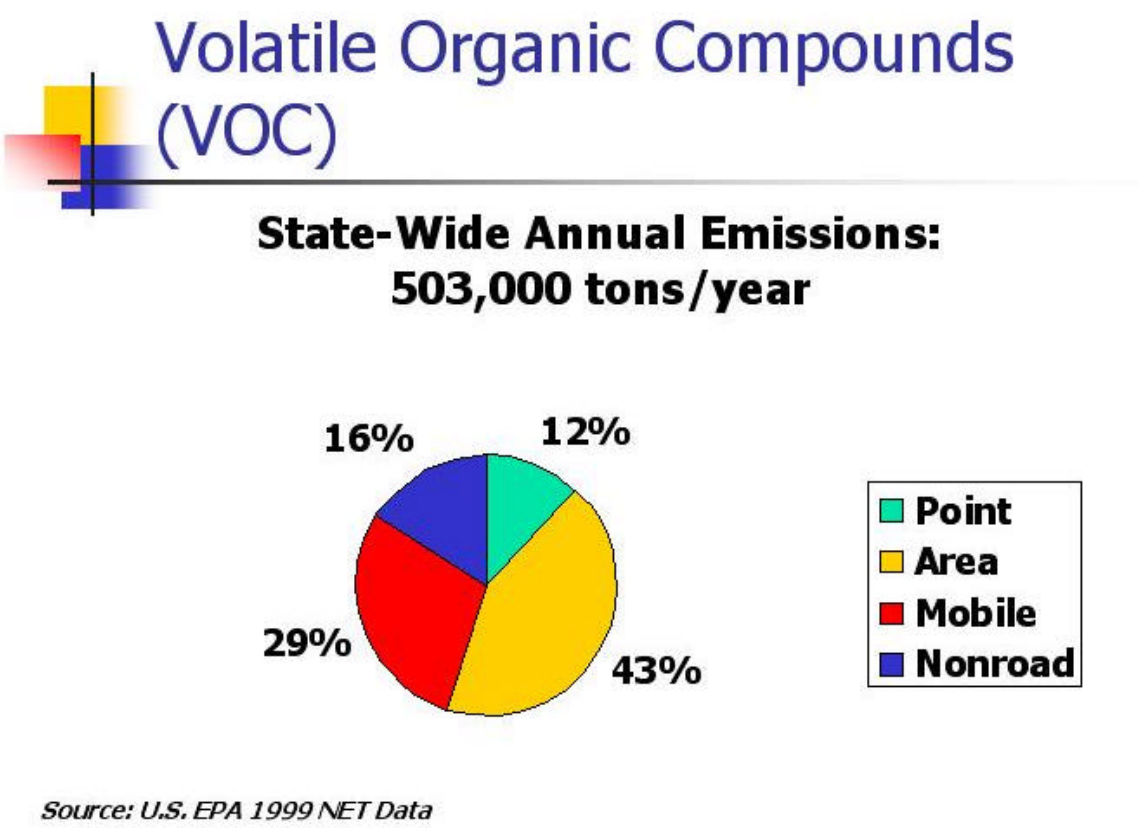
[d] Based on a 3-year average of annual averages

[e] Based on a 3-year average of annual 98th percentile values

[f] Based on a 3-year average of annual 99th percentile values

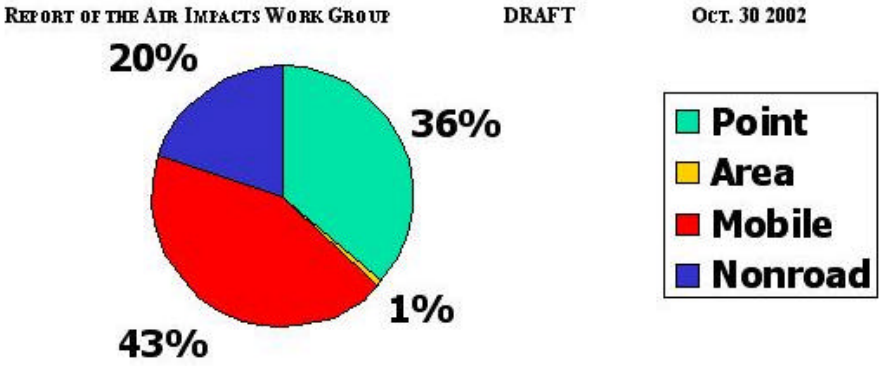
APPENDIX H

Criteria Air Pollutant Profiles for Virginia



Oxides of Nitrogen (NO_X)

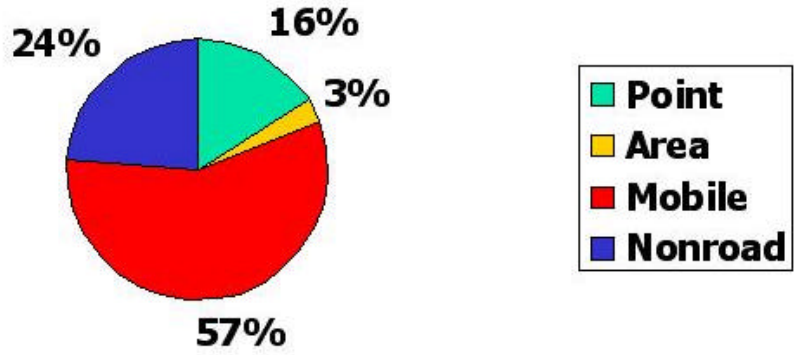
State-Wide Annual Emissions: 603,000 tons/year



Source: U.S. EPA 1999 NET Data

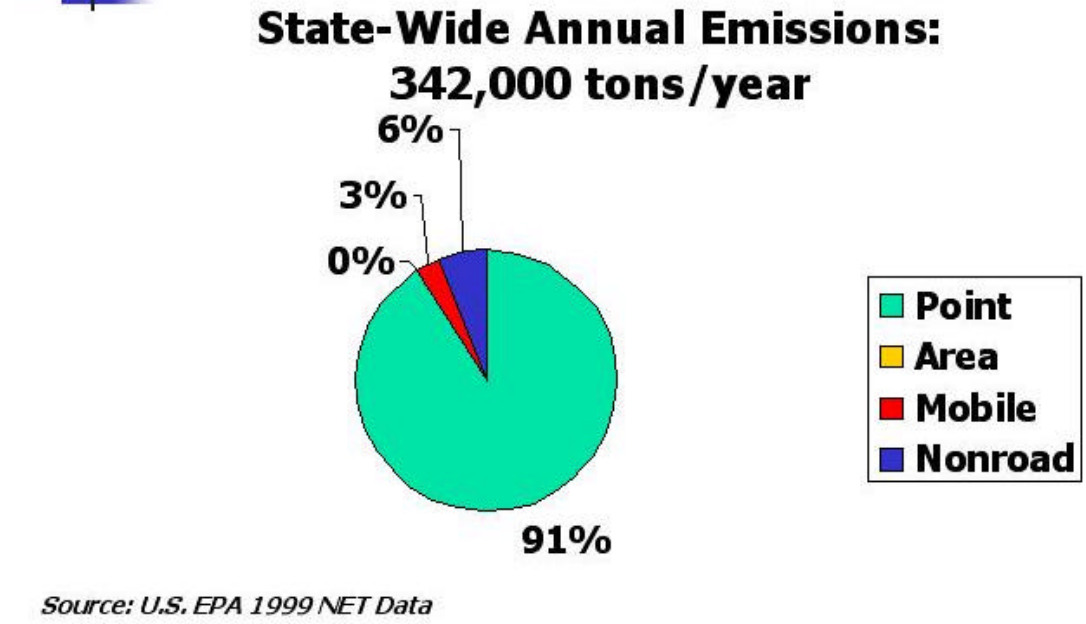
Carbon Monoxide (CO)

State-Wide Annual Emissions:
2,551,000 tons/year



Source: U.S. EPA 1999 NET Data

Sulfur Dioxide (SO_2)



Source: U.S. EPA 1999 NET Data

APPENDIX I

Current and Proposed Non-Attainment Areas in Virginia