

**POLLUTION PREVENTION IN PERMITTING PILOT (P4) PROJECT
CYTEC INDUSTRIES INC. PROJECT AT REGION I**

TECHNICAL SUPPORT DOCUMENT

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June 23, 1997

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PROJECT OVERVIEW:

Introduction:

This document provides an explanation of the Title V permit developed for Cytec Industries Inc., (Cytec) Wallingford, CT. The document includes a description of the terms and conditions contained within the Title V permit and an explanation of how these terms and conditions were derived. The permit was developed as part of the national Pollution Prevention in Permitting Pilot (P4) project. The Region I participants were Cytec, EPA Region I, EPA's Office of Air Quality Planning and Standards (OAQPS), and the Connecticut Department of Environmental Protection (DEP). This document describes specific terms and conditions that are innovative but are intended to be replicable and applicable to other facilities.

Project Background:

The Cytec/DEP/EPA Region I project builds on the successful original P4 project (P4-Phase I) conducted by the Intel Corporation, the Oregon Department of Environmental Quality, EPA, and the Pacific Northwest Pollution Prevention Research Center. The Intel project identified opportunities to create incentives for pollution prevention (P2), instead of traditional end-of-pipe controls, by accommodating Intel's need to make frequent operational changes to its facility without reopening and modifying its Title V permit. The permit promotes P2 and proactive environmental management strategies, ensures full regulatory compliance, and achieves a high standard of environmental protection, while being responsive to Intel's operational flexibility needs.

In P4-Phase II, the participants intended to explore further opportunities to advance P2 and permit flexibility. In proposing to develop a Title V permit through this effort, the Region I participants sought to repeat and to expand upon the process used in the Intel project, i.e., to develop a Title V permit within the current regulatory framework for Cytec. Ultimately, the final goal is a Title V permit template consisting of P2 and operational flexibility elements that are replicable and transferable to other State permitting programs.

The DEP and EPA used several criteria to evaluate potential sources for participation in the P4 project including:

- the source's complexity as to number and different types of emissions points.
- the growth potential of the source over and beyond the duration of the permit term.
- the commitment of the source to this project.
- the environmental record of the source, from a multimedia perspective.

After considering many potential sources, the agencies determined that Cytec was the best source for the project.

Project Goals:

The objectives of the project were:

- To produce an integrated draft Title V operating permit that promotes P2 and operational flexibility;
- To identify opportunities for and barriers to P2 and operational flexibility within the confines of the current rules, and to use this information in the development of national rulemaking efforts and;
- To provide opportunities for business growth without compromising the current regulatory requirements.

Importance of this permit:

This permit develops replicable permit provisions that promote P2, streamline permitting requirements and provide sources additional operational flexibility. In this permit, the term “operational flexibility” applies to the permit provisions that streamline and reduce Title V permit modification process requirements. Generally, permit authorities are required to modify Title V permits whenever the source changes its emissions due to an equipment/process change, method of operation, or becomes subject to a new applicable requirement. Permit modifications do not all require the same level of review and processing. The level of permit review and processing depends on the type of action triggering the modification or the degree of specificity contained in the permit. This Title V permit provides conditions that reduce or eliminate the level of permit review and processing by using facility-wide applicability limits, conditional pre-approved applicable requirements, and self implementing compliance mechanisms. The final product is a permit that anticipates and adapts to the needs of the facility and reduces the time and man hours associated with processing permit modifications.

Operational flexibility is particularly important for facilities that, due to their products and/or processes, frequently have to change or install new equipment to remain competitive and to grow their business. Constant reopening of Title V permits requires considerable resources from both the State and the applicant. Without flexible Title V permits that anticipate and adapt to operational needs, State and local permitting authorities would be required to continually process Title V permits for companies such as Cytec that frequently change operations and products. This situation may discourage companies from installing new, more efficient equipment, delay implementation of Clean Air Act (CAA) requirements and consume valuable time and resources from State agencies.

This permit is designed to anticipate the needs of Cytec through a set of self-implementing permit provisions. These provisions include mechanisms that allow Cytec to implement anticipated requirements without the need for significant permit modifications. These mechanisms generally rely on preapproving the compliance terms and conditions for new requirements that Cytec anticipates triggering during the life of the permit. Some examples of requirements preapproved into the permit include: 1) generic and specific classes of changes proposed for the facility, 2)

compliance requirements for anticipated applicable requirements, and 3) alternative compliance requirements. In addition, the permit establishes a plantwide applicability limit (PAL) for Cytec's VOC emissions. The PAL caps Cytec's VOC emissions at historical actual emission levels. The *quid pro quo* is that to grow and remain below the PAL, Cytec will be required to implement P2 techniques that improve overall operational efficiency and reduce pollutants on a unit basis. Pre-approved operational changes, emissions PALs, and P2 techniques are all components of operational flexibility.

Permit Accomplishments:

The Cytec permit accomplishes several key elements:

- integrates P2, operational flexibility and pre-approved New Source Review (NSR) construction permit terms and conditions into one document.
- anticipates future applicable requirements and allows for these requirements to be implemented without requiring significant permit modification.
- recognizes the benefits that can be derived from P2 efforts and creates incentives for generation of enforceable emissions credits that could be used to satisfy regulatory obligations.
- recognizes that companies competing in a global marketplace need the ability to make frequent changes without delay.

Each of these four elements is important. However, as to significance, this permit acknowledges that P2 is a mainstream activity for the regulatory agency and the source. Historically, P2 has been treated as a voluntary activity. This permit clearly establishes a framework that links P2 to operational flexibility. The DEP and EPA state that the agencies will provide Cytec options to reduce administrative burdens and streamline permitting procedures in return for commitments to implement a premise wide P2 program. The P4 model and the conceptual program changes that it encourages emphasize that regulatory agencies streamline certain administrative requirements that trigger substantial costs to both the source and the permitting authority. In turn, the agency is enabling the source to follow through with their commitments to operate more effectively. This trust is explicit in the permit condition that allows Cytec to limit PTE using P2 activities and implicit in the requirement to develop a P2 plan.

From this mutual commitment, the Cytec permit begins to transcend traditional command and control model to an enhanced approach to environmental management. However, we should emphasize that this permit does not relax environmental requirements. The following can explain the difference between prior air permits and Cytec's: prior to the P4 project, agencies traditionally established the emissions limits and instructed the source, in enforceable permit terms and conditions, how it was to achieve these limits. That is, the State agency sets the "bar" (the overall air quality goals) and tells the source what tools are used to meet it. In this permit, the State is still setting the "bar" but allows the source the flexibility in how best to achieve it.

Participants and Objectives:

The participants in the Region I project include:

- Cytec Industries Inc., a specialty chemical manufacturer,
- SCI-TECH, INC., an environmental consulting firm contracted by Cytec
- Title V/NSR personnel from the DEP and;
- Title V/NSR and regional counsel personnel from the EPA Region I office.

In addition, the project coordinator, EPA Region X, contracted with the consulting firm, Industrial Economics, to provide expertise and to facilitate various aspects of the project process.

The key objectives for each participant are outlined below:

Cytec:

- Maximize operational flexibility to accommodate growth opportunities, to respond quickly to market demands, and to provide incentives to comply with applicable requirements through alternative means such as P2.
- Streamline the permit process to expedite operational changes and to reduce future delays and complications in the permitting process.

DEP:

- “Road test” the State’s Title V program .
- Identify barriers in State rules that discourage P2 and other innovative environmental solutions.
- Streamline procedures to encourage effective, efficient and productive implementation of the State regulations.
- Develop a P2 permitting process “template” for use in developing future permits.
- Identify and address issues/concerns that would significantly increase resource commitments following issuance of the Title V permit.
- Develop a Title V permit shell that can be applied to other Connecticut sources.

EPA:

- Identify barriers in Federal rules that discourage P2 and other innovative environmental solutions.
- Create a working partnership with the DEP that encourages innovative environmental solutions.
- Communicate the key P4 issues to EPA Headquarters and incorporate the resolutions to these issues into national policies and standards.
- Transfer the lessons learned from the project to other State and National agencies.

Source description:

Cytec, previously part of American Cyanamid Co., is headquartered in Garrett Mountain, New Jersey. Cytec develops, manufactures and markets specialty chemicals, specialty materials, and building block chemicals. These serve a broad group of end users including the water treatment, paper, mining, coatings, plastics, aerospace and automotive industries. Cytec has operations in the United States, Great Britain, Netherlands, Canada and Mexico. Cytec employs approximately 600 people at the 250-acre Wallingford site. The Wallingford facility, considered critical to Cytec's core business, manufactures three distinct types of products from three separate production departments:

- Resin products for paint, adhesives, water treatment chemicals and paper products;
- Thermoset molding compounds for dinnerware and electrical devices;
- Thermoplastics for the automotive, medical devices and food packaging industries

Besides the three manufacturing areas, Cytec operates a waste water treatment plant that treats effluent from the three manufacturing areas and a boiler house that supplies steam for the facility.

Cytec uses several types of volatile organic compounds (VOC) in the manufacturing of its products and these materials represent the main source of emissions from the facility. Overall, most of the VOC used is consumed by the final product or captured and recycled. However, some VOCs are lost to the environment. In 1990, by using EPA or DEP approved monitoring and emission quantifications methods, Cytec estimated total actual VOC emissions from the manufacturing lines at approximately 320 tons per year (TPY). Other emission points for VOCs at Cytec include the waste water treatment plant, liquid storage vessels, the boiler house and a sludge incinerator. Besides VOCs, Cytec emits other criteria pollutants including NO_x, SO₂, CO and PM₁₀. These pollutants are primarily emitted from combustion sources. PM₁₀ is also emitted during processing at the manufacturing lines.

Cytec is located within a serious nonattainment area for ground level ozone and, therefore, subject to the following regulatory requirements:

- DEP permits and orders, including: VOC RACT order, NO_x RACT order and several minor NSR construction/operating permits;
- New Source Performance Standards (NSPS);
- MACT standards under development for Polymers and Resins and the Miscellaneous Organic NESHAP (MON);
- Connecticut New Source Review requirements (major and minor);
- Other Connecticut SIP requirements including: particulate emissions standards, VOC emissions limitations and;
- State-only enforceable requirements including control of hazardous air pollutants and odors

Flexibility Needs and Regulatory Impediments:

To respond to fluctuating market demands and to remain competitive, Cytec anticipates making the following changes at its facility:

- expanding capacity and installing new state-of-the-art manufacturing equipment,
- replacing and/or upgrading existing equipment and;
- changing material formulations and/or product process lines.

From an analysis of its anticipated operational requirements, Cytec developed a list of operational flexibility needs.

Desired Operational Flexibility Needs:

- Make equipment changes to manufacturing processes without delay and without reopening the Title V permit.
- Make material formulation changes associated with manufacturing without delay.
- Construct and operate new projects without delay including: pilot plants, new boiler, storage tanks and new control equipment.
- Perform remedial activities without delay or reopening the Title V permit.
- Use P2 techniques either alone or in combination with add-on controls to meet emission standards.
- Make process/equipment changes/modifications that trigger a new applicable requirement without reopening the Title V permit, or requiring additional approvals under NSR.
- Conduct inter-RACT emissions trading across Control Technology Guidelines (CTG) categories.
- Allow applicability modification determinations using actual-to-future actual emissions comparison.

The regulatory impediments to operational flexibility and their potential impact on Cytec are discussed below:

Regulatory Impediments and Potential Impacts

Title V rules:

Typically, regulatory agencies are required to reopen Title V permits for the following reasons:

- 1) the source triggers an applicable requirement due to a voluntary action taken at the facility;
- 2) EPA promulgates a new applicable standard within two years of permit issuance;

- 3) the source implements practically enforceable limits for the purpose of “netting out” of a major NSR action and;
- 4) the source wants to make changes that are inconsistent with the terms of the permit.

Constant reopening and modification of Title V permits could create potential problems for both business and regulatory agencies. The time delays associated with permit modifications may produce disincentives for businesses to expand operations or to implement new, less polluting technologies. For regulatory agencies, the time and personnel required to process routine Title V permit modifications could monopolize scarce resources.

Major/Minor NSR rules:

Since Cytec is located in a serious ozone nonattainment area, major modifications of NO_x or VOC emissions are subject to the Federal provisions for LAER and emission offsets. In addition, the DEP’s minor NSR regulations currently require sources to comply with the State hazardous air pollutant regulations and to install Best Available Control Technology (BACT) for all minor modifications that result in a potential emissions increase above the State minor NSR threshold levels. The State may also require an air quality impact analysis, depending upon the increase in criteria air pollutant emissions.

The DEP’s construction regulations are also different from the federal construction rules. For example, the DEP does not allow modifications to “net out” of major NSR applicability. The DEP’s regulation also contains a complex set of NSR applicability requirements similar to the federal de minimis requirements. These minor NSR regulations could be more or less stringent as compared with the federal rule depending on the specific circumstances of the modification.

RACT/Averaging Plans and HAPs:

The current DEP regulations do not have a generic RACT averaging method that allows sources to use emissions averaging as an alternative compliance mechanism without the need for the State to submit a single source SIP revision. In addition, the State regulations require an analysis of any alternative averaging compliance method to ensure that the alternative method does not result in increased emissions of a “more toxic” HAP.

RACT/BACT/MACT and P2:

Cytec anticipates triggering several proposed MACT standards once EPA promulgates these standards. Cytec would like the opportunity to generate enforceable emissions credits from P2 activities across the facility as a means to comply with these standards. Cytec understands that if the MACT standard does not explicitly allow P2 as an alternative compliance method, then P2 opportunities are limited. Therefore, the project participants requested that EPA consider P2 when developing all future MACT standards.

Cytec also wants to use P2 to demonstrate compliance with applicable RACT and BACT standards. EPA currently allows the use of P2 to comply with RACT standards provided that the terms and conditions for P2 are explicitly stated in a federal document and are practically enforceable. For BACT requirements, the DEP allows P2 for minor NSR BACT determinations on a case-by-case basis. EPA allows P2 for major NSR BACT determinations if the P2 conditions are federally enforceable and occur at the affected emission unit.

Practical Enforceability and Potential to Emit (PTE):

When determining an emission unit's PTE, EPA allows sources to take credit for emission limits achieved by pollution control equipment provided these terms and conditions for the controls are contained within a document which is enforceable as a practical matter. Previously, EPA required the controls to be federally enforceable. However, this requirement is the subject of litigation and has not been resolved as of June 1997. In any case, if Cytec proposed to construct a new unit with uncontrolled emissions above major modification threshold levels but with controlled levels below the State's minor NSR level, EPA would require Cytec to obtain an NSR permit to make controlled emission levels practically enforceable.

Like-kind equipment replacement:

Cytec intends to replace some of its existing equipment, such as its sludge incinerator, with similar equipment. State and federal regulations define such changes as modifications subject to all applicable NSR requirements. Both agencies require the actual-to-potential methodology to determine the emission increase resulting from modifications. If the existing equipment is underutilized and its actual emissions are below the design capacity, this test may result in either the State imposing major/minor NSR for the new equipment or the source accepting additional operational limits to avoid NSR. Either result may discourage Cytec from pursuing facility upgrades that would increase efficiency and decrease emissions.

To provide incentives for sources to replace outmoded, less efficient, higher polluting equipment with newer, more efficient units, this permit includes a placeholder that allows Cytec to determine NSR applicability for like-kind replacements using the actual-to-future actual test proposed by EPA in the NSR reform package. For this section, like-kind replacement means that the new unit has the same throughput, capacity and utilization factor as the old unit but may have a different manufacturer.

Remedial Activities:

Cytec conducts voluntary remedial activities. While these activities are environmentally beneficial, they do have the potential of emitting VOCs. As stated previously, Cytec is intending to accept a VOC PAL for its facility. If Cytec includes the VOC emissions from remedial activities when determining PAL compliance, Cytec may lose operational capacity.

Permit Solutions:

The DEP, EPA and Cytec agreed on the following approaches to operational flexibility:

- NSR preapprovals
- Plantwide Applicability Limit (PAL) for VOC
- Emissions Reduction Section and P2
- NSR and Title V minor permit modifications
- Like-kind equipment replacement
- VOC RACT emissions averaging
- Remedial Activities

The following describes these approaches:

Pre-approved Minor NSR¹:

During the life of the permit, Cytec anticipates installing and operating new equipment that would trigger the State minor NSR requirements. To expedite the minor NSR permitting process, the Title V permit includes the compliance terms and conditions for the anticipated equipment. This concept is known as pre-approved NSR. Pre-approved NSR allows Cytec to respond to market demands by reducing delays and complications associated with permit modifications. By including all projected applicable State minor NSR requirements up-front into the Title V permit, Cytec is allowed to purchase, construct and/or install the equipment during the term of this permit without triggering the Title V significant permit modification requirements.

To develop these conditions, Cytec first provided DEP with information about the anticipated projects. The DEP then performed the necessary technical review, including a BACT analysis, and incorporates the relevant emissions limits, monitoring, recordkeeping and reporting requirements in the appropriate sections of the permit. In effect, the DEP reviewed and approved into the permit the terms and conditions of anticipated projects as if Cytec was constructing/installing those projects at permit issuance.

To implement pre-approved NSR, Cytec simply notifies the DEP and EPA by letter of the modification. The letter specifies the exact process and operating parameters that correspond to the pre-approved compliance terms and conditions. The letter is physically attached to the permit and becomes part of its enforceable terms and conditions.

The pre-approved NSR provisions allow Cytec to construct and operate equipment with capacities no greater than those referenced in the pre-approval section of the permit. For example, the permit provides all the terms and conditions for Cytec to construct and operate a

¹Please note that Cytec did not anticipate any modifications to its facility that would require a major NSR transaction. Therefore, this permit did not address the issues involved in preapproving major NSR.

boiler with a rated heat input of no greater than 99 MMBtu/hr. Cytec, if it so chooses, may construct and operate a boiler with a lower heat input. However, since the DEP's technical analysis and BACT review were based upon the 99 MMBTU/hr value, the new boiler would still be subject to the conditions approved for the 99 MMBTU/hr value boiler.

In contrast, by pre-approving an NSR project, the permitting authority can take the appropriate time before construction commences to perform a thorough technical review. NSR preapproval assures the source that the project has been approved and that it can move forward on its own schedule. The public is also afforded greater access to the permitting process since all projected company activities are accounted for during the Title V permit approval process. In summation, conducting the NSR review process within the same schedule as the Title V permit is more efficient for the permitting agency and the source.

PAL²:

A PAL is an emissions cap established for a particular pollutant(s). The PAL provides the key permit condition that encourages P2 activities. The idea for the PAL is simple: Cytec can make modifications that affect its VOC emissions without the need to obtain a NSR construction permit provided Cytec's actual emissions remain below the PAL. In addition, if Cytec's Title V permit contains the monitoring and emissions quantification requirements for a proposed modification, Cytec may implement the modification through the permit's notification process.

A PAL equals the facility's actual emissions baseline that represents the facility's normal operations plus the applicable NSR modification threshold level. The PAL is adjusted to account for any new applicable requirement(s). The PAL offers facilities the flexibility to offset emissions from expansions through either traditional end-of-pipe controls, operational limits or P2 activities. The PAL provides companies the incentive to decrease emissions rates and to become more efficient so as to maintain maximum operational flexibility.

The key to creating a PAL that encourages P2 activities is to set the baseline on the facility's

² In the NSR reform package, EPA is proposing to allow sources the opportunity to base major NSR applicability on compliance with a PAL. So long as the source activities do not result in emissions above the cap level, the source will not be subject to major NSR. The key to a PAL is to ensure that the terms and conditions that show how a source complies with the PAL are practically enforceable. For modifications to a source operating under a PAL, States would issue a minor preconstruction permit that contains the necessary compliance terms and conditions.

Connecticut is developing a federally approved state PAL rule that provides Title V sources that have obtained a PAL the opportunity to avoid a minor construction permit. As envisioned, the rule would allow a Title V source modifying its facility to avoid major and minor construction requirements if the compliance terms and conditions for the modification are clearly defined and approved into the Title V permit.

actual emissions from a period that accurately reflects the facility's normal operations. For this project, the team determined that Cytec's 1990 operations represented the facility's normal operations. Therefore, the PAL was established using the facility's 1990 actual emissions adjusted to account for any further reductions achieved by new applicable requirements (e.g., MACT, RACT). The permit also includes a mechanism that adjusts the PAL baseline if Cytec triggers any future applicable requirement during the life of the permit or if a new, more accurate method to quantify emissions is developed. Existing CAA provisions require Cytec to operate a full range of control devices on their operations including scrubbers, chillers and capture/recirculation controls. With a PAL based on actual emissions and with the facility already operating numerous control devices, P2 remains the most viable option that Cytec can use to expand operations and/or to comply with future applicable requirements. Cytec anticipates making operational improvements that achieve P2 through implementation of "design for the environment" program and other P2 techniques.

In addition to promoting P2, the PAL mechanism provides a permitting authority with an effective tool to manage air quality. Under the current rules, older grandfathered facilities and newer facilities with generous allowable emissions are allowed to emit at rates far exceeding their current actual emissions with few regulatory repercussions. This situation makes it difficult for a State to manage its air shed since these facilities may increase emissions to a point where currently approved air strategies are no longer adequate. By limiting plant emissions to past actual emissions, States are ensured that the long term emissions from current facilities will not alter significantly. This ensures that a State's long term air strategies and attainment demonstrations remain adequate. The PAL also provides the States with increased source compliance and enforcement capabilities that ensure source emissions are consistent with State attainment demonstrations.

Emissions Limitation Section:

A unique feature of this permit is a section that identifies classes of air pollution control equipment, operational limitations and P2 measures that Cytec use, or anticipates it will use, during the permit term. By cross referencing with other sections of this permit, this section creates a mechanism to make specific emission control projects and P2 measures practically enforceable. By approving the practically enforceable conditions for specific types of emission limiting measures, Cytec can take advantage of the lower potential emissions provided by the control measure without the need to obtain a preconstruction permit or to modify its Title V permit.

The section is divided into three general methods to limit emissions: 1) new air pollution control equipment, 2) operational limits and, 3) P2 measures. Cytec can elect to implement an emissions limitation using the administrative amendment provision provided in the notification section of this permit.

Permit P2 Section:

This section includes conditions that require Cytec to develop and implement its P2 program. In addition, the section establishes a procedure to allow the use of P2 to meet future State BACT limits. The key issue regarding the procedure is the requirement that the emission reductions achieved by P2 are quantifiable and practically enforceable.

NSR Reform Package:

In August 1996, EPA proposed to revise parts of 40 CFR parts 51 and 52; the sections that address the Federal Prevention of Significant Deterioration (PSD) and nonattainment NSR programs. These revisions, referred to as the NSR Reform Package, will give permitting agencies greater flexibility to administer their permitting programs, particularly in respect to major NSR/PSD applicability.

The permit attempts to anticipate the flexibility offered by the reform package by providing placeholders that incorporate the current language found in the reform package. For example, the like-kind replacement section incorporates the use of the proposed actual-to-future actual methodology test. The reform package also outlines the use of PALs. However, regarding PALs, the DEP and EPA believe that the underlying authority exists to establish PALs in Title V and NSR permits. In both cases, the permit team recognizes that, before final issuance of the permit, all permit terms and conditions must comply with the current underlying State/Federal requirements.

Title V Minor Permit Modifications:

CT's Title V program currently does not contain provisions for a minor permit modification process. This means that virtually all changes would be incorporated into Cytec's Title V permit using the significant modification process. CT is in the process of revising its Title V rules to include a minor permit modification process. The minor permit modification process, with the various preapproved requirements of this permit, will allow CYTEC to limit the instances where it must incorporate new requirements using the significant modification process.

Like-Kind Equipment Replacement:

The permit establishes streamlined procedures that allow for the replacement of emission sources with identical equipment. This provision acts a placeholder for anticipated changes contained within EPA's proposed NSR reform package.

VOC RACT Emissions Averaging:

The permit provides a replicable mechanism for Cytec to determine and implement emission averaging (bubbling) as an alternative means to show compliance with applicable RACT standards. This provision allows Cytec the opportunity to over control specific emission units or to implement P2 activities as a means to show compliance with RACT standards.

Remedial Activities:

An issue at Cytec concerns whether remedial activity is related to Cytec's primary business activity. If the remedial activity is related to the primary activity, the emissions from the activity are included in all compliance requirements. Current EPA interpretation provides that if the source of the contamination is not part of the site's primary activity, the emissions from any subsequent remedial activity are not included in the source's emissions inventory for modification determination. Cytec will evaluate the origin of the remedial activity at its site to determine how they relate to current activities at the site.

How This Permit Promotes P2:

The permit contains three provisions that promote P2:

- PAL
- Emission Reduction Section, P2 subsection
- Permit P2 section and management plan

As described previously, the PAL is the key enforceable provision that encourages P2. By limiting facility emissions to historic actual emissions, the PAL compels Cytec to respond to growth opportunities and market demands by improving operational efficiency or changing to less polluting formulations and processes. Cytec has indicated that many of these operational improvements will be achieved through P2 and "design for the environment" techniques.

To facilitate P2 credit, the permit contains the P2 emission limitation subsection that allows Cytec to take advantage of emission limits through the implementation of preapproved P2 projects. The P2 emission subsection provides the enforceable terms and conditions that make the P2 emission limits practically enforceable.

In addition, the permit describes the process that allows Cytec the use of P2 to meet the State BACT emission limits. The key to this process is the condition that requires P2 emission credits to be quantifiable and practically enforceable.

The permit also contains a P2 operation and management plan for Cytec. Under this plan, Cytec is required to implement several P2 programs and activities including:

- Employee training and recognition program
- P2 review procedures for new and existing operations
- Community outreach
- Product/Stewardship/customer and supplier outreach recognition program
- Environmental review and audit
- P2 bench marks/key P2 plant performance indicators

- P2 reporting and tracking procedures

PERMIT SECTION DESCRIPTION:

This permit uses an integrated permit design: each permit section relies on other portions of the permit to fully implement the P2 and operational flexibility requirements. Due to this integrated design, the intent and purpose of each permit section may not be self-evident. This chapter of the TSD explains the goals and the design aspects of each of the permit sections and where applicable, how each section is implemented. Included at the end of this TSD is an example illustrating how the source and the State will use the innovative conditions of the permit to process a typical modification.

Emission Unit Section:

Goal: This section will contain the terms and conditions that ensure that each emission unit at Cytec is in compliance with all applicable requirements.

Discussion: Cytec is developing the section and will submit it as part of their formal Title V submittal. As with all title V permits, Cytec's permit will contain the terms and conditions that ensure that each emission unit is in compliance with all applicable requirements. At permit issuance, this section will contain all the compliance terms and conditions for each emission unit at Cytec. During the life of the permit, Cytec may trigger one or more of the permit's innovative preapproval/applicability provisions. These provisions require Cytec to submit a notice that includes the new compliance terms and conditions of any new or existing emission unit affected by the innovative provision(s). If the DEP does not disapprove these changes, the terms and conditions contained in the notice will become the compliance requirements for the specific emission unit and, in the case of existing emission units, supersede the compliance requirements found in this section.

Specific: Once developed, the compliance requirements contained in the emission unit section will be incorporated into the monitoring and emission quantification sections of the permit. The preapproval/applicability sections of the permit will refer to the monitoring and emissions quantification sections to establish the necessary compliance terms and conditions.

Applicable Requirements Section:

Goal: Forty CFR Part 70 and RCSA 22a-174-33 require the DEP to identify and incorporate all applicable requirements into the Title V permit. This section includes currently applicable requirements and requirements that Cytec anticipates it may trigger during the initial permit term.

Discussion: This section is composed of subsections that correspond to the general Clean Air Act and SIP requirements (example: 40 CFR part 60, 61, 63 etc.). Within each subsection, the permit identifies either currently applicable requirements or requirements that Cytec anticipates being

subject to during the life of the permit. In addition, for each identified standard/applicable requirement, the section references the specific Federally required citation or the Connecticut SIP citation that contains the compliance terms and conditions.

By identifying future applicable requirements in this permit, the permit reduces the number of future significant permit modifications that Cytec's permit would require over its life. Typically, any change made by a source would trigger case by case minor NSR determination/review and/or a significant Title V modification. Either process is slow and cumbersome, hinders the ability of a source to conduct its business and consumes State and Federal resources for routine transactions.

By including the compliance requirements for all potentially applicable requirements in the permit, Cytec can implement these requirements using the minor permit modification process. EPA also requires States to reopen Title V permits if EPA promulgates new applicable requirements within two years of permit issuance. To keep from reopening permits for this reason, the permit contains the terms and conditions for proposed Federal regulations that may affect Cytec. If EPA promulgates these standards within two years of permit issuance and if the final regulation contains no substantive differences from the permit provisions, then Cytec could comply with those terms and conditions using the minor permit modification process.

Please note, the permit only referenced the primary, replicable compliance requirements for potentially applicable standards. The permit did not approve alternate compliance requirements that require extensive case-by-case determination unless the specific alternate compliance mechanism was developed and approved within the construct of the permit.

Specifics:

The following Clean Air Act and SIP requirements were identified:

- §112(g) modifications pursuant to the extent that EPA has proposed standards
- Currently promulgated MACT standards (40 CFR part 63)
- Currently promulgated NSPS and NESHAP standards (40 CFR part 60 and 61, respectively)
- VOC RACT State standards (40 CFR part 52)
- Federally enforceable requirements of the Connecticut SIP
- State only enforceable requirements (e.g. 22a-174-29)

As stated previously, the use of an alternative compliance mechanism would require a significant permit modification unless those terms and conditions are clearly stated within the permit. An example of an alternative compliance requirement specifically developed within the permit is the option for RACT emissions averaging. Besides the traditional compliance requirements specified by the batch processes and industrial wastewater Alternative Control Techniques (ACT) documents, the permit provides a replicable mechanism to determine an alternate compliance mechanism, i.e., emissions averaging (bubble). The provision includes unit emissions averaging equations that clearly define a replicable means to determine the emissions averaging

requirements. If Cytec elects to implement this provision, Cytec defines the emission units involved, the emissions monitoring and emissions quantification used for each unit, and the recordkeeping required to show compliance. Cytec then submits the information to the State as required by the State's minor permit modification procedure.

Emission Limitation Section:

Goal: This section provides a mechanism that makes emission limits established by emission limitation projects practically enforceable.

Discussion: Sources cannot take credit for emission limits to calculate PTE if the emission limits are not practically enforceable. This section describes a mechanism that allows Cytec to receive credit from emission reduction projects (e.g., new control equipment/operational limitations, P2 measures) by specifying the conditions that make the associated emission limits practically enforceable.

If, during the life of the permit, Cytec elects to limit emissions associated with a project, the section prescribes a sequence of directions that Cytec must follow to make the emissions limits practically enforceable. The sequence of operations is as follows: 1) identify the project; 2) identify the appropriate emission quantification method; 3) calculate the allowable emissions from emission unit taking into account the enforceable emission limits from the project; 4) identify the appropriate monitoring method and; 5) submit the required information to the DEP using the permit notification procedure.

Emission Quantification Section:

Goal: This section provides the method to determine the applicable quantification method used to quantify air pollutant rates for emission units.

Discussion: Various sections of this permit preapprove CAA requirements or provide the mechanism to show that a requirement is not applicable. This section contains the mechanism to establish the emission quantifications methods used to show compliance with an applicable CAA requirement or to show that a requirement is not applicable. The section contains: 1) a description of emission sources categories present at Cytec; 2) a description of the emission quantification method associated with each category; 3) a description of control equipment present or anticipated to be installed at Cytec; 4) a methodology used to determine the appropriate emission quantification method for each type of control equipment; 5) a hierarchy used to determine the quantification method for new sources or control equipment not described in other portions of this section.

Specific: The sequence of operations Cytec must follow to establish the emission quantification method required to show compliance to any provision contained within this permit is outlined below:

For New Control Equipment:

Implemented using notification section

- A) Method established by applicable requirement; if none specified then;
- B) Method established by emission unit section if a comparable control device is present; if not then;

Implemented using minor permit modification procedure:

- C) Method determined using the test methods established in the permit:
 - 1. Data from Continuous Emissions Monitors (CEMs)
 - 2. Data from stack testing
 - 3. Mass balance equations
 - 4. AP-42 Data (only with emission factors A, B or C if emissions exceed minor NSR applicability levels)
- D) If the permit does not establish the method, Cytec will use the significant modification procedure to establish the method.

Note: If more than one quantification method is defined by an applicable requirement for the control equipment or emission unit, then Cytec is required to implement the method that is the least uncertain.

For New Emission Source Categories:

Implemented using notification section:

- A) Method established by applicable requirement, if not specified then;
- B) Method established by selecting the general class of emission unit that best describes the new emission unit and employing the associated quantification method. If no comparable class of emission unit exists then;

Implemented using minor permit modification procedure:

- C) Method established according to the following hierarchy:
 - 1. Data from CEMs
 - 2. Data from stack testing
 - 3. Mass balance calculations
 - 4. AP-42 (only with emission factors A, B or C if emissions exceed minor NSR applicability levels)

D) If the permit does not establish the method, Cytec will use the significant modification procedure to establish the method.

Emission Monitoring Section:

Goal: This section provides the method to determine the applicable monitoring method used to monitor air pollutant rates for emission units.

Discussion: Various sections of this permit preapprove CAA requirements or provide the mechanism to show that a requirement is not applicable. This section identifies the appropriate emission monitoring method to ensure that Cytec is complying with an applicable CAA requirement or to demonstrate that a requirement is not applicable. This section performs the following functions: 1) describes the source categories present at Cytec; 2) identifies the monitoring method for each source category; 3) describes a hierarchy to determine the emissions monitoring method where necessary.

Specific: The sequence of operations Cytec must follow to establish the monitoring method required to show compliance to any provision contained within this permit is outlined below:

For New Control Equipment:

Implemented using notification section:

- A) Method established by applicable requirement; if none specified then;
- B) Method established by emission unit section if a comparable control device is available; if none available then;

Implemented using minor permit modification procedure:

- C) Method determined using the generic monitoring methods establish for each general type of control equipment:
- D) If the permit does not establish the method, Cytec will use the significant modification procedure to establish the method.

Note: If more than one monitoring method is defined by an applicable requirement for the new control equipment or emission unit; then Cytec is required to implement the method that is the most precise, accurate and continuous.

For New Emission Source Categories:

Implemented using notification section:

- A) Applicable requirement, if not specified then;
- B) Method established by selecting the general class of emission unit that best describes the new emission unit and employing the associated monitoring method. If no comparable class of emission unit exists then;

Implemented using minor permit modification procedure:

- C) Method established according to the following hierarchy:
 1. Data from CEMS
 2. Data from stack testing and records of the operational parameters during the test
 3. Recordkeeping of the operational throughput used in the mass balance calculations to quantify emissions
 4. Recordkeeping of the operational throughput used with the AP-42 factor to quantify emissions
- D) If the permit does not establish the method, Cytec will use the significant modification procedure to establish the method.

Pre-approved Modification Section:

Goal: This section provides the compliance terms and conditions for minor NSR permit requirements for specific sources and categories of sources that Cytec anticipates installing during the life of the permit.

Discussion: Cytec anticipates constructing a new boiler and additional above ground storage tanks at its facility. The PAL will allow Cytec to avoid NSR permitting for VOC emission increases generated by these modifications. Non-VOC pollutant emissions will still be subject to the DEP's minor NSR requirements, including minor source BACT and ambient impact analysis. This section provides the terms and conditions, including BACT, which satisfy the DEP's minor NSR requirements. This section also includes a provision that allows Cytec to register under any NSR general permit issued by the DEP.

Specifics: The current permit contains approval for a specific boiler project and generic conditions for liquid storage vessels and includes the specific compliance requirements, i.e., the emissions monitoring and emissions quantification method.

Like-Kind Replacement Section:

Goal: This section allows Cytec to use the actual-to-future actual methodology to determine NSR applicability for the replacement emission units with similar equipment.

Discussion: This section acts as a placeholder for EPA's proposed change to the methodology

used to determine the emissions increase from modifications. EPA is taking comment on a proposal to allow the actual-to-future actual methodology to determine the emission increase from a modification. If EPA approves this change to the methodology, modifications involving the replacement of existing equipment with similar equipment could take advantage of the new methodology.

PAL:

Goal: This section establishes a federal and State enforceable VOC emissions limitation for all VOC emitting activities at Cytec that comply with the requirements of Connecticut's SIP approved rules for PALs. Once established, Cytec will not require an NSR permit for subsequent physical or operational changes that effect VOC emissions provided these changes are made consistent with the PAL requirements.

Discussion:

The PAL allows Cytec to construct new VOC emission units or to modify existing VOC emission units without the need for Cytec to obtain a major NSR preconstruction permit so long as Cytec's actual emissions remain below the PAL. In addition, in lieu of obtaining a State minor NSR permit, Cytec may use the permit notification mechanism to establish the monitoring and emissions quantification methods required to show compliance with the PAL if these methods are preapproved within the permit. If the permit does not contain the requirements to accurately monitor and quantify the emissions from the new or modified unit, then Cytec must establish the compliance requirements through the State's minor NSR program.

Specifics:

The section contains the following:

- A mechanism to establish the PAL baseline
- A mechanism to adjust the PAL in the event Cytec becomes subject to a new applicable requirement that impacts VOC emissions or, if Cytec develops new, more accurate VOC emissions quantification methods
- Requirements for Cytec to comply with the PAL on a twelve month rolling average
- Compliance requirements in the event that Cytec's actual VOC emissions increase above the established PAL baseline

Permit P2 Section:

Goal: The section requires Cytec to develop and submit its P2 plan to the State. In addition, the

permit establishes a procedure for Cytec to use P2 to meet a State Minor NSR BACT requirement.

Discussion: Cytec will submit the P2 plan to the DEP for review and comment. The permit requires Cytec to implement the P2 plan. The specific plan elements are off-permit and are not enforceable.

This section also provides a procedure that allows the use of P2 to establish or meet a BACT limit. To implement, Cytec must ensure that the P2 reductions are practically enforceable.

Specifics:

The P2 plan contains the following elements:

- corporate statement of commitment
- employee training and recognition
- existing and new process P2 review procedures
- community outreach
- product stewardship/customer and supplier outreach and recognition program
- environmental reviews/audits
- bench marking

Remedial Activities Section:

Goal: This section describes how the emissions from remedial activities emissions will be addressed if it is determined that the remedial activities are a distinct source separate from Cytec's other operations.

Discussion: If remedial activities are considered part of Cytec's operations, then Cytec must include the emissions from the activities when evaluating compliance with its VOC PAL. EPA is developing a policy for determining if remedial activities are unrelated and, therefore, separate from the primary source. As envisioned, if Cytec remediates contaminants resulting from operations that are unrelated to current operations, then the remedial activities would be considered separate from Cytec's operations premise. The remedial activity itself must meet all applicable air permitting requirements.

Specifics: The section provides provisions requiring Cytec to quantify emissions and to retain documentation needed to show compliance with any applicable requirement.

Permit Notification Section:

Goals: This section describes when and how to notify DEP and EPA that a preapproved permit condition has been triggered.

Discussion: The notice provides the detailed compliance information that ensures that all affected emission units are in compliance with all underlying requirements. If the DEP does not object to the contents of the notice, the notice is attached to the title V permit. The terms and conditions contained in the notice then become enforceable conditions of the Title V permit. Please note that all requirements for record keeping necessary to show compliance with any condition in the notice are found in the record keeping section of the permit.

Specific:

The section is divided into two categories: seven-day notice and thirty-day notice.

- Seven-day notice: Applicable to all pre-approved requirements that are replicable and do not contain specific notification schedules.
- Thirty-day notice: Applicable to all pre-approved requirements that are replicable and do contain specific notification schedule and/or that require opportunity for DEP review.

The section identifies the specific elements that Cytec must include in each notice. In addition, the notification section states that all new requirements triggered by Cytec that are not pre-approved within the permit are subject to the applicable Title V modification requirement.

Permit Recordkeeping Section:

Goal: This section identifies the specific recordkeeping requirements that Cytec needs to demonstrate compliance with an applicable requirement or to demonstrate that a specific requirement is not applicable.

Discussion: The section identifies the specific recordkeeping needs of currently applicable requirements, each pre-approved condition that Cytec may trigger, and/or any pre-approved compliance mechanisms that Cytec may implement.

Specific: The section identifies the recordkeeping needs for the following requirements:

- VOC RACT order 8012
- Batch Process ACT
- Emission Averaging
- Nox RACT order 8114
- Emissions Limitation Registration
- Emission Quantification
- Emissions Monitoring
- Like-Kind Replacement
- PAL
- and all other requirements

Permit Reporting Section:

Goal: This section identifies the types and frequency of reports Cytec is required to submit to show compliance with this permit.

Discussion: This section identifies the reports required by compliance schedules, if applicable, and/or any monitoring requirements referenced by any subsection of this permit.

Specific: The section:

- Provides compliance schedule requirements and progress reports, if applicable.
- Provides annual certification compliance requirements
- Requires Cytec to notify DEP within seven days upon discovering a deviation of any permit condition

PERMIT IMPLEMENTATION EXAMPLE

The following example illustrates how this permit is intended to work:

To develop new products, Cytec intends to install a new batch reactor. The new reactor will be a minor source for VOC and HAP (< 10 tons per year) and an insignificant source of PM10. Emissions from the reactor will be controlled using a condenser such as those used for other reactors at Cytec. No SOCOMI chemicals will be produced. Emission quantifications and monitoring protocols will also be similar to protocols used for existing units.

Step 1: Determine if Cytec triggers any new applicable requirements

- Source is subject to Batch Processes ACT per IV(d) of the applicable requirements section
- Source is subject to RCSA 22a-174-23 [odors] and -29 [HAP] [State-only enforceable]

Step 2: Determine emissions quantification methods [p 23]

- The applicable requirements do not define the emissions quantification method. Therefore, per II (b)(ii) of this section, use material balance or engineering calculations or test data to quantify emissions.
- Condensers, at (c)(iv) of the emissions quantification section, describes current equipment and matches description of proposed equipment
- Emissions from existing equipment can be quantified using the calculation methodology described in the emissions unit section of this permit. Proposed equipment meets description of existing equipment. Therefore, emissions from proposed equipment will be quantified in the same manner using engineering calculations.

Step 3: Determine emissions monitoring

- Per II (b)(ii) of the emissions monitoring section, emissions will be monitored on a per batch basis. Proper condenser operation will be monitored using a thermocouple to measure exit temperature within 2 F on a continuous basis.

Step 4: Evaluate compliance with applicable requirements

- The new reactor meets the cost effectiveness criteria defined at IV(d)(ii) of the applicable requirements section. The condenser is determined to reduce emissions by 95 percent, which exceeds the 90 percent requirement.
- Compliance with RCSA 22a-174-29 is shown.

Step 5: Determine effect on PAL

- The PAL section is triggered for all modifications involving VOC emissions units.
- Are emissions quantifications defined in permit and approved ? **Yes.**
- Are emissions monitoring methods defined in permit and approved ? **Yes.**
- For pollution control devices, are there any changes to existing controls ? **No.**

Step 6: Determine notification section requirements

- Cytec will provide 7 day notice since the new reactor meets the cost effectiveness criteria of the Batch Processes ACT.
- Cytec will submit the following information as required by Paragraph III of the notification section:
 - a. Equipment identification and description
 - b. Emission unit identification and description
 - c. Location of new emission unit
 - d. Anticipated date of completion
 - e. Anticipated date of commencement
 - f. Compliance methodology
 - g. Quantification method: Engineering calculations
 - h. Monitoring method: Condenser temperature
 - I Recordkeeping: Batch type and number, condenser temperature
 - j. Reporting: Instances of failure to maintain necessary condenser temperature
 - k. Anticipated emissions of each pollutant: Calculated using quantification method from (g) and assuming continuous operation
 - l. Citations of the specific proposed MACT standards Cytec is using as the basis for the 112(g) MACT determination and with which Cytec shall comply (not applicable)
 - m. Like-kind replacement (not applicable)

Step 7: Determine recordkeeping requirements

- Requirements provided in Batch Processes ACT
 - a. ID and description of emission point
 - b. ID and description of the emission

- c : Monitoring data and calculations showing 90 percent control effectiveness
- Emissions quantification section-applicable:
 - a. Emission source ID and description
 - b. Emission unit ID and description
 - c: Control device ID and description
 - d: Emissions quantification method: Engineering calculations
 - e. Date, place and time of sampling or measurements
 - f. Dates analysis of such samples or measurements were performed
 - g. Name of entity that performed the analysis
 - h. Analytical technique or method used for the analysis
 - I. Results from the analysis
 - j. Operation conditions at time of such sampling or measurement
 - k: All calibration and maintenance records related to the instrumentation used in such sampling or measurements, all original strip-chart recordings or computer printouts generated by continuous monitoring instrument, and copies of all reports required
- Emissions monitoring section-applicable:
 - a. Emission source ID and description
 - b. Emission unit ID and description
 - c. Control devise ID and description
 - d: Type of monitoring, including any recordkeeping, used to obtained data: thermocouple with high level alarm
 - e. Date, place and time of sampling or measurements
 - f. Dates analysis of such samples or measurements were performed
 - g. Name of entity that performed the analysis
 - h. Analytical technique or method used for the analysis
 - I. Results from the analysis
 - j. Operation conditions at time of such sampling or measurement
 - k: All calibration and maintenance records related to the instrumentation used in such sampling or measurements, all original strip-chart recordings or computer printouts generated by continuous monitoring instrument, and copies of all reports required.
- PAL- applicable:
 - a. Emission source ID and description
 - b. Emissions unit ID and description
 - c. The 12-month rolling average emission rate of each VOC emitted
 - d: The cumulative 12 month average emission rate of all VOC emitted from Cytec

Step 8: Include information from step 7 in notice to DEP and Cytec complies with applicable requirements.

Step 9: Unless DEP objects, the notification with the attached information (including recordkeeping) is physically attached to the terms and conditions contained within the Title V permit and become enforceable terms and conditions of the permit.