Virginia Department of Environmental Quality
Air Resources Impact Work Group Meeting
OCTOBER 9, 2002
DEQ Central Office--1st Floor Conference Room

Meeting Agenda

10 a.m. - Brief description of the contents of the draft report

-Review of the draft report by work group

-Suggested modifications for the final report

12 noon - Lunch

12:30 - Continue discussion of input and options for the final report

2:45 - Public Comments

3:00 - Final comments and closing

NOTE: DRAFT REPORT FOLLOWS

REPORT OF THE AIR TECHNICAL ADVISORY COMMITTEE
**********OCT. 1 2002 DRAFT**********

Table of Contents

I. Executive Summary

[TO BE DETERMINED WHEN REST OF REPORT COMPLETED]

II. Introduction and Charge to the Air Technical Advisory Committee (TAC)

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. In that letter Director Burnley offered the following objectives related to air quality for the Technical Advisory Committee:

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 TAC was convened on June 18 2002 and held five meetings through October 2002. Director Burnley reported that the 12 members of the Air TAC were selected for their technical expertise as well as their representation of diverse interests *(See Appendix >> for a list of TAC 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. The TAC members were not asked to reach agreement about any preferred or prioritized options.

With assistance from staff of the DEQ, the Air TAC 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 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 TAC members offered that do not fit within these categories.

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 for understanding air pollution in the Commonwealth. Additionally, it provides field data that can be used to assess the validity of modeling software programs and thereby address ongoing public concerns about the use of modeling in planning and permitting.

There has been public concern expressed that there is insufficient monitoring data for specific air pollutants (PM2.5, PM10, ozone). Although the Virginia Air Monitoring Network meets the minimum sampling 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 "criteria pollutants" measured by the DEQ are: Sulfur Dioxide (SO2), Nitrogen Dioxide (NO2), Carbon Monoxide (CO), Ozone (O3), Particulate Matter (PM2.5 and PM10), Pb (Lead). Of these, the Air TAC determined that there is a need to increase the number of Ozone and PM monitors 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 rain depositions, the Virginia Acid Precipitation Network (VAPN) and the National Acid Deposition Program (NADP). There are currently seven acid rain 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. 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. Equipment necessary for site development would help determine deposition in the Bay.

Option 1.1 Criteria For Additional Monitoring Sites

The Air TAC identified a number of criteria for DEQ to consider in establishing new air monitoring sites. Areas that should receive priority are:

a) areas of population density that have limited air quality data,
b) areas facing pending impact due to new industry,
c) ecologically sensitive areas (agriculture, forests, rivers and streams, visibility), and
d) area where data is lacking for determination of impact on agriculture and air pollution transport.

Other important criteria to factor into site selection are:

a) health-based concerns,
b) prevailing winds and topography, and
c) availability of EPA or other modeling data.

Consideration for new monitors should also take into account data available from other states, but monitors do need to be placed where they can track Virginia area sources. Data from North Carolina, for example, might support but could not substitute for data collected from the Danville area.

Option 1.2 Placing New Ozone (O_3) Monitors

The Air TAC identified an option of four new monitors for ozone in more populated areas of south and central Virginia. These areas are suggested as interim sites until Non-Attainment Area needs are determined through discussion between DEQ and EPA. The following option list shows possible general locations and rationale for increasing the number of ozone monitors. They are listed in order of need, according to the above criteria.

- Charlottesville: major metropolitan area without ozone monitoring data; close proximity to proposed or recently constructed power plants;
- Prince Edward County: centrally located in a part of the state void of ozone data; close proximity to proposed or recently constructed power plants; monitor would also be in a position to provide ozone transport data and agricultural impacts;
- Campbell County: could be placed to be central to Lynchburg, Martinsville, Danville and South Boston, areas of no current ozone data; close proximity to proposed or recently constructed power plants;
- Bristol: the monitoring site at Rural Retreat, Wythe County is the westernmost ozone monitor in Virginia; monitor in this area would fill a "data void" for southwest VA; close proximity to proposed or recently constructed power plants;
- Danville: area of proposed or recently constructed power plants; no current Virginia ozone data; data is available from North Carolina's monitors.

Costs

1. Charlottesville area: $63,000 initial cost. This includes a new site and one additional FTE out of the Harrisonburg office. Yearly recurring cost is $42,500.
2. Prince Edward County and Option 1: $179,000 initial cost. This includes one new site, one additional FTE out of the Lynchburg office, a vehicle, and one additional FTE out of the Office of Air Quality Assessment, and the $63,000 from Option 1. Yearly recurring cost is $85,000.
3. Campbell County and Option 2: $249,500 initial cost. This includes a new site and $179,000 from Option 2. Yearly recurring cost is $7,500.
4. Bristol and Option 3: $292,000 initial cost. This includes a new site in Bristol area, one additional FTE out of the Abingdon office, and the $249,500 from Option 3. Yearly recurring cost is $42,500.
5. Danville and Option 4: $362,500 initial cost. This includes a new site in the Danville area and $292,000 from Option 4. Yearly recurring cost is $7500.

Option 1.3 Placing Particulate Matter 2.5 (PM2.5) Monitors

The following prioritized option list shows the recommended general locations in order of need and the rationale for increasing the number of PM2.5 monitors.

- Charlottesville: major population area with proposed or recently constructed power plants; in 1998 when the locations for the new PM2.5 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 are being purchased and installed in the Richmond and Tidewater areas. Data from a PM2.5 monitor can be used in conjunction with the data from the existing Charlottesville PM10 monitor to better determine health impacts.
- Danville: major population area with no particulate monitoring and with proposed or recently constructed power plants; Danville was on the list of the "second batch" of PM2.5 monitors that were to be installed, but never were.

- Prince Edward County: rural area with no particulate monitoring; area of proposed or recently constructed power plants; a monitor here would be collocated with proposed ozone monitor.

The Air TAC also identified an option for two additional PM2.5 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

I. Charlottesville PM2.5 station
   a. if station is serviced out of the Harrisonburg DEQ office, first year cost $49,350. This includes initial set-up of station and hiring of an FTE. Yearly recurring cost of $39,300.
   b. if station is run in conjunction with an established ozone monitor with operator (ozone option 1), the costs for the addition of a PM2.5 would be $13,150. Yearly PM2.5 recurring cost of $4,300.

II. Danville PM2.5 monitoring station
   a. first year cost $126,500; yearly recurring cost of $78,600. This includes set-up of monitoring station, set up of "clean-area" in Lynchburg office, hiring FTE, purchase of vehicle, and Option 1
   b. if FTE has been hired in Ozone option 2, first year cost $37,300. Yearly recurring cost of $8,600.

III. Prince Edward Co. PM2.5 monitoring station
   a. first year cost $140,850; yearly recurring cost of $82,900. This includes the set-up of stand-alone monitoring station and Option 2.
   b. if FTE has been hired and site installed in Ozone option 2, cost would be $51,650. Yearly recurring costs of $12,900.

Option 1.4 Placing Acid Rain Deposition Monitors

One new acid rain deposition monitor in the Langley area would increase the data coverage area.

Costs

The first year cost would be approximately $10,000 for equipment and set-up. Yearly recurring costs would be negligible as it would be operated by volunteer operator.

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

The Air TAC 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. All data from all agencies across the nation that are submitted to the EPA database Air Quality Standards (AQS) 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, information 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.

An improved monitoring network through the addition of both official and "unofficial" monitoring sites would close the current gaps in the monitoring network and provide numerous benefits. Closing this gap 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 their air pollution problems;
- provide true non-attainment boundaries based on data and real airsheds not political boundaries.
- provide a basis for the determination of need for new "official" monitoring stations;
- alert the DEQ to the need to find money for the new "official" monitors;
- alert the community to the need for taking action to improve its air quality, so that it doesn't become a non-attainment area;
- provide good field data on emerging monitoring technologies;
- provide field training to environmental technicians and scientists, and grants to universities and colleges to train environmental scientists;
- provide educational opportunities at institutions of higher learning or other places.

Option 2.1 Industry monitors

Permits can require pre-construction air monitoring data from industry; monitoring is usually conducted by an outside contractor.

Option 2.2 Special Purpose Monitoring sites (SPM)

Special purpose short-term monitoring sites could be considered "unofficial" stations for the purpose of gathering information to assist in making permitting decisions and informing the public. These stations would not need to operate on the same frequency as the "official" monitors and could employ promising new monitoring technologies. This could reduce operating costs significantly in the short-term. Ideas for where unofficial or SPMs could be placed include:

- Areas where large transportation and/or new industry is being considered or is already underway, such as in the New River Valley. 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.

Option 2.3 Mobile monitoring capacity

Create a mobile monitoring capacity that can be used for seasonal and/or emergency purposes. This would allow flexibility and cost-effective use of resources.

Option 2.4 Monitoring data from other states

Use of data from other states would enable Virginia to track air flow better.

Costs

Acid Deposition Monitors are privately run. Costs for replacement of two (2) Acid Deposition monitors would run $10,000 per site and personnel costs.

Options for Funding

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 could raise the fees on VOC, NO_x, and PM_{10} (point and area sources) emissions. An increase of $1/ton would yield approximately $855,000 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 or increase the tax on diesel and gasoline sales and earmark that amount for monitoring and modeling efforts.
- Consider establishing permitting fees to cover the expanded monitoring network.
- Consider using a tax based on the pollution emitted (type, quantity, and source of pollutant).
- Consider a tax on pollutant emissions from all regulated industry in addition to Title V.
- More information is needed on possible Federal aid.

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 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.

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

There has been significant concern expressed about the impact of multiple sources that are not required to conduct multiple source impact analysis because they fall outside of the PSD process. Currently, only facilities that emit air pollutants at a rate of greater than 250 tons of pollutant per year are required to obtain a PSD permit, which requires the facility to determine if it will have an impacts on the ambient air. The concern is that numerous smaller facilities not required to undergo this PSD analysis could be installed, but together their combined impacts could have a significant impact on air quality without any analysis of these impacts having been conducted. The question raised by this concern, then, is when if ever should facilities outside of the PSD process be required to conduct a multiple source analysis of impacts?

Option 3.1 Analysis of Multiple Source Impacts

No need has been demonstrated to change the widely recognized PSD thresholds of single facility Significant Impact Levels (SILs). However, DEQ could require a demonstration of multiple source impacts in response to public concerns related to multiple nearby proposals even if those proposals are individually insignificant. Such analyses should be limited to potential impacts within the local area and should not be expected to address regional issues (ozone).

This option would go a long ways towards addressing reasonable public concern related to additive or synergistic impacts on local air quality.

If this option is followed, then DEQ should develop criteria to determine when such an analysis should be required. Criteria that DEQ should consider include the following:

- A NEPA-type of scoping review with public participation could determine if a public concern exists;
- The SIL itself may serve as a cut-off;
- DEQ can formulate criteria based upon the particulars of the applicant, such as size and location;

- Another, arbitrary limit could be set.

DEQ should then provide formal guidance to applicants detailing the requirements for such an analysis. This guidance should clearly spell out both applicant and DEQ responsibilities.

Costs

Applicants can (and often prefer to) prepare the analysis for major sources. Such requirements should not be imposed on minor, insignificant sources or they are unlikely to proceed. The cost can range widely, from $50,000 to $100,000 (or more, if collecting emissions data) to perform the analysis consistent with State Corporation Commission requirements

Option 3.2 Use Current PSD for Proposed Facilities Above SIL's

Continue using the present PSD permitting procedures of analyzing multi-source impacts when the analysis of the specific proposed facility demonstrates that it exceeds the significant impact levels (SIL's) for applicable pollutants (except for ozone) and averaging periods. This procedure is applicable to all areas within the vicinity of the location of the proposed facility and to the Federally protected Class I (applicable increment and AQRV analysis) areas within Virginia and surrounding states.

Costs

From DEQ's perspective this option involves the least additional cost. The cost to the applicants would be the cost currently factored into the PSD permitting process. The largest additional cost associated with accepting this option would be the cost associated with the public's concern that the current PSD process does not properly address the concept of combined impacts. These additional costs show up as:

- additional DEQ regional staff time in responding to comments and attending public briefings;
- additional DEQ Central Office staff time in reviewing source submittals and responding to FOIAs;
- additional DEQ Management staff time in educating and communicating with the public.

Option 3.3 Conduct PSD Analysis for All Applicants

Perform multi-source impacts (PSD type analysis) of applicable pollutants (except ozone and $PM_{2.5}$) for all PSD proposed applications independent of size or insignificant status in its area of influence (county where located and surrounding counties generally out to 50 kilometers) and the Class I areas (increments and AQRVs impacts).

Costs

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) analysis. This approach is more complex than the preliminary (significance) modeling; therefore DEQ will bear this cost for all PSD applications, not just for those that exceed significance levels.

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 cost associated with the public's concern for addressing combined impacts will likely be less for this option because the multi-source analysis does require an inventory of existing and permitted sources be included in the analysis.

Option 3.4 Conduct PSD and Combined Impact Analysis for All Applicants

Perform multi-source (option 2) and combined impacts analysis for all applicable pollutants (except ozone and $POM_{2.5}$) using all proposed sources for all applicable major source applications and

applicable minor source applications for a domain to include the locality around the proposed source and the Class I areas (increments and AQRVs impacts).

Costs

This option requires significant additional expenditures on the part of both DEQ and the applicant. DEQ staff time will be spent in gathering data, establishing emissions levels and evaluating the submittals once the applicant has completed the analysis. The applicant's costs will increase due to the consulting time associated with the additional modeling and the additional time working with the federal land managers and DEQ. The cost associated with additional public scrutiny may be minimal because this approach seems to anticipate the public concern for combined impacts.

Option 3.5 Conduct PSD Analysis for All Applicants and Include Ozone and $PM_{2.5}$ Regional Analyses

Perform option 3 and ozone/$PM_{2.5}$ regional analyses to address all applicable pollutants for any proposed major source in order to determine impacts in the vicinity of the proposed source and on the Class I areas (increments and AQRVs).

Costs

This option represents the highest cost situation for both DEQ and the applicant. The extent of the additional cost depends on whether DEQ or the applicant performs the regional modeling. If DEQ performs the modeling the cost associated with this model are staff time, creation of the emissions inventory (stationary, mobile and area sources), development of meteorological data and running the actual regional model. If the applicant performs this modeling there is a large cost associated with the time required to set-up and run the model as well as the consulting costs and the additional DEQ staff support time to provide emissions data.

Option 3.6 Perform Single Source Modeling Above 100 tons/year

DEQ would develop a written policy requiring that proposed power generation facilities would perform single source air quality modeling for any criteria pollutant (except ozone) with projected emissions in excess of 100 tons per year using standard models and modeling methodologies approved by DEQ for use in support of air permit applications.

For those power generation sources whose impacts exceed DEQ significant impact thresholds for criteria pollutants, an assessment of combined impacts would be required. This assessment would consist of additional multi-source modeling of pollutants for which the proposed source modeling indicated impacts in excess of DEQ significant impact thresholds and would include emissions from the proposed source, nearby large sources and a monitored background concentration.

A written policy requiring the above would address “state major” power generation facilities and would require sources with projected emissions below one of the critical PSD significance thresholds (250 tons / year) to perform air quality modeling. This would largely eliminate the exemption from modeling for power generating facilities projected to emit less than 250 tons per year of a criteria pollutant while still providing a reasonable lower limit to the requirement. It also would Provide regulators and the public with additional information upon which to base permit decisions.

Costs

Costs would amount to $20,000 - $100,000 per project on the part of the applicant. Additional costs may come from the potential delay in air permit processing and additional resource requirements on the part of DEQ to review submitted analyses.

Option 3.7

DEQ would develop a written policy requiring modeling of the proposed facility in combination with other proposed and recently permitted facilities in Virginia to assess the general incremental combined impact upon air quality associated with criteria pollutants except ozone. The modeled impacts would be combined with data from Virginia's existing air quality monitoring network to assess impacts of existing sources. Since the monitoring network is designed to assess impacts from numerous sources of air pollution, including industrial, mobile, off-road, urban, regional background and natural sources, monitored air quality data provides information that is superior to modeled impacts and is the best, simplest and most cost-effective way to assess impacts from existing sources.

DEQ would also periodically model, using the latest modeling system readily available, ozone concentrations within the state. The analysis should be based upon the latest inventory of proposed and recently permitted facilities modeled in combination with the latest inventory of other sources readily available. The emission rates associated with the new and proposed sources should be typical of those conditions that are realistically anticipated to occur.

This analysis should be designed to assess the incremental impact of relatively new sources permitted and proposed for construction in Virginia. Air permit applicants should be allowed to use the latest run conducted by the Virginia DEQ to augment their combined impact assessments designed to address concerns raised by the Virginia SCC as discussed above. These periodic model runs should be conducted by the Virginia DEQ on quarterly basis or other reasonable schedule as allowed by resource constraints.

A Technical Advisory Committee with volunteer representatives from various stakeholder groups should be maintained to advise DEQ on procedures for implementing this periodic ozone modeling assessment and on interpreting the results.

This analysis would address the concerns recently expressed by the Virginia State Corporation Commission and would use air modeling to assess projected impacts to air quality from relatively new and proposed sources.

This approach has the advantage of providing detailed information about the impact of a variety of sources, including new power generation facilities. To otherwise require either a separate, discrete ozone modeling exercise to evaluate each air permit application or to require developing an enhanced ozone analysis capability beyond what the Virginia DEQ currently has available would be extremely burdensome and expensive to permit applicants and to the Virginia DEQ.

Costs

Costs would range from $20,000 to $100,000 on the part of the permit applicant to perform the combined air impact analysis. Additional resources would be required on the part of DEQ to conduct periodic regional ozone modeling and update inventory of emissions.

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

For present procedures, localized effects are analyzed with models like the Industrial Source Complex (ISC) model or the recently developed AERMOD modeling system. Also, CALPUFF modeling system is used for regional type impacts upon the Class I area in Virginia and surrounding states if applicable. These are the standard tools used to perform the current PSD modeling procedures

Issue 4.A: Ozone Analysis

Option 4.A.1 Regional Analysis

Continue to rely on OTAG analysis and other regional, cooperative modeling exercises, as well as DEQ in-house modeling. A regional analysis is most beneficial for what is a regional problem. This option would require collection of baseline information.

Option 4.A.2 Ozone Monitoring of New Facilities

Consider requiring, as a permit condition, ozone monitoring of new facilities located at geographically useful sites. It should be noted that there is a concern with faulty characterization of the relationship between any particular source and nearby ozone levels.

Issue 4.B: Modeling the Combined Impacts of New Sources on Air Quality

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 have a solid baseline from which to operate. That baseline is currently modeled in many parts of Virginia and is not based on actual monitoring data, which causes public concern about the validity of the modeling results. A second factor is the cost of conducting incremental analyses is extremely high, which causes an inability to conduct this on a regular basis.

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:

- Information would be provided that would permit the assessment of current and planned new source growth on air quality and air quality related values.
- Information would be provided for periodic assessment of PSD increment consumption.
- Information would be provided that could give early warning of potential NAAQS exceedances.
- Public concern about cumulative effects would be addressed.
- The permitting process would proceed more efficiently.
- Information would be available for the MARAMA CALPUFF effort.

Option 4.B.1. Conduct a Cumulative Increment Analysis

DEQ could use the process of the required periodic analysis of all PSD increment consuming sources as its guide. A cumulative increment analysis would build a baseline that applicants can use and that Virginia DEQ can maintain as a key means of addressing issues of cumulative effects. Ozone is only one portion of the big picture of cumulative effects.

Option 4.B.2. Estimate the Contribution of New Sources

DEQ could conduct and/or sponsor air quality modeling analyses to estimate the contribution of new source emissions, including estimates of the contribution to ambient concentrations of Criteria Pollutants and estimates of current PSD Class I and Class II increment consumption. The estimates should include the contribution to ambient concentrations, deposition (wet and dry), and PSD increment concentration of primary pollutants (e.g., sulfur dioxide and particulate matter) and secondary pollutants derived from primary emissions (e.g., ammonium sulfate, nitrogen dioxide) emitted or associated with these sources.

Specifically three emission scenarios could be evaluated: 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.

This effort should be conducted as a cooperative effort with stakeholder involvement. The National Park Service would be willing to participate in a collaborative modeling analysis by providing information they have available such as meteorological information and model setup advice.

For localized impacts in the vicinity of the proposed source and impacts on the Class I areas from all other applicable options, ISC and AERMOD modeling system or CALPUFF modeling system may be used for all applicable pollutants (except ozone and $PM_{2.5}$). For ozone and $PM_{2.5}$ impacts, regional type model must be used (CMAQ, DEQ- OADA input).

The models described above include EPA approved or recommended models. The modeling technology for the regional type models varies with pollutant, i.e., whether to use the photochemical models (for ozone) or others for $PM_{2.5}$.

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 would be considerable however.

Issue 4.C: Availability of and Access to Emissions Inventory Information

From the applicant perspective, adequate information concerning emissions of existing mobile and stationary sources for use in modeling has not been readily available from the DEQ. Delays cause unnecessary costs and planning difficulties. Without this information, effective modeling by the applicant of combined impacts becomes difficult at best.

It should be noted that recent budget cuts (September 2002) eliminated several data entry positions.

Option 4.C.1. Provide Additional Resources in the Regions

The DEQ can assess its process for maintaining emissions inventories for existing sources and seek to ensure that up-to-date information is readily available for modeling and permitting purposes. Since such information is provided through the regions, resources need to be provided to the DEQ regional offices. If this is done, timely analyses of multiple existing sources would become feasible, facilitating PSD increment analysis as well as modeling efforts for planning purposes.

Costs

This option would require additional personnel to update, enhance, and maintain inventory information. One possible way to fund this option is through Title V fees that are already collected; these fees should be enough to maintain the emissions inventory if dedicated solely for that purpose.

Option 4.C.2. Use fall-back data from monitoring network

In the absence of such data, analyze proposed and recently permitted sources and use background monitoring data to represent impacts of all the operating sources.

No additional costs are incurred for this option.

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

There are two key ways for addressing combined impacts of emissions on Virginia's air quality: permitting and the establishment of Non-Attainment Areas where localities must impose often stringent measures to reduce air pollution and control health and other impacts.

Issue 5.A: In The Event Of Discovery of Unacceptable Combined Impacts, What Action Can Be Taken?

This issue goes to the heart of the controversy that is likely to erupt when a large number of new facilities are proposed. 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? The converse of that question is whether a fair process can be established that ensures that public concerns about the combined impacts on air quality are adequately vetted and addressed?

Option 5.A.1. Separate Permitting and Planning Processes

One option is to keep permitted and planning processes separate and distinct from each other. 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 within the group analyzed.

This option argues that there should be no permit denial or negative finding for a project whose impacts, when added to future permitted but not yet operating and not yet permitted projects, is unacceptable. 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, so that current applicants for permits are not penalized or impacted by the projected but not yet permitted or operating 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. The downside of this option is that it risks leaving citizen concerns unanswered. It also may penalize the last permit applicants in the group.

Option 5.A.2. Integrate Permitting and Planning

The second option is that the permitting and planning processes need to become more interactive and integrated, so that the DEQ becomes more proactive and responsive to the impacts of current proposed projects. This would mean that the permitting of projects should consider the combined impacts of existing projects, permitted but not yet operating projects, and proposed projects not yet permitted or operating. The

planning process therefore becomes incorporated into the permitting process through this combined impact analysis.

This option argues that, should unacceptable impacts result from a combined impact analysis, the DEQ should combine the proposed projects into a "group" to move these projects as a group 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 could then separate out that individual project from the "group" analysis and give it separate consideration. This option is based on the principle of equal treatment for all proposed projects in the group; responsibility for reducing the combined impacts would be shared by all proposed projects in the group 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. The downside of this option is that it slows the permitting process, potentially increases the costs to DEQ and applicants, and risks penalizing the first permit applicants in the group.

Option 5.A.3. Suspension of Permits

An additional idea that would assist with meeting public concerns is that, should there be a significant group of proposed projects, applications for the entire group should be suspended until the combined impact analysis for the entire group is completed. The suspension would require that a definite deadline be set and the analysis would need to identify which, if any, of the proposals could be problematic. Specific criteria should be set for determining problematic proposals, such as those that might impact a non-attainment area. This analysis would lead to recommendations for bringing the impacts into an acceptable range, such as recommendations for best available technologies and what might mitigate impacts on the NAAQS while also conservatively taking into account the NO_x State Implementation Plan. This option is consistent with what some other states have done when faced with groups of proposed projects.

Option 5.A.4. Resolving Modeled Violations

For present PSD permitting procedure, background sources in the multi-source, refined modeling must be identified if contribute significantly to a modeled violation of a specific air quality standard. If the proposed source is significantly contributing any violation, then either the violation must be remedied or the proposed source must be modified in some manner to cause less that significance in order for the permitting process to progress to issuing the construction and operation permit. However, if the proposed source does not contribute significantly to any violation, then the permitting process progresses. In the mean time, the applicable regional office will facilitate resolving the modeled violations.

Costs

The option described above are the current additional costs for resolving a modeled violation. In DEQ staff time the costs can range from $1500 (30 hours staff time to amend a permit) up to $10,000 in staff time to issue a State Operating permit. The actual costs to the applicant depend upon whether the applicant is causing the violation. If the violation is discovered to be caused by a source included in the list of background sources, the cost to that source will vary depending on the remediation method. The solution could vary from issuing a new permit where the costs would be the applicant's time to requiring installation of controls to reduce emissions.

Option 5.A.5. Permitting Delay or Moratorium

In all other options not dictated by regulations, the permitting process would essentially be halted until resolution of all predicted violations of standards or thresholds since there are no regulatory rules to handle this situation. All background sources and proposed sources, if applicable, contributing to the

violations would have to be determined and then their emissions must be limited to the degree that the violations disappear in further refined air quality analyses with an appropriate model for the impacted area and the distance of the sources from that area.

Costs

This option would require that sources determined to cause or significantly contribute to a violation perform their own multi-source analysis which could require additional costs of $50,000 to $100,000 to each source required to perform the model. There could be additional costs associated with any remediation steps that may be required and increases in construction costs caused by delays.

Option 5.A.6. Proportional Reduction of Sources

Another options 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.

Costs

Pursuing this option would represent a large cost to DEQ. It would require additional modeling review time at a cost of $47.30/man-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.

Option 5.A.6. Revise Maintenance Plans for Ozone and $PM_{2.5}$

As to ozone and potential PM2.5 maintenance area, evaluate existing maintenance plans and change the plans to address the impacts. Implement the changes through the permitting procedure.

Issue 5.B: Designation of Non-Attainment Areas

The current method for designating non-attainment areas relies on a combination of monitoring data and political boundaries. In other words, if an area is determined by monitoring data to exceed the National Ambient Air Quality Standards (NAAQS), then a Non-Attainment area must be established. The boundaries of that area, however, are not determined by additional monitoring but by the boundaries of the political jurisdiction within which the exceedance was found. Public concern has been expressed that this situation does not adequately protect public health safety.

With sufficient monitoring, non-attainment areas could be drawn using scientifically established airsheds and not political boundaries. The following are specific options for how this could be implemented.

Option 5.B.1 Coverage Area of the Monitor

The boundaries of non-attainment areas should be determined by the coverage area of the monitor(s), in consultation with the EPA. Whenever possible, the DEQ needs to work with the EPA in establishing non-attainment areas. Scientific data is needed for determining non-attainment areas from the EPA.

Option 5.B.2 Placement of Monitors in Outlying Areas

When boundaries of non-attainment areas are in question, place monitors in outlying areas to clarify the area's boundaries.

Option 5.B.3 Use of Unofficial Monitors

Consider using unofficial monitors (non-Federal Reference Method (FRM) method) to conduct short-term studies to better define airsheds.

6. Other Issues

In addition to the charge provided the TAC, members 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.

Issue 6.A: Reducing Emissions through Incentives

Option 6.A.1. Provide Incentives for Cleaner Plants

Support timely implementation of NO_x SIP cap and trade system in a manner that reduces emissions and encourages new and cleaner generation.

Issue 6.B: Health Impacts of Air Pollution Are Not Well Understood

The health impacts of air pollution are not yet well understood, although a direct correlation between air pollution and health impacts has been established. This means that if any harmful impacts are reduced, important health benefits result. The adverse effects of air pollution (increased morbidity and mortality) occur at any level of air pollution, and are significant at levels of pollution (PM2.5, PM10, ozone) that are prevalent in Virginia. It is important to note that PM2.5 arising from mobile sources and coal combustion are known to be a more significant health risk than PM10, in terms of increased mortality. Reductions in air pollution (ozone, PM10, PM2.5) 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 will also be realized from lower employee-absenteeism.

Option 6.B.1. Obtain Information about Health Impacts and Specifically $PM_{2.5}$

Additional long-term studies are needed on the effect of reducing air pollution on mortality. Specifically, more information needs to be obtained on the type and sources of dangerous components of $PM_{2.5}$. 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.B.2 Disseminate Health Information to Public

The state needs to 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.

Issue 6.C: Need For Education of the Concerned Public on Complex Air Quality Issues.

There is a sense that the concerned 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. 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 the DEQ and other parties.

- 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.C.1. 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 could be more proactive in educating the public about the current permitting system (State Implementation Plan); it could encourage individuals and others to use the DEQ website information in their outreach efforts. The DEQ could also develop a "handout information package" for individuals or organizations to use in their public education efforts. The DEQ could 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.

The SCC also needs to improve its website so that it is more user-friendly.

Option 6.C.2. Education During the Permitting Process

The DEQ could 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 could change this. With a bit of guidance, training, and preparation, agency personnel could participate more effectively in public briefings and hearings.

The DEQ could 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 could 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 applications, 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.
- The 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.

Appendix

AN INVENTORY OF CUMULATIVE IMPACTS ISSUES OUTSIDE OF VIRGINIA

PREPARED BY IRENE BOLAND, INSTITUTE FOR ENVIRONMENTAL NEGOTIATION

AUG. 19, 2002

States:

South Carolina

Randy Watts - Utilities Division of Public Service Commission

8-10 merchant facility applicants of those, 5 received permits, 1 pending, 1 denial

DHEC is working with EPA to assess the protocols for evaluation of cumulative impacts.

Message left with Larry Turner of DHEC Water Quality and Kevin Clark of DHEC Air Quality.

Georgia
Jack Kapp - Georgia Air Protection Branch
In May 2002, temporary suspension of power plant applications, since then have counseled 3 withdrawals of applications from companies. Currently have 13 applicants, in the past year and a half, seven permits have been issued. Not requiring Ozone Modeling, but do require SO_2, NO_x cumulative impacts modeling. Where technically feasible, are requiring that combined cycle plants make use of graywater, otherwise, no formal changes to the process.

Tennessee
Lee Keck – TDEC Water Supply
Since August 9 2001, there has been a temporary moratorium on power plant submissions. They have since assessed their transmission capacity in western Tennessee where the applicants are focused, and are allowing only four plants to build within the two year time frame, based on the recommendations of the Governor's Interagency Energy Policy Work Group.
http://www.state.tn.us/environment/epo/hotlist.htm#merchant
Also see printout of requirements for energy companies that came out of the meetings. Importantly, Tennessee now requires that the ECD approve any application prior to TDEC. Interestingly enough, Tennessee requires that new plants serve state residents and reduce service to state users last in the event of blackouts.
John Patton - Tennessee Air Pollution Control confirmed that air modeling has not changed. Check this website for links outlining different stages in the process - http://www.state.tn.us/ecd/energy_policy.htm ECD's website contains more info.

Kentucky
The Governor lifted the state moratorium on May 15, 2002 following the signing of the power plant siting bill, Senate Bill 257 which went immediately into effect. The law deals with new merchant power plants and prevents construction without approval from the newly established state review board. "The plant siting law contains a strong environmental review -- for all proposed power plants – by the state Cabinet for Natural Resources and Environmental Protection. It also protects utilities' transmission by requiring merchant plants to pay for any upgrades to the grid caused by their additional load." See link for summary http://www.ekpc.com/news.html#LIFTED

Maryland
http://www.mde.state.md.us/
http://www.esm.versar.com/pprp/ceir11/intro.htm
Maryland Power Plant Research Program, PPRP, "coordinates the State's comprehensive review of new facilities and associated facilities as part of the Sate and Federal licensing program." The PPRP was established in 1971 in response to Calvert Cliffs Nuclear Plant which withdraws 3 billion gallons from the Bay everyday. The website includes numerous pdf files on environmental impacts and good background info on power plants, air pollution topics and discusses water allocation technologies and issues (see printout "Water Supply Impacts"). PPRP is using CALPUFF modeling for air quality decision-making. Maryland does assess cumulative impacts for water through the Department of the Environment, Water Rights.

Oregon, Idaho, Washington
The Bonneville Power Authority serves portions of all three states and is undergoing a cumulative impacts study for air quality. Bonneville Power Authority just finished Phase I of "Regional Air Quality Modeling Study" see "Modeling Overview" in Phase I Results. Use of CALPUFF computer modeling simulates worst case scenario and middle of the road scenario. Also, BPA is beginning to develop a "Cumulative Impacts Protocol" for a water impact study.

Moratorium on power plant permitting in TN, GA, KN, OR, ID, WA. SC and MA have proposals to do so

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Jim Meyer, Bonneville Power Authority, jrmeyer@bpa.gov
Larry Turner, South Carolina, DHEC, Water Quality, 803.898.4300
Randy Watts, South Carolina, Public Service Commission

Resources:

- "What Are Cumulative Impacts?" from www.epa.gov
- Journal of the American Water Resources Association article on State Water Law Reform
- Jonathan Hull, Southern Legislative Council, Chattahoochee R. water supply dispute settlement, see article "The War Over Water"
- Center for Groundwater Research, http://www.rcgrd.uvm.edu/ for technical articles
- Shared Vision Modeling- occurred between Florida, Georgia, Alabama, see summary
- National Water Resources Association, http://www.nwra.org/
- Todd Edward's Article,"Water Permitting Fees and TMDL Development in Southern States"
- http://www.pecva.org/powerplants/powerplants.asp
- See powerplantreport.pdf from Kentucky DEP on cumulative impacts from http://www.nr.state.ky.us/nrepc/power
- See Kentucky DEP excerpt "Power plants impact study – water supply issues
- See article on moratorium, and 'siting board" http://gov.state.ky.us/pressreleases/2002/energymoratorium.htm
- Read about Tennessee's use of moratorium, also includes concerns about transmission capacities and decision to allow only four plants in the next two years.
- www.kyrc.org/webnewspro/100401095464209.shtml see printout

Abbreviations for Department of Environmental Quality
Air Monitoring and Models

AIR MONITORING

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
CO - Carbon Monoxide
FRM - Federal Reference Method
IMPROVE - Interagency Monitoring of Protected Visual Environments
NAAQS - National Ambient Air Quality Standards
NADP - National Acid Deposition Network
NAMS - National Air Monitoring Station
NO - Nitric Oxide
NO2 - Nitrogen Dioxide
NOx - Oxides of Nitrogen
NTN - National Trends Network (acid rain deposition)
O3 - Ozone
PAMS - Photochemical Assessment Monitoring Station
Pb - Lead
PM - Particulate Matter
PM10 - Particulate matter equal to or less than 10 microns in aerodynamic diameter
PM2.5 - Particulate matter equal to or less than 2.5 microns in aerodynamic diameter
SLAMS - State and Local Air Monitoring Station
SO2 - Sulfur Dioxide
SPM - Special Purpose Monitor
VAPN - Virginia Acid Precipitation Network

MODELS

CMAQ - Community Multiscale Air Quality modeling system
MAQSIP - Multiscale Air Quality Simulation Platform
CAMx - Comprehensive Air Quality Model with extensions
ISC - Industrial Source Complex

OTHERS

PSD - Prevention of Significant Deterioration
AQRV - Air Quality Related Value