ADEQ NON-CRITERIA POLLUTANT CONTROL STRATEGY
1996 REVISION
(reprinted 12/2001)

PREAMBLE: GUIDE FOR IMPLEMENTATION

Following is the Arkansas Department of Environmental Quality's (the "Department's") latest revision of its policy for dealing with "noncriteria pollutants" i.e., air pollutants for which no specific federal or state emission limit have been established through rulemaking or scientific consensus. There are tens of thousands of chemical compounds produced in the United States for which epidemiological data concerning environmental exposure is lacking. Given the potential for acute or chronic public health effects from unstudied air emissions and the immense uncertainty in this field of regulatory concern, the Department developed the Non-Criteria Pollutant Control Strategy (the "Strategy") in 1988. The Strategy is a methodology for examining the potential public health effects of air emissions from facilities, within the Department's regulatory authority.

In the past, the legal effect of this Strategy has been misinterpreted by both the regulated community and the Department staff. This Strategy is a guideline, a methodology, a way of thinking about a particular regulatory problem. The Strategy is reduced to writing to prompt a regulatory dialogue on these issues in a scientific manner. With a legal status short of a regulation, the Strategy allows for the flexibility necessary to accommodate advances in science, information gleaned from federal agencies or other states, or other credible information that the drafters of the Strategy did not anticipate.

In actual practice, the Strategy will begin a regulatory exercise to determine whether additional information concerning proposed noncriteria air emissions from a facility is necessary. The "first cut" is conservative, but in practice releases a majority of permitted facilities from further regulatory inquiry. Any subsequent inquiries will take into account the magnitude of the cumulative risk involved and the resources available to the permittee, with the Department providing technical analyses whenever possible. At any stage in this procedure, the Department will consider any evidence submitted by the facility supporting the determination that further inquiry is not needed, even if such evidence is not specifically contemplated by the protocol set out in this Strategy.

Properly implemented, the Strategy may reveal that noncriteria emissions from a facility pose such a potential human health risk that additional controls or other limits on emissions are prudent. In such cases, this Strategy does not itself serve as the legal basis for requiring more stringent emission controls. Instead, Arkansas state law [A.C.A. §8-4-203(c)(2)] clearly defines the legal issue at stake in such circumstances:

> In the case of any discharge limit, emission limit, environmental standard, analytical method, or monitoring requirements the record of the proposed [permitting] action ... shall include a written explanation of the rationale for the proposal, demonstrating that any technical requirements or standards are based upon generally accepted scientific knowledge and engineering practices.

While the Strategy may serve as a mechanism for developing the scientific basis for a permit condition required by A.C.A. §8-4-203(c)(2), it is important that both the Department staff and the regulated community understand that the Strategy is a process for gathering scientific information, not a legalistic procedure. This Strategy does not impose any new procedural requirements that are enforceable in and of themselves. Any regulatory decisions stemming from applicability of the Strategy must be supported by generally accepted scientific knowledge, not fidelity to procedure.

Uncertainty should foster cooperation, not resort to lega1 certainties inappropriate for the subject matter. This Strategy should be used as a tool for cooperatively investigating the potential human health impact of air emissions for which toxicological data is uncertain. To the extent practicable, any regulatory issues identified by application of this Strategy shall be addressed in a process parallel to any existing permitting process.

On occasion, the Department may become aware of emissions from a facility that exceed the Presumptively Acceptable Emission Rates, but such emissions have not previously been reviewed under this Strategy. In such cases the Department may contact the facility and request information to enable this evaluation to be undertaken.

This Strategy is implemented pursuant to state rather than federal law, thus any air permit provision resulting from application of this Strategy is state enforceable only.

IMPLEMENTATION

As a first step in implementation of the Strategy, facilities are required to submit a list of all air contaminants that might reasonably be expected to be emitted from the facility with emission rates above any applicable regulatory *de minimis* levels. Facilities should provide measured or estimated emission rates for each air contaminant for which the facility, through general process knowledge, knows to be emitted above regulatory *de minimis* levels. The list and reported emission rates should be based on the best available information from test reports, emission factors, technical literature, knowledge of process, etc.

Facilities are encouraged to provide any degree of documentation desired that may negate the need to conduct in-house screening, expedite the review or otherwise alleviate potential concerns. Such documentation might include assertions that non-criteria pollutants are not emitted, assertions that potential emissions of non-criteria pollutants result in insignificant impacts, etc. If the emission rates in question are below the Presumptively Acceptable Emission Rates ("PAERs") back-calculated from ADEQ's Presumptively Acceptable Impact Levels ("PAILs") described herein using an application of the latest version of the Industrial Source Complex-Short Term air quality model approved by EPA, currently ISC-ST3, to assumed conservative point source emission parameters, the facility may simply refer to this list of PAER rather than reproduce the modeling. This list of PAER is used solely as a screening exercise. There is no intent to imply that emissions from particular sources in excess of the listed PAER present a health risk.

If, after reviewing the above described documentation, the Air Division determines actual screening is warranted, the Air Division will conduct a preliminary screening based on the information provided and its own resources and release applications that obviously satisfy the strategy. If the preliminary screen indicates compounds requiring additional consideration, the permit writer or other qualified Division staff will conduct an in-house, second stage screen by running EPA approved air dispersion models with model inputs derived from information contained in the application or subsequently obtained from the facility. This modeling will be conducted with regulatory default options unless the facility has provided information which preempts the use of such defaults. Resulting predicted ambient concentrations will be compared to the PAILs described herein. Modeling will be consistent with the principals described in the EPA document "Guideline on Air Quality Models." During these first and second stages of modeling, the facility may contact the permit writer assigned to its facility to monitor and potentially provide additional information to the process.

If a second-stage screen conducted by the Air Division indicates the potential for ambient concentrations exceeding the PAILs, the Air Division will immediately notify the facility of its findings for specific air contaminants and indicate its intent regarding further evaluation of these emissions. This notification will include a statement that the facility may be required to submit additional information to demonstrate that the projected ambient concentrations do not result in unacceptable impacts to human health or the environment, and/or that the Air Division may develop and impose specific permit conditions unless the facility elects to reduce the projected ambient concentrations of specified air contaminants.

At this stage, the facility may take any combination of the following measures:

1. Use refined modeling to predict lower concentrations; or
2. Revise emission rate estimates;
3. Use alternative risk assessments to develop site specific presumptively acceptable impact levels;
4. Propose additional control of emissions of contaminants of concern;
5. Propose alternative operating scenarios that result in lower modeled concentrations;
6. Install ambient air monitors at appropriate locations;
7. Accept emissions limitations in a permit that result in lower modeled concentrations.

The notification to the facility will contain these options and ask for the facility's intended course of action. Any refined modeling or risk assessment will be the responsibility of the facility and subject to review and approval by the Air Division. Facilities may choose among EPA approved or generally accepted documents, including regulations, guidance documents, policies, models, etc. Unless and until notified otherwise, the application review will continue with the assumption that the facility will accept the operating conditions that are developed and implemented by the Air Division.

The Department may request information which will enable the permit writer to evaluate the risk associated with exposure to such compounds, taking into account the likely exposure pathways and concentrations.

PRESUMPTIVELY ACCEPTABLE IMPACT LEVELS

The Presumptively Acceptable Impact Level shall be a maximum ambient 24-hour average concentration less than or equal to 1/100th of the Threshold Limit Value (TLV) for each substance emitted. TLV values are updated and published on an annual basis by the American Conference of Governmental Industrial Hygienists and can be found in a booklet titled *Threshold Limit, Values (TLVs) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs).*

The ambient concentration resulting from the proposed emission rate of a substance is determined by using atmospheric dispersion models to obtain the maximum ambient, ground level concentration expressed as a 24-hour average. AERMOD, a freely available atmospheric dispersion model developed and supported by the Environmental Protection Agency, is used by the Air Division and is the preferred model. Other EPA approved models may be used when necessary or appropriate. Regulatory default options are used unless supporting information justifies the use of non-default values.

All sources of a particular pollutant shall be modeled at the allowable or actual emission rate, whichever is higher. A rectangular grid, with the emission sources at, or near, the center and a maximum spacing of 100 meters between receptors is used. Concentrations on a sources' own property do not need to be reported if the public is excluded by an effective physical barrier (e.g. the area inside a plant security fence).

The meteorological data used in the model will be the most recent available full year of data and, for multiple year runs, the most recent available full years. Little Rock/North Little Rock surface and mixing height data are appropriate for most modeling in Arkansas. Other regional meteorological data may be used when appropriate and available. When reporting the ambient concentration for a one-year run, the highest-first-high value is used. For a five-year run, the highest-second high value is reported. Values flagged as “calm” should not be excluded.

PRESUMPTIVELY ACCEPTABLE EMISSION RATES

The Presumptively Acceptable Emission Rate (PAER) for a substance is obtained by the use of the following equation.

PAER (lb/hr) = 0.11 x TLV(mg/m^3)

A brief description of the derivation of the conversion factor is given after the following examples. Example 1 shows the use of this factor to obtain the PAER for toluene.

EXAMPLE 1

A facility emits toluene and wants to determine the Presumably Acceptable Emission Limit without conducting atmospheric dispersion modeling.

The TLV for toluene is 188 mg/m^3.

PAER (lb/hr of substance emitted) = 0.11 x 188 mg/m^3 = 21lb/hr toluene

If the facility emits more than 21 lb/hr of toluene, an atmospheric dispersion model using facility-specific inputs will be required. If the resulting maximum 24-hr average ambient concentration exceeds 1880 ug/m^3, additional review may be necessary.

In many instances, non-criteria pollutants and other volatile compounds are emitted from the same source. If total volatile organic compound (VOC) emissions and either total or individual non-criteria pollutant concentrations are both known and consistent, the PAIL or PAER can be based on various alternative scenarios. In the following scenarios, the required degree of speciation and the potential for specific permit conditions and related testing, reporting and recordkeeping requirements increase with each scenario described.

1. All compounds can be assumed to have the same PAIL or PAER as the compound with the lowest TLV/100 concentration.

2. Compounds with low TLV/100 concentrations may be addressed individually and the remaining compounds assumed to have the same PAIL or PAER as the remaining compound with the lowest TLV/100 concentration

3. All compounds can be considered individually.

Example 2 shows the application of scenarios 1 and 2 above.

EXAMPLE 2:

A paint booth has a throughput capacity of 6 gallons of paint per hour. Two enamel coatings and a clear coat are applied (at different times) in this booth. The coatings contain various non-criteria pollutants, all of which happen to be volatile organic compounds (VOC), at different percentages. The VOC content of the coatings are indicated in the Physical Data section of the material safety data sheets (MSDS) under the heading "Percent Volatile by Volume." In order to perform the VOC calculations the percent volatile by weight must be obtained from the manufacturer of the coatings and used in subsequent calculations.

Based on historic data, the facility knows that no more than 750 gallons of paint are applied monthly. The facility requested to be limited in its air permit to 750 gallons per month of paint. For this reason, the air permit will contain a specific condition limiting monthly usage to no more than 750 gallons. (Note: Without the specific condition, the annual emissions would have to be based on the assumption of 6 gallons per hour and 8760 hours of operation per year. It is normally easier to maintain records and demonstrate compliance with limits that are based on the amount of material used than limits based on hours of operation.)

As can be seen by examination of the following spreadsheet, both the hourly emission rate of total VOCs and the hourly emission rate for the total speciated compounds are potentially higher than the PAER for toluene (the constituent with the lowest TLV). A limit based on Total VOC emissions could not be used to demonstrate that emissions are lower than the PAER.

For black enamel, the combined emissions of the non-criteria pollutants MEK, MIBK, toluene and xylene (21.2 Ib/hr) would not exceed the PAER for toluene (21.2 Ib/hr). A permit condition limiting the application rate to 6 gal/hr could be used. Since the clear coat does not contain any speciated compounds that exceed the PAER for that compound, the 6 gal/hr limit would also effectively limit emissions from applying the clear coat.

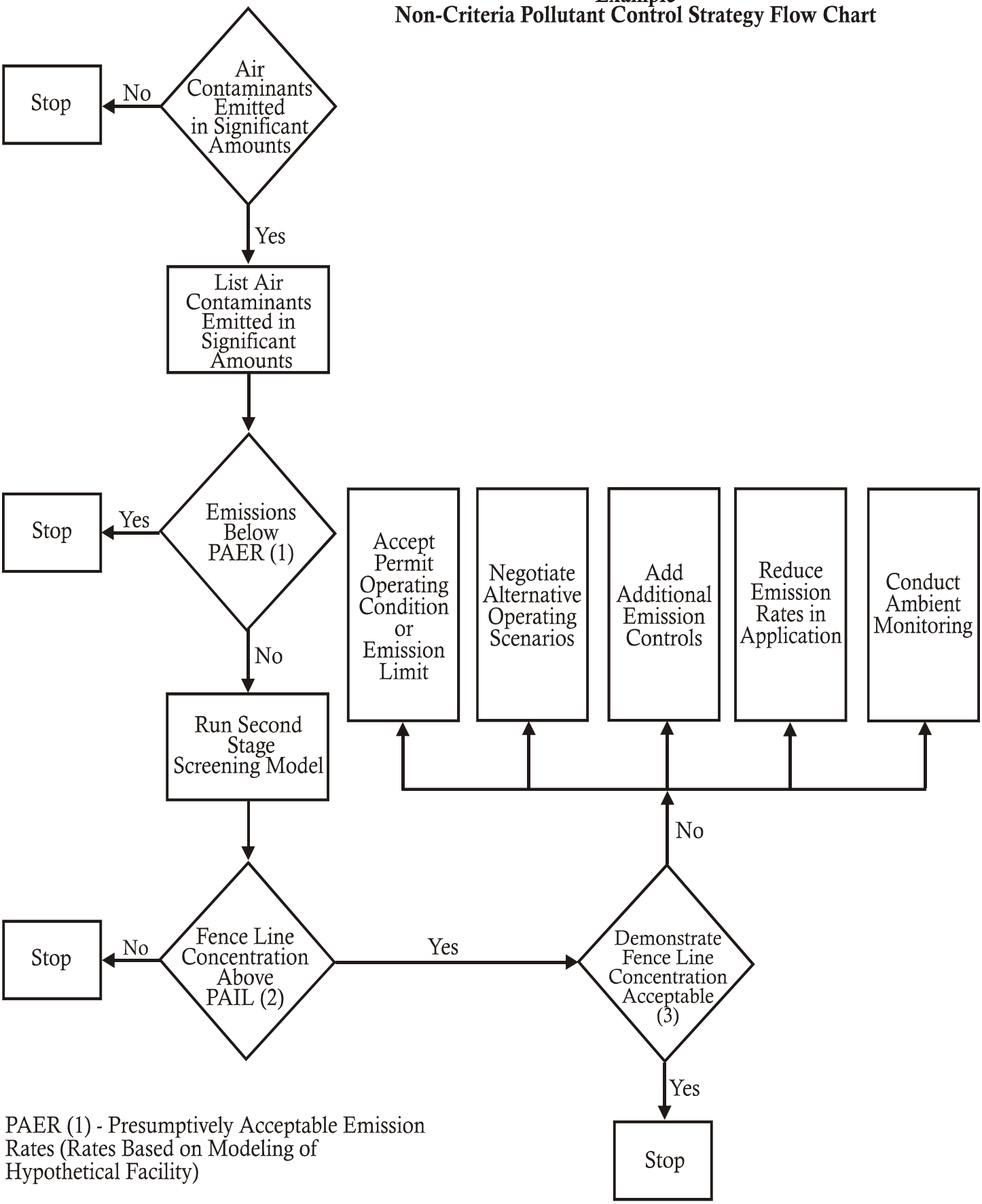
If a permit condition limits toluene emissions to 21.2 lb/hr, the remaining compounds can be evaluated against the next lowest PAER (23.1 Ib/hr MEBK). Since the combined emission rate of MEK, MIBK and xylene when applying white enamel (16.1 Ib/hr) is lower than the PAER for MIBK (23.1 Ib/hr), white enamel coating could also be applied.

The row labelled "adjusted annual emissions" is based on a maximum application rate of 750 gal/month. A permit condition limiting operations to 750 gal/month could be used to limit annual emissions and minimize permit fees that are based on ton/year emission rates.

Emission Rate Spreadsheet for Example 2

	density (lb/gal)	use rate (gal/hr)	use rate (gal/mth)	Compostion (wt%)					total toxics	total toluene
				total VOC	MEK	MIBK	toluene	xylene		
black enamel	8.22	6	750	70	9	6	10	18		
white enamel	8.64	6	750	66	2	23	18	6		
clear coat	7.48	6	750	74	0	35	0	26		
TLV (mg/m^3)					590	205	188	434		
PAER (lb/hr)					66.4	23.1	21.2	48.9		
emission rate (lb/hr)										
black enamel				34.5	4.4	3.0	4.9	8.9	21.2	16.28
white enamel				34.2	1.0	11.9	9.3	3.1	25.4	16.07
clear coat				33.2	0.0	15.7	0.0	11.7	27.4	27.38
annual emissions (ton/yr)										
black enamel				151.2	19.4	13.0	21.6	38.9	92.9	
white enamel				149.9	4.5	52.2	40.9	13.6	111.3	
clear coat				145.5	0.0	68.8	0.0	51.1	119.9	
adjusted annual emissions (ton/yr)										
black enamel				25.9	3.3	2.2	3.7	6.7	15.9	
white enamel				25.7	0.8	8.9	7.0	2.3	19.1	
clear coat				24.9	0.0	11.8	0.0	8.8	20.5	

Example
Non-Criteria Pollutant Control Strategy Flow Chart



PAER (1) - Presumptively Acceptable Emission Rates (Rates Based on Modeling of Hypothetical Facility)

PAIL (2) - Presumptively Acceptable Impact Levels (usually TLV/100)

(3) Site Specific Refined Modeling, Risk Assessment, etc.

Basis of PAER Conversion Factor

The conversion factor was developed by running ISC-ST3 with inputs designed to result in ambient concentrations that would not exceed the Presumably Acceptable Impact Level of .1/100th of the TLV. The following conservative assumptions were used:

stack height	=	10 meters
stack diameter	=	1 meter
stack exit velocity	=	0.1 meters/second
fenceline distance	=	200 meters
exit gas temperature	=	295° Kelvin

An emission rate of 1 gram/second (7.9 pounds/hour) resulted in a maximum predicted 24-hour ambient concentration of 703 micrograms/cubic meter and a maximum predicted annual impact of 40 micrograms/cubic meter. For a given model run, the relationship between emission rate and resulting ambient concentration is linear. In this example, an emission rate of 0.0014 grams/second (0.011 pounds/hour) would result in a one-microgram per cubic meter ambient concentration.

Thus, the PAER, in grams per second, for a substance being emitted is

TLV (mg/m^3)/100xl000 µg/mg x 0.0111b/hr/$\mu g/m^3$

1/100 x 1000 x 0.011 = 0.11