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Enabling Document for Permits for Early Reductions Sources

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Emissions Standards Division

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711
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U. S. ENVIRONMENTAL PROTECTION AGENCY

Enabling Document for
Permits for Early Reductions Sources

Prepared by:

9/13/95
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1. The promulgated rule "Permits for Early Reductions Sources" (November 21, 1994 issue of the Federal Register, pages 59921-59933) established an interim, federal operating permit program for sources participating in the Early Reductions Program. This document provides information to better understand and implement the rule.

2. Copies of this document have been sent to the following federal departments: Labor, Health and Human Services, Defense, Transportation, Agriculture, Commerce, Interior, and Energy: and to the National Science Foundation; State and Territorial Air Pollution Program Administrators; the EPA's Regional Administrators; Local Air Pollution Control Officals; the Office of Management and Budget; and other interested parties.

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4. Copies of this document may be obtained from the organizations listed on the previous page of this document.

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1.0 INTRODUCTION

1.1 PURPOSE OF ENABLING DOCUMENT

The purpose of this enabling document is to provide practical information and guidance to permit applicants and permit writers implementing the early reductions specialty permit program. This document is designed to help participating facilities develop their early reductions specialty permit applications, and to help permitting agencies review these applications and develop permits for early reductions sources.

This document includes:

- An explanation of the early reductions permit rule (section 2.0);
- Guidance on preparing an early reductions permit application (section 3.0);
- Guidance on preparing an emissions reduction demonstration (section 4.0); and
- Guidance on developing an early reductions specialty permit (section 5.0).

Several examples and checklists are provided in the appendices, including:

- Permit application information (Appendices A-E);
- A review checklist for permit applications (Appendix F);
- An example early reductions specialty permit (Appendix G); and

- An example emissions reductions demonstration (Appendix H).

1.2 BACKGROUND

In 1990, Congress passed amendments to the Clean Air Act (CAA). The amendments rewrote section 112 of the CAA to require initial technology-based regulation of sources of toxic air pollutants, followed by health risk-based standards at a later time. The amendments listed 189 hazardous air pollutants (HAPs) that were to be regulated and directed the U.S. Environmental Protection Agency (EPA) to develop standards for sources emitting these HAPs. The standards must require installation of the "maximum achievable control technology" or "MACT" (although for some area sources the Administrator may impose "generally achievable control technology" or "GACT"). The determination of MACT must be based on the best-performing facilities within the source category (e.g., oil refinery, chemical plant) in question. In 1992, EPA published a list of all the major source categories to be regulated under section 112 and a schedule for issuing standards.

However, under section 112(i)(5) of the CAA, a source can obtain a six-year extension to an otherwise applicable MACT standard compliance date if it voluntarily reduces its HAP emissions <u>before</u> proposal of such a standard. In order to obtain this "early reductions" extension, a source must demonstrate <u>qualifying</u> HAP emissions reductions--generally, a 90-percent-by-mass reduction or a 95-percent reduction of a particulate HAP on an annual basis. This provision was designed to encourage sources to substantially reduce their emissions before the required deadlines. At the end of the six-year extension, a source must meet all applicable MACT standards.

To establish the technical and procedural requirements for obtaining an early reductions compliance extension, EPA promulgated "National Emission Standards for Hazardous Air Pollutants; Compliance Extensions for Early Reductions" in

December 1992 (Federal Register, December 29, 1992, pp. 61970-62002). This rule includes the statutory requirement that every successful early reductions source be issued a title V permit containing federally enforceable emissions limitations to ensure that early reductions are maintained throughout the compliance extension period.

States eventually will issue title V permits to sources successfully demonstrating achievement of early reductions. However, State title V permitting programs would not have been approved by EPA in time to process the initial early reductions permit applications. Therefore, EPA acted to establish an interim title V permitting mechanism. The early reductions permit rule was promulgated in the Federal Register on November 21, 1994 (pp. 59921-59933) as 40 CFR part 71, subpart B, "Federal Operating Permit Programs, Permits for Early Reductions Sources." This specialty permit rule provides a permitting mechanism for early reductions sources until comprehensive operating permit programs become effective pursuant to title V.

2.0 EXPLANATION OF RULE

This chapter provides a discussion, by section, of the most important elements of the early reductions specialty permit rule. The sections of the rule are:

- Program overview;
- Definitions;
- Applicability;
- Permit applications;
- Permit content;
- Permit issuance, reopenings, and revisions; and
- Public participation and appeal.

Together, these elements set out the regulatory framework for the permit application requirements and emissions reduction demonstration given in sections 3 and 4 of this document.

Many of the sections of the title V rule promulgated under 40 CFR part 70, "State Operating Permit Programs," have been incorporated into this specialty permit rule. Certain sections were dropped or modified as appropriate for the narrower scope of this rule (i.e., to apply only to HAP emissions from the early reductions source within a facility).

2.1 PROGRAM OVERVIEW (§71.21)

The regulations under this subpart describe a specialty permit program that is a Federal title V permit program tailored to early reductions sources. This specialty permit program is an

interim program that will be gradually replaced as States obtain approval of their comprehensive operating permit programs under title V. Until that time, specialty permits will be issued to early reductions sources by the EPA Administrator (in fact, the duty will be delegated to the EPA Regional offices.)

As implied above, EPA will not necessarily stop issuing specialty permits immediately upon approval of a State's comprehensive title V permit program. EPA may issue a specialty permit after such approval in the following cases:

- If the State obtains its program approval after a facility has filed an early reductions permit application but before the permit is actually issued; or
- If the deadline for a facility's comprehensive title V permit application under the approved State program is later than the specialty permit application deadline under §71.24(b).

EPA's primary consideration in deciding whether to issue a specialty permit or defer to the State in the above cases will be the length of delay that would occur by waiting for the State to issue the permit.

Even if a source has obtained a specialty permit, the facility containing the source still must apply for the comprehensive title V permit required by the approved permit program after the State title V program is approved. The State will incorporate the specialty permit into the comprehensive title V permit issued to the facility containing the early reductions source.

The rule requires that specialty permits be issued for terms not to exceed five years. EPA plans to issue specialty permits with five-year terms. Although a source's compliance extension will still be in effect beyond the five-year permit term, specialty permits issued under this subpart will not be renewed. Rather, renewal will be accomplished by incorporating the terms

and conditions of the specialty permit into the comprehensive permit issued to the facility. In the event that a specialty permit's term expires before a comprehensive permit is issued, the specialty permit will remain in effect until the comprehensive permit is issued.

The EPA Administrator may delegate to a State the responsibility for implementing the specialty permit program. However, EPA would retain the right to issue specialty permits in cases where the permit application was filed before delegation was granted. To obtain delegation, a State will have to demonstrate that it has the ability to administer and enforce the specialty permit program.

2.2 DEFINITIONS (§71.22)

This section of the rule includes definitions taken directly from the promulgated part 70 (State title V) rule, where applicable to this subpart. A few definitions were also added from the promulgated part 63 (early reductions compliance extensions) rule. Terms already defined in the CAA were not repeated. Key terms with specific meaning under this subpart are discussed below.

One term that has a specific meaning under this subpart is "enforceable commitment." An enforceable commitment provided an alternate means of obtaining an early reductions compliance extension, but only for sources subject to "early" section 112(d) standards--those standards that were proposed prior to January 1, 1994. Generally, early reductions must be achieved before the proposal date of the applicable section 112(d) standard. However, some sources affected by the "early" section 112(d) standards may not have had enough time to achieve the qualifying emissions reductions before proposal. The CAA amendments alleviated this problem by allowing such sources to make an enforceable commitment prior to the proposal of an early section 112(d) standard. Those sources making an enforceable commitment had until January 1, 1994 to achieve qualifying emissions reductions. Because January 1, 1994 has passed, no new

enforceable commitments can be made, and all sources participating in the program from now on must achieve the required reductions before proposal of the otherwise applicable standard.

Another key term defined in this section is "post-reduction year." The post-reduction year is a one-year period that usually begins on the date the reductions are required to be achieved. For most sources, that date would be the date of proposal of the first section 112(d) standard that applied to the early reductions source. For sources that made enforceable commitments, that date would be January 1, 1994 (and the post-reduction year would run from January 1 through December 31, 1994). Sources, at their discretion, may define an earlier post-reduction year provided they notify the permitting authority.

An additional key term defined in this section is "Section 112(d) standard." This term refers to an emissions standard issued under the authority of section 112(d) of the CAA, as amended by the 1990 amendments. These standards are the National Emission Standards for Hazardous Air Pollutants (NESHAP), which, as explained previously, in most cases will be based on the MACT.

2.3 APPLICABILITY (§71.23)

This section states that the rule applies to owners or operators who are participating in the early reductions program and who must file a permit application before the State comprehensive title V program is approved. It also states that all HAP emissions from the early reductions source must be included in its specialty permit application and its permit.

2.4 PERMIT APPLICATIONS (§71.24)

Filing details and content requirements for permit applications are provided in §71.24.

2.4.1 Where to File Permit Applications

Responsibility for processing specialty permit applications will be delegated by the EPA Administrator to the EPA Regional

offices during the period before State title V permitting programs are approved. Therefore, the owner or operator of a source must submit the permit application to the appropriate EPA Regional Office. Copies of the application must also be submitted the appropriate State air pollution control agency and to:

- EPA Emission Standards Division
  Mail Drop 13
  Research Triangle Park, NC 27711
  Attn: Early Reductions Officer

- EPA Office of Enforcement and Compliance Assurance
  EN-341-W
  401 M Street, S.W.
  Washington, D.C. 20460
  Attn: Early Reductions Officer

2.4.2 Deadlines for Filing Permit Applications

Owners/operators of sources who made enforceable commitments were required to file a permit application by April 30, 1994. For sources that have not made enforceable commitments, the permit application must be submitted by the later of:

- 120 days after proposal of the earliest section 112(d) standard that the source is seeking a compliance extension from; or

- 120 days after the part 71 early reductions permits rule is promulgated (because the rule was promulgated on November 21, 1994, this date is March 21, 1995).

The post-reduction emissions demonstration **is** part of the permit application. However, in most cases it will not be submitted with the application but rather will be filed later as a supplement. This is because the post-reduction year on which the post-reduction emissions demonstration is based normally will end one year after proposal of the applicable section 112(d) standard, and the specialty permits rule allows the source one month after the end of the post-reduction year to submit the

demonstration (well after the permit application deadline). However, if the source establishes an earlier post-reduction year with the permitting authority, as allowed under the rule, and such a year ends at least one month before the permit application deadline, then the post-reduction demonstration must accompany the permit application.

One exception to the above is that any source sampling results used by the source as part of the post-reduction emissions demonstration must be submitted with the permit application. This will require that sources perform the sampling early in the post-reduction year, thus assuring the permitting authority that reductions occurred, as required, before proposal of the applicable standard.

2.4.3 Permit Application Content

The primary components of a complete permit application are:

- Identifying information for the facility.
- A description of the early reductions source (also required and delineated in more detail in the Early Reductions Rule, 40 CFR §63.74).
- Substantiated base-year and post-reduction emissions for the source that show achievement of qualifying early reductions (delineated in more detail in the Early Reductions Rule, 40 CFR §63.74).
- Proposed emissions limitations:
  - The alternative emissions limitation (AEL) for the early reductions source;
  - A second alternative emissions limitation for "high-risk" HAP's if any are emitted from the source; and
  - Additional emission limiting requirements to promote or ensure practical enforceability of the alternative emissions limitation, as appropriate.
- Alternative operating scenarios, if the owner so chooses.
- Monitoring, recordkeeping, compliance certification, and reporting requirements proposed for the source.

Several of these permit application components are discussed below. Additional information relevant to permit application components appears in other sections of this document (i.e., sections 3 and 5 and appendices A trhough E, and F).

2.4.3.1 Alternative Emissions Limitation. The alternative emissions limitation proposed in the permit application must be an annual cap (calendar-year basis) on aggregate HAP emissions from the early reductions source. This limitation must reflect a HAP emissions reduction on a mass basis of at least 90 percent (95 percent for particulate HAP) from the established base-year emissions.

If the early reductions source emits any of the 45 high-risk pollutants listed in the early reductions rule, then a second alternative emissions limitation must be proposed in the permit application. This second alternative emissions limitation will be similar to the first except that it will require a reduction in HAP's of at least 90 (or 95) percent considering the weighting factors of any high-risk HAP'S emitted. The weighting factor for each pollutant is provided in the list of high-risk pollutants found in Table 1 of 40 CFR 63.74. The factors are based on the relative risks of adverse public health effects that may be associated with exposure.

The permit application may include proposed additional limitations to aid practical enforcement of the alternative emissions limitations, as provided in §71.24(e)(4). The proposed additional limitations may include:

- Limitations on raw material usage;
- Limitations on throughput (such as barrels per year for a storage tank);
- Capacity restrictions (such as MMBtu/hr for a boiler);
- Limitations on operation (such as hours per year); and
- Work practice standards (such as periodic inspections and specified repair practices).

Any additional limitations included in the specialty permit would assist in tracking a source's progress toward meeting the alternative emissions limitation (which is an annual cap).

2.4.3.2 Alternative Operating Scenarios. Alternative operating scenarios for the source may be proposed by the owner/operator if emitting processes or operations are anticipated to vary during the course of a year or during the course of the permit. The permit application must identify associated permit terms and conditions needed to ensure that the source will meet the alternative emissions limitation under the alternate operating scenarios.

For example, if a facility has a storage tank in which either ethylbenzene or xylene will be stored during the year, the permit could be written to accommodate both scenarios. The emissions calculation provisions for that tank should be written so that any HAP-specific properties input to the calculations, such as vapor pressure and molecular weight, are referenced only generically. Thus, the permit would cite "vapor pressure of the HAP" stored in the tank, rather than "vapor pressure of xylene." In addition, the recordkeeping section would require the owner/operator to record for each HAP stored in the tank, what HAP it is, when it was stored in the tank, and the properties of that HAP. The example permit in Appendix G illustrates this.

2.4.3.3 Monitoring, Recordkeeping, Reporting, and Compliance Certifications. Specifically, the permit application must contain:

- A statement of how the applicant proposes to demonstrate continuing compliance with the proposed alternative emissions limitation and other permit conditions; and
- A schedule of submissions of compliance certifications during the permit term (at least annually).

Methods to demonstrate continuing compliance would include a description of monitoring devices and/or activities (such as

process or equipment parameter monitoring or performing equipment inspections) for the emissions units in the source, test methods, and recordkeeping and reporting. It would also include the emissions calculation procedures for the periodic (e.g., quarterly) demonstration of compliance.

If a radionuclide source is included in the early reductions source's emissions pool, the permit application must contain a certification that no increases in radionuclide emissions will occur under any post-reduction scenario.

The example permit in Appendix G gives a practical application of these monitoring, reporting, and recordkeeping requirements.

2.5 PERMIT CONTENT (§71.25)

Several of the elements required in a specialty permit issued by EPA under this subpart mirror those required in a State's comprehensive title V permit. In general, a specialty permit will contain:

- An alternative emissions limitation;
- A second alternative emissions limitation if the source emits any of the high-risk HAP's listed in the early reductions rule;
- Additional emissions-limiting requirements such as operational limits or work practice standards as needed to ensure enforceability;
- Monitoring, recordkeeping, and reporting requirements;
- Compliance requirements;
- Terms and conditions for the alternative operating scenarios identified by the permittee in the application (if any);
- If requested by the permittee, terms and conditions for trading HAP emissions among emissions units within the early reductions source;
- A permit shield that applies only to compliance with part 63, subpart D; and

- A number of "boilerplate" title V permit conditions, including emergency provisions and a severability clause that keeps the permit requirements valid if any part of the permit is challenged. (See section C of the example specialty permit in Appendix G).

A specialty permit must contain all the monitoring requirements necessary to determine whether the source is complying with the alternative emissions limitation(s). These requirements include monitoring and analysis procedures and test methods, as applicable. These procedures and methods must be consistent with those used for the early reductions demonstration required by the part 63 regulation. The permit must require monitoring on a frequency sufficient to ensure compliance.

The permit must require records of samples or measurements, along with analyses of such samples, to be kept on site. Records on samples must include the date, place, and time of sampling or measurement and the operating conditions at that time. Records on sample analyses must include the date of analysis, the company that performed the analysis, the analytical techniques used, and the results. The permit must require all monitoring records and supporting information to be kept for at least five years.

Specialty permits issued under this subpart, like those issued under part 70, must require that the source owner/operator submit reports of all monitoring to the EPA at least every six months. EPA intends to require the submission of monitoring results and emissions calculations on a semiannual basis. However, shorter reporting intervals may have to be specified for the life of the permit for certain emitting units. For example, emissions from some emission points may fluctuate widely over time, or may make up the bulk of emissions from the entire early reductions source. Emissions from such points may need to be tracked more frequently to make sure the alternative emissions limitations are not exceeded.

Under part 70, reporting of deviations from permit requirements, including those due to upset conditions, must be

"prompt." EPA will define "prompt" in relation to the extent and type of deviation likely to occur at the source for each specialty permit issued under this subpart. To minimize the number of reportable deviations, the permittee should suggest in the permit application terms and conditions covering routine variations in operations and maintenance.

Additional limitations that may be included in the permit are discussed in section 2.4.3.1 of this enabling document. EPA will issue a specialty permit to include additional limitations, if necessary, to ensure enforceability of the alternative emission limitation.

The specialty permit will contain terms and conditions for alternative operating scenarios at the early reductions source, if requested by the applicant. Alternative operating scenarios are discussed in section 2.4.3.2 of this enabling document. EPA will issue a specialty permit to include permit terms and conditions sufficient to ensure enforceability of the alternative emissions limitation under any alternative operating scenario described in the permit. The permit shall also require the owner/operator to record in a log the scenario under which the source is operating and provide notice to the Administrator (i.e., EPA Regional Office) that the change has occurred. The notification requirement is waived if process monitoring information is sufficient to identify that a change to a particular operating scenario has occurred.

Specialty permits will contain a permit shield statement. This statement essentially says that if the permittee complies with all terms and conditions of the permit, the permittee will be regarded as complying with the requirements of the early reductions regulations (part 63, subpart D). This shields the permittee from being found out of compliance with any part 63, subpart D, requirements that are misinterpreted in, or mistakenly omitted from, the early reductions permit. The Appendix G example permit provides permit shield language.

2.6 PERMIT ISSUANCE, REOPENINGS, AND REVISIONS (§71.26)

Procedures for permit issuance and changes are set out in §71.26.

2.6.1 Permit Issuance

Within 45 days of receiving a permit application, EPA must determine whether the application is complete or incomplete. If the application is incomplete, EPA must notify the applicant and request the additional information needed. If no notification is sent within 45 days, the application is considered complete. If a source submits a complete early reductions permit application on time, the source is protected by the "application shield." Prior to the issuance of the specialty permit, this shield keeps an early reductions source from being in violation of the requirement to have an early reductions permit. The protection ends when EPA either makes a final decision to issue or deny the permit or requests additional information by a certain deadline and the source fails to provide it.

The Administrator must make all draft permits and draft permit modifications available for public review. Public participation in the permit issuance process, which includes notice, opportunity for comment, and a hearing if requested, is discussed in section 2.7 of this enabling document.

EPA must take final action on each permit application within 12 months of receiving a complete application unless additional information is requested and the applicant does not provide it in a timely manner.

As stated previously specialty permits issued under this subpart will not be formally renewed, despite the fact that the compliance extension granted the source will extend beyond the 5-year term of the specialty permit. Rather, EPA intends that the terms and conditions of the specialty permit be renewed through comprehensive title V permitting programs. When the State title V program for issuing comprehensive title V permits is approved, the State will incorporate the specialty permit

terms and conditions into the facility's comprehensive title V permit. If a specialty permit reaches the end of its term before a comprehensive permit can be issued, it will remain in effect until the comprehensive permit is issued. If the State's title V program is never approved (or it appears that approval will not be timely), the specialty permit will be incorporated into a comprehensive permit issued by EPA under part 71.

2.6.2 Permit Changes

This subpart contains procedures for permit revisions due to:

- Administrative amendments;
- Permit revisions; and
- Reopening for cause.

2.6.2.1 Administrative Amendments. An administrative amendment is a permit revision that:

- Corrects typographical errors;
- Identifies minor administrative changes at the source (such as a change in the name, address, or telephone number of a person identified in the permit);
- Requires more frequent monitoring or reporting by the permittee;
- Allows for certain changes in ownership or operational control of the source; or
- Incorporates any other minor changes similar to those above.

This last item allows EPA to process quickly other insignificant changes not listed in the regulation without having to go through the lengthy permit modification process.

To obtain an administrative permit amendment, a source owner/operator must submit to EPA a proposed addendum to the permit. The addendum must identify which of the existing permit

conditions will be amended and what the amended conditions will be.

Although Administrative Amendments formally become effective 60 days after receipt of application by EPA unless EPA objects within that time period, the early reductions source may implement the changes in the request immediately. The EPA must take final action on the administrative amendment within 60 days from receipt of the request. Administrative amendment of a permit is not subject to draft permit or public notice requirements. If EPA denies the amendment, the source shall comply (upon receiving such notice of denial) with the original terms and conditions of the permit.

2.6.2.2 Permit Revisions. A permit revision is a change to a specialty permit that does not qualify as an administrative amendment. Unlike a part 70 permit program, this specialty permit program does not make a distinction between minor and significant permit revisions. The requirements for permit revisions are the same as those for permit issuance, including application submittal, public participation, and review by affected States. The Administrator must take final action on a request for permit modification within nine months of receiving a complete application.

2.6.2.3 Permit Reopenings. A specialty permit may be reopened and revised under certain conditions, which must be specified in the permit itself. A permit may be reopened and revised if the Administrator determines that:

- The permit contains a mistake;
- Inaccurate statements were made in establishing the alternative emissions limitation or other terms or conditions of the permit; or
- The permit must be revised to ensure compliance with the alternative emissions limitation.

The Administrator will provide the source owner/operator advance notice of at least 30 days before reopening a permit.

2.7 PUBLIC PARTICIPATION AND APPEAL (§71.27)

This section of the rule establishes specific procedures for public participation related to preparation of draft permits, initial permit issuance, and permit revisions. This section also delineates administrative appeals procedures for final permit decisions. Because this section contains much procedural detail not germane to the primary focus of this document, it will not be summarized comprehensively. Instead, the following generally describes public participation in the permit issuance process. The reader is referred to the rule for additional detail.

When a complete permit application is received, EPA must decide whether to prepare a draft permit or issue a notice of intent to deny the application. Along with the draft permit or notice of intent to deny, EPA must prepare a statement of basis. This would either describe the reasons for denying the application or describe how and why the permit terms were developed.

After the permit has been drafted or tentatively denied, EPA must issue a public notice about its actions. Notice of draft permits must provide at least 30 days for public comment, and the Administrator will issue notice of a hearing at least 30 days before the hearing is to be held. Public notice includes notification of affected States. The definition of "affected States" is taken directly from the part 70 rule, where affected States are those whose air quality may be affected and are contiguous to the source's State or located within 50 miles of the source.

After the public comment period on a draft permit (or denial) closes, EPA must issue a final permit decision and response to comments.

3.0 PERMIT APPLICATION GUIDANCE

This section provides a detailed discussion of each item needed in the permit application. The items needed are based on the regulatory requirements summarized in Section 2.4 and the information needed by the permit writer to draft the permit (this will be covered in section 5.0). For the applicant's ease of understanding, specific examples are given wherever possible. Supplementary information on applications is given in appendices A through E.

3.1 COVER LETTER AND TABLE OF CONTENTS

3.1.1 Cover Letter

A complete cover letter for a specialty permit application should include the items listed below so that the application reviewers will be able to quickly visualize the type of source and the magnitude of emissions. The citations in brackets are the associated requirements in the proposed specialty permit rule (part 71 numbers) or the promulgated early reductions rule (part 63 numbers).

- A general description of the source or sources [§71.24(e)(2)];
- A statement explaining which definition of source is appropriate for the early reductions source(s) [§63.73] and a statement of the EPA approval status of the base year emissions;
- A table summarizing the base year emissions and the requested alternative emission limitations for the source, including both the total HAP emissions and the total weighted HAP emissions adjusted for high-risk pollutants, if appropriate [§63.74(e)];

- A statement certifying that the information provided with this specialty permit application constitutes the best available data for emissions from the source and, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete [§71.24(f)];

- The name and phone number of the plant contact who would be able to answer any technical questions regarding the submittal [§71.24(e)(1)]; and

- The signature of a responsible official representing the company that controls the contiguous area under common control containing the source [§71.24(e)(2) and §63.74].

A sample cover letter is provided in the example permit application in appendix A.

3.1.2 Table of Contents

Including a table of contents in the specialty permit application will help reviewers see the overall organization of the application. The table of contents should identify each major section of the submittal and give a corresponding page number. Page numbering is critical for the reviewing agencies. The application is reviewed concurrently by as many as three regulatory offices. By having page numbers, the respective agencies can discuss various components of the submittal. In addition, page numbering helps the regulatory agency pinpoint any deficiencies in the application and makes it easier for industry to address agency comments.

3.2 COMPANY AND SOURCE IDENTIFICATION INFORMATION

3.2.1 Company Identification

The application should contain the company's name, address, and the name and phone number of the plant contact.

3.2.2 Source Identification

Source identification information should include:

- A general source description;

- Identification of emission points in the source, including any changes from the base year to the post-reduction year; and
- A site plan.

For applicants who submitted a base year emission demonstration to EPA for review and approval prior to permit application submittal, much of this information will already have been submitted and is not required to be resubmitted. However, EPA prefers that applicants copy and resubmit with the application package applicable source identification information previously submitted.

3.2.2.1 General Source Description. The applicant should provide a narrative description of the source that includes equipment and/or processes, the type(s) of manufacturing or processing employed, and the HAP emissions generated by the source. Examples of satisfactory general source descriptions follow.

EXAMPLE 1: The proposed early reductions source is located within a synthetic organic chemical manufacturing facility that primarily produces aromatic derivative chemicals. The early reductions source is defined as the set of emission points associated with the Dock Tank Farm. This includes three xylene fixed-roof tanks and one styrene fixed-roof tank. It also includes the loading and unloading of xylene and styrene. Hazardous air pollutants are emitted from the tanks during filling and emptying of tanks and storage of the above chemicals. Emissions also occur during the transfer of product chemicals to tank cars. The source conforms to the definition found in section 63.73(a)(4) of the early reductions regulation. The HAP emissions from the set of emission points defined as the source total more than 10 tons per year (tpy).

EXAMPLE 2: The proposed early reductions source is within a resins manufacturing complex and is defined as all emission points located in the epoxy resins manufacturing department.

This includes tanks storing raw materials and intermediates, process vents, and the transfer equipment for loading and unloading raw materials and finished goods. Hazardous air pollutant emissions are generated during filling and emptying of storage tanks, from "breathing" in the vapor space of storage tanks, from the venting of noncondensable gases in distillation columns, and during the filling and emptying of tank cars and trucks. The source conforms to the definition found in section 63.73(a)(3) of the early reductions regulation. This source can be defined as a facility, structure, or installation for the purpose of establishing standards under section 112(d) of the Clean Air Act (CAA).

3.2.2.2 Identification of Emission Points. The applicant should include a list of all the emission points that includes a brief descriptive title and a facility-assigned identification code, the HAP's emitted and their corresponding CAS numbers, HAP weighting factors, and State or local permit identification numbers. This information can be presented in a table format. An example of such a table is given in appendix A. High-risk HAP's and their weighting factors are listed in section 63.74 of the early reductions regulation. The applicant should show any changes to the emission points from the base year to the post-reduction year (for example, some base-year emission points may have been recycled or shut down and some emission points may have been added because of equipment or process changes.

3.2.2.3 Site Plan. The site plan should show the boundary of the contiguous facility and clearly identify the locations of all emission points included in each source. The level of detail for the site plan will depend on the complexity of the source and the source definition. For example, if the source definition includes all storage tanks in tank farm A, it should be easy to identify the location of these tanks on a site plan. However, if the source definition is a collection of emission points from various locations at a facility, the site plan must clearly indicate which emission points are included in the source.

In some cases, it may be necessary to include two site plans to identify a source. The first site plan would show the entire contiguous facility and highlight the location of processes or specific emission points that make up the source (a "macro" site plan). The second site plan would magnify the individual processes and identify each specific emission point (a "micro" site plan).

3.3 EMISSIONS REDUCTION DEMONSTRATION PLAN

The specialty permit application's demonstration plan should include a description of each control measure being used to achieve post-reduction emissions levels. All control equipment employed must be described, as well as any air pollution minimization techniques such as process changes, raw materials changes, or recycling, and work practices such as maintenance and repair for equipment leaks.

The suggested format for submitting emissions reduction information in the demonstration plan is a simple table accompanied by summary text, which will give the reviewer an overall picture of the applicant's planned emissions reduction approach. (See example table 2-1 and text in appendix A.) The table should show: (1) emission point description, (2) emission point identification number, (3) emissions reduction measure employed, and (4) expected emissions reduction efficiency. The table should be accompanied by a brief text for each emission point (or group of points) that describes the emissions reduction method employed (if any) and the method for demonstrating actual post-reduction emissions. The emissions demonstration method description should include source tests conducted (if any), post-reduction year parameter monitoring being done, and calculations to be performed to arrive at actual annual emissions.

All of the emission points presented should correspond to the emission points listed in the earlier Source Identification section of the application (see section 2.2.2.2). If there are many emission points, applicants may choose to decrease the size

of the table by grouping emission points either by type or by common control device.

As a guide in tracking the emissions reduction measure for each emission point, the applicant should assign an identification number to each emissions reduction device unit. That is, if several baghouses of similar design are used, each baghouse should be identified separately. Preferably, the identification number should be consistent with the identification number assigned in any existing State or local air permits.

The applicant should not confuse this information with the actual emissions reduction demonstration. Guidance on the actual demonstration is given in section 4.0 of this enabling document. Inclusion of the information discussed above is recommended to help reviewers picture the emissions reduction approach.

3.4 PROPOSED PERMIT TERMS AND CONDITIONS AND RATIONALE

The pool of early reductions permit applicants is expected to include a variety of industry types. Further, different applicants from the same industry are likely to delineate different source configurations for inclusion in early reductions permits. Thus, early reductions permit terms and conditions are likely to vary widely from source to source.

The first step toward establishing permit terms and conditions for a particular early reductions source is to have the applicant propose them in the permit application. The terms and conditions to be developed include (see §71.24(e)(6)(i)):

- An AEL for the whole source (and any other emission limiting requirements, such as work practices, necessary to assure compliance with the AEL);
- Emission point-specific terms and conditions, such as:
  - monitoring requirements,
  - recordkeeping requirements, and
  - emissions calculation procedures;

- Operational flexibility provisions, if any; and
- Reporting requirements.

The following text presents guidance on applicants' proposals for these types of conditions. Applicants are not expected to propose precise wording for their permit terms and conditions because the permitting authority will prepare the final permit terms and conditions.

3.4.1 Alternative Emissions Limitations

Numerical Limit. Program participants must propose an AEL as part of their permit application [§71.24(e)(3)]. The AEL is the overall annual (calendar year) emissions cap the source must meet to maintain the 90-percent (95-percent) reduction. The AEL is always a mass-based standard and may be expressed in tons per year (tpy) or pounds per year (lb/yr) or their metric equivalents. The AEL generally is calculated by multiplying total base-year emissions by 10 percent (5 percent for particulate HAP's).

A second AEL is required if the early reductions source emits any high-risk pollutants. It is calculated by multiplying the base-year emissions adjusted for high-risk pollutants by either 10 percent or 5 percent, as appropriate [§63.74(e)(1)]. If both gaseous and particulate HAP's are emitted from the early reductions source, then separate AEL's must be proposed for each type [§63.74(e)(1)(v)].

In some cases, HAP emissions at the early reductions source may have been reduced by more than 90 (95) percent, and the owner/operator may wish to preserve the incremental reductions above the required 90 (95) percent, perhaps for future offset credits under title I of the CAA. In this case, the AEL could be established at less than 10 (5) percent of base year emissions to preserve the credits. Or, a source may already have a State permit at a lower level and may want to accept the lower number in their early reduction permit for consistency. (Note: A general discussion of how reductions beyond the required 90 or

95 percent may be used in offsets or netting transactions under title I is contained in the preamble to the early reductions rule (Federal Register, December 29, 1992, p. 61987).

Participants who have not had base-year emissions approved prior to submitting their application should be aware that their proposed AEL could be changed as a result of the EPA's technical evaluation of the base-year emissions. For example, assume a participant estimates (gaseous) base-year emissions to be 100 tpy in the permit application. If, after EPA review, the approved base-year emission level is 96 tpy, the AEL would be changed from 10 tpy to 9.6 tpy.

Frequency and Method of Calculation. The AEL is a yearly (calendar year) limit on the early reductions source's HAP emissions and, therefore, the source's actual HAP emissions must be determined after the end of each year to determine compliance. However, the permit will likely require HAP emissions to be determined semiannually and reported, so that the permitting authority will be able to track a source's progress toward meeting the calendar-year limit. The applicant must propose HAP emissions calculation methods for the purpose of determining AEL compliance. These calculation procedures will become part of the final permit terms. More detail on emissions calculations is presented in the section describing emission point-specific terms and conditions (section 3.4.3).

For applicants who have not made enforceable commitments, the post-reduction year and post-reduction year emissions may not be based on a calendar year [because the post-reduction year begins on the proposal date of the applicable section 112(d) standard, unless the source establishes an earlier post-reduction year based on a calendar year]. In these instances, the final permit will establish subsequent annual compliance checks of HAP emissions based on the calendar year. The source owner/operator would then be required to submit the first annual HAP emissions data for the calendar year in which the post-reduction year ended. As an example, the owner operator of a participating

source subject to a section 112(d) standard proposed by EPA on August 6, 1995 would have to provide to the permitting authority documentation of HAP emissions from August 6, 1995 to August 5, 1996 (the post-reduction year) and, if a compliance extension is granted, would be required in the permit to submit annual compliance emission data for calendar year 1996 and subsequent years until the extension expires. [Note: In the previous example, the source owner/operator also would have the option to establish the post-reduction year as July 1, 1995 to June 30, 1996 (which would show that the source achieved the 90/95 percent reductions earlier than required by the Early Reductions Program), thereby making the post-reduction year coincide with calendar half-years and perhaps making emissions reporting easier.]

Permits will not be issued until several months after the post-reduction demonstration has been submitted. Nonetheless, applicants should continue to monitor HAP emissions after the end of the post-reduction year and before the permit is issued so that a continuous record of emissions is available for semiannual and annual reporting.

3.4.2 Emission Point-Specific Terms and Conditions

3.4.2.1 Monitoring. Generally, each emission point in the early reductions source should be adequately and appropriately monitored so that actual emissions can be determined on an ongoing basis. For the more significant emitting units in the early reductions source, monitoring may take the form of continuous measurement of emissions or some process parameter(s) directly related to emissions. For small emission points, the monitoring may be less sophisticated; monitoring may be less frequent and/or employ less costly monitoring devices or methods. Precisely what constitutes a "small" emission point and what is meant by "less sophisticated" monitoring cannot be explicitly decided in this guidance, but will depend on the nature of the early reductions source and its emissions and on the types of available methods for tracking emissions performance. Final

permit monitoring terms will reflect the joint input from the early reductions source, the permitting authority, and affected States.

The permit application, therefore, must contain complete descriptions of each proposed monitoring activity. Monitoring methods may include:

- Testing at regular intervals;
- Direct emissions monitoring;
- Monitoring some process parameter directly related to emissions;
- Recording specific work practices or maintenance procedures that were performed; or
- Inspecting equipment.

Development of monitoring requirements. Information useful for developing monitoring requirements for early reductions sources may be found in EPA's proposed Enhanced Monitoring Rule (Federal Register, October 22, 1993, p. 54648) or in the provisions of other EPA standards already proposed or promulgated, such as New Source Performance Standards (NSPS) or National Emission Standards for Hazardous Air Pollutants (NESHAP) for the same or a similar industry. A complete description of monitoring for emission points would include:

- A brief description of the type of monitoring proposed (such as temperature measurement, pressure drop measurement, direct emissions monitoring, etc.) and the monitoring devices (e.g., thermocouple with digital readout), test methods, or activities that will be used to accomplish the monitoring. For monitoring other than direct emissions monitoring, the description should include the rationale for each monitoring selection (e.g., if temperature measurement is selected to monitor a specific piece of emitting equipment, how does temperature relate to emissions?).

- The proposed frequency of monitoring for emitting units in the early reductions source. This frequency should be selected to support the periodic demonstration of compliance with the AEL, and be conducted often enough to provide a timely and accurate emission estimate.

- If different from the manufacturer's directions, proposed requirements for the installation, use, and maintenance of any monitoring equipment employed (otherwise, the permit will require that the manufacturer's directions be implemented).

Identification of appropriate parameters to be monitored will be the responsibility of the applicant. In the case of wastewater sources, identification of parameters is expected to be particularly challenging because emissions from wastewater are affected by the design and operation of plant-specific equipment as well as by the HAP loading in the wastewater. Applicants need to identify the parameters that most significantly affect emissions and that can be easily monitored. It is also particularly important for the applicant to provide supporting rationale for why the selected parameter is a reasonable indicator of actual emissions.

Monitoring strategy using source testing. In addition to using source tests for post-reduction emissions demonstrations (see section 3 for a more complete discussion of the post-reduction demonstration), applicants may also use source tests in their overall strategy to demonstrate compliance with the AEL. For example, if one of the emissions reduction measures used in early reductions is thermal incineration, a specialty permit would probably require continuous monitoring of incinerator firebox temperature. If performance of the incinerator was demonstrated at only one temperature through a source test, that temperature would be specified as the minimum operating temperature in the permit or would be the lowest temperature at which the demonstrated performance level could be assumed. It is obvious that dropping below the designated temperature would not necessarily result in uncontrolled emissions; however, emissions

below the designated temperature could not be quantified accurately. As a result, any periods in which the firebox temperature falls below the level specified in the permit either would violate a permit condition and/or cause emissions for that period to be estimated at some default level that would be considerably higher than that indicated by the source test data at the designated temperature.

Conversely, the scope of the demonstration source test could be expanded to develop a relationship between emissions and the incineration temperature. Compliance provisions in the permit could then be written in a way that allowed for emissions determination at any incineration temperature. This flexibility can be especially important where the emission point is only one of multiple emission points that make up the defined source. Higher emissions during periods of lower incineration temperatures could be offset by greater reductions from other emission points, or vice versa.

Compliance with enhanced monitoring requirements. The final rule to implement the enhanced monitoring provision of the CAA likely will not contain provisions specific to early reductions sources. Monitoring requirements adequate and appropriate for determining compliance with the AEL will be worked out during the issuance process for each specialty permit. At the end of the six-year extension period, early reductions sources must comply with explicit enhanced monitoring requirements included in the applicable MACT standards that become effective for those sources.

Quality assurance/quality control (QA/QC) for monitoring devices and procedures. Early reductions permits will contain certain specifications related to QA/QC of monitoring information, such as minimum monitor "on-line" time (minimum data availability), measurement accuracy, etc. Specific requirements will be worked out for each early reductions source individually so that the characteristics of each source can be taken into account.

3.4.2.2 Recordkeeping. Along with a description of monitoring methods, the application should include proposed recordkeeping requirements. Records must be kept of the monitoring performed on the emitting units; these records will document the source's compliance status. Recordkeeping requirements proposed for the early reductions source should include:

- Records of required monitoring performed to demonstrate compliance with the AEL (the date, place, and time of monitoring);
- The results of the monitoring;
- The occurrence and duration of monitor downtime (for calibration, maintenance, or due to a malfunction);
- A log of calibrations and maintenance performed on monitoring systems;
- The occurrence and duration of any other process or control equipment malfunctions; and
- If source testing was performed, the date, time, and place of the test, as well as the dates analyses were performed, the company performing the analyses, the test results, the process operating conditions at the time of the test, and any problems encountered during the test.

Under §71.25(a)(4)(ii), records of all monitoring data and supporting information must be retained for a period of at least five years (this length of time is consistent with the rule promulgated under part 70 for State title V permitting programs). Supporting information includes all calibration and maintenance records, all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by the permit.

Early reductions permits will require the first semiannual emissions report submitted to include actual HAP emissions data for the interval from the end of the post-reduction year to the

end of the first semiannual reporting period. This will ensure continuity of emissions reporting; without this requirement no emissions information would have to be submitted for the period beginning at the close of the post-reduction year and ending with permit issuance.

3.4.2.3 Emissions Calculation Procedures. The source owner/operator will be required to demonstrate compliance with the yearly AEL and will also have to determine emissions semiannually to keep track of progress toward meeting the AEL. The owner/operator will therefore need to translate the information recorded from the periodic monitoring or other records related to emissions into a quantification of actual HAP emissions. The applicant must describe the calculation procedure to be used to determine actual emissions for each emission unit. Of course, if emissions for a unit are directly monitored, no calculations or procedures are needed. However, for all other cases, the procedure or calculations to arrive at actual emissions must be described, and the technical basis for the procedure or calculation explained. Appendix A contains examples of calculation procedures for determining actual emissions.

Because the AEL is an annual limit on actual emissions, there should be no periods of unquantified emissions. Therefore, the calculation procedures should include an approach for determining (or estimating) emissions when a monitoring device is inoperable or a monitored parameter exceeds the range of values that has been directly correlated with HAP emissions. For example, suppose an applicant has demonstrated through source testing that an incinerator will have a HAP destruction efficiency of 99 percent for incinerator firebox temperatures of at least 1600°F; however, no efficiencies were established below 1600°F. In the event that the incinerator firebox temperature falls somewhat below 1600°F, a way of estimating emissions for that period must be established. Although the efficiency certainly would not be zero, a default conservative efficiency would need to be assumed to provide an emissions estimate. The

manufacturer of the unit may have information that could be used to estimate efficiency under these conditions. If no information is available on which to base an estimate, a source test could be performed at the lower temperature.

3.4.3 Operational Flexibility Provisions

The permit application should identify any alternative operating scenarios expected to occur during the life of the permit that would affect emissions. Alternative scenarios can involve the use of different solvents or raw materials, or production of different products altogether. Along with the description of the alternative scenarios, the applicant should describe how HAP emissions will be affected under each scenario and how the AEL will still be met. The monitoring, recordkeeping and reporting provisions of the permit will apply when the source is operating under the alternative scenario unless separate terms are proposed and issued specifically for operation under the alternative scenario. The purpose of defining alternative scenarios is to avoid the permit modification process for every process variation, especially if the alternative scenario is anticipated and permit conditions can be set ahead of time.

3.4.4 Reporting

Under §71.24(e)(6)(i), an applicant also must propose reporting requirements. The reporting section of a specialty permit application should include:

- A statement indicating the frequency of reporting, along with the date that the reports will be submitted to the permitting authority; and
- Statements describing information that will be contained in each report.

The EPA may issue guidance on a suggested report format in the future, with the objective of setting up easy-to-follow

semiannual emissions data reporting. An advance example format for emissions reporting is provided in figure 3-1.

EARLY REDUCTIONS
SEMIANNUAL EMISSIONS REPORT FOR
XYZ CHEMICAL, RALEIGH, NC

Date: _____

Semiannual Period: _____

Total Emissions For This Period: _____

SEMIANNUAL PERIOD	HAP EMISSIONS (tons)	WEIGHTED HAP EMISSIONS (tons)
TOTAL		

Alternative Emissions Limitations: _____

Detailed Description of Emissions for this Semiannual Period

Emission Point IDs	HAP Emissions (tons)	Weighted HAP Emissions (tons)
TOTAL		

Figure 3-1. Example Report Format

4.0 EMISSIONS REDUCTION DEMONSTRATION

The emissions reduction demonstration, when complete, will document actual base-year emissions and actual post-reduction emissions (also weighted base-year and post-reduction emissions if any high-risk pollutants are emitted from the early reductions source). As discussed in section 3, the permit applicant must include documentation of base-year emissions with the initial specialty permit application (unless the base-year emissions were submitted to the permitting authority earlier). In most cases, the applicant will provide documentation of actual post-reduction emissions as a separate submittal after the end of the post-reduction year. (In instances where an "earlier" post-reduction year has been established, the applicant may have to file the post-reduction emission with the permit application. See section 2.4.2 for additional detail). However, if any source tests were performed to support emissions reduction, the applicant must provide test results by the permit application deadline (the results normally would be submitted in the same package with the permit application).

This section provides specific guidance for documenting base-year and post-reduction emissions. The example permit application in appendix A provides example base-year emissions documentation and appendix H presents an example emissions reduction demonstration.

4.1 BASE-YEAR EMISSIONS DOCUMENTATION

Applicants are expected to submit documentation of base-year emissions prior to or with the specialty permit application. For an enforceable commitment example and guidance on documenting

base-year emissions, applicants should refer to the early reductions rule and/or the Enabling Document for Regulations Governing Compliance Extensions for Early Reductions of Hazardous Air Pollutants (EPA-450/3-91-013).

Applicants who submitted the base-year emissions documentation separately do not have to submit the documentation again. Instead, those applicants need only provide a summary of base-year emissions with the specialty permit application. The summary will facilitate review of the application without the original base-year emissions submittal. Applicants are reminded that the permit application may be reviewed by organizations other than the permitting authority e.g., a public reviewer.

The suggested summary format is a table that summarizes the names of the emitted HAP's and the base-year HAP emissions (total and weighted) for each emission point (see example table 1-1 in Appendix A).

4.2 POST-REDUCTION EMISSIONS DOCUMENTATION

The rules for documenting post-reduction emissions are the same as those for documenting base-year emissions. Section 63.74 of the early reductions rule contains the documentation requirements, and they are explained in more detail in the enabling document. Briefly, the applicant must demonstrate post-reduction emissions using the best available data accounting for actual emissions. The best available data are presumed to consist of documented results from source tests, unless one of the following applies:

- No source test method exists for the emission point(s);
- It is not technically or economically feasible to perform source tests;
- Another method of deriving emissions will produce emissions estimates with accuracy comparable to source tests; or
- Emissions from a point or set of points is so small that estimating emissions by means other than source

tests will not significantly affect the accuracy of total emissions established for the source.

Because actual HAP emissions for the entire post-reduction year are to be demonstrated, the results from source tests or other measures of short-term emissions must be combined with monitoring data or other emissions-related inputs for the post-reduction year to produce an estimate of actual, post-reduction, annual HAP emissions. Thus, short-term tests by themselves are not sufficient to demonstrate actual emissions over the post-reduction year. This combining of short-term test results or other short-term emissions indicators with post-reduction year monitoring data or other emissions-related inputs is what constitutes the post-reduction emissions demonstration (due after the end of the post-reduction year).

4.2.1 Short-Term Test Results

If any source tests have been performed to support post-reduction emissions, the results should accompany the specialty permit application (or must be sent by the permit application deadline). The test results summary should provide the following information for each emissions unit tested [§63.74(d)(3)(i)]:

- Identification number and descriptive title;
- Test method or protocol used;
- Results summary; and
- Discussion of any problems encountered during testing and a statement on the validity of method for the type of emissions tested.

Selection of acceptable test methods. Acceptable test methods must be used where source tests are used to demonstrate post-emissions reductions. An acceptable method would be any one of the following:

- An EPA method (i.e., a method with an EPA number) already validated for the applicant's source type and pollutant(s). EPA reference or test methods typically include a scope that defines the source types or pollutants to which the method applies.

- An EPA method validated by the applicant for the applicant's source type and pollutant(s), according to the requirements specified in EPA Method 301, Field Validation of Pollutant Measurement Methods from Various Waste Media.

- Any other method validated for the source type and pollutant using EPA Method 301.

Section 12.1.1 of EPA Method 301 states that if a test method has been validated previously at a "similar source," the procedures in Method 301 can be waived as long as it can be adequately demonstrated that the sources are "similar." To receive a waiver, the source owner/operator must provide supportive documentation to the EPA Emissions, Monitoring and Analysis Division, including a description of the source test method, a discussion of why the requestor believes that the source is similar to the source for which the method was validated, and a statement of accuracy and precision of the method. A list of validated methods is presented in appendix B.

Information on the selection of acceptable test methods and the integration of performance test methods into the proposed compliance plan was given in section 3.4.3.1. Additional information on test methods is given in appendices B, C, and D.

4.2.2 Use of Different Test Methods to Establish Base-Year and Post-Reduction Emissions

In some cases, applicants may use a different test method to measure post-emissions reductions than was used to measure base-year emissions because a better method has become available in the interim. The applicant may feel that because the method used for base-year emissions measurement is not as accurate, the base-year results should be adjusted.

Adjustment can be made by performing the base-year method simultaneously with the post-emissions reduction method when post-emissions reductions are measured. The applicant should then develop a correlation between the results yielded by the two methods and apply this correlation to adjust the base-year emissions estimate(s).

5.0 PERMIT DEVELOPMENT

The purpose of this section is to provide guidance for the EPA, State, or local agency permit writer on:

- Reviewing a permit application for completeness;
- Synthesizing a draft permit from the information in the application;
- Identifying issues that need discussion with the applicant; and
- Revising the draft permit based on comments from the permittee, other permitting authority reviewers, and affected States.

These topics are discussed in the following sections. Where possible, examples from actual permit applications reviewed and permits developed by EPA are provided to illustrate the points discussed.

Permit applicants may also find it valuable to read this section for additional insight into developing a complete application.

5.1 PERMIT APPLICATION COMPLETENESS REVIEW

Within 45 days of receiving a permit application, the permitting authority must determine whether an application is complete or incomplete. If the application is incomplete, the permitting authority must notify the applicant and request the additional information needed. If permitting authority does not notify the applicant within 45 days, the application is considered complete by default. This section provides guidance

on reviewing an application for completeness and notifying an applicant of any deficiencies.

The purpose of a permit application review is to:

- Assess whether the regulatory requirements for a complete permit application have been met; and
- Identify any other deficiencies in the application that prevent the permit writer from proceeding with permit development.

Because the completeness review is a preliminary review, it is likely that not all deficiencies will be identified at this stage. As the permit writer begins to check the application in a detailed manner and develops the applicant's proposed permit conditions into an actual permit format, the need for additional information may become apparent.

An application should be considered complete as long as it is "substantially" complete; that is, the application constitutes a good-faith effort to provide all of the information needed. Because permit writers can request additional information at any time, an application should not be considered incomplete unless it is missing important information. Such omissions can occur in an applicant's effort to submit an application by a certain deadline.

If the application is considered complete, the permit writer should send the applicant a letter to that effect. The letter should also make it clear that the determination of completeness does not mean that no additional information will be requested as permit development proceeds.

If the application is not complete, the permit writer must send the applicant a letter saying so, and itemizing the information needed in as much detail as possible. It is also recommended that the permit writer call the source's technical contact to discuss the items needed, if they are very extensive or complex.

When an application has been declared complete, the permitting authority begins drafting the permit. If additional information is requested by the permitting authority during processing, the applicant must provide the additional information by the date specified in the request. The date specified can be negotiated between the permitting authority and the applicant; however, the permitting authority must agree to this date. If the applicant does not provide the requested information by the specified date, the permit might not be issued by the normal deadline. Where all necessary information is received in a timely manner, the permitting authority must take final action on the specialty permit application within 12 months of receiving the complete application.

During either the preliminary or the more detailed subsequent permit application review, three types of deficiencies may be spotted:

- Items that are required but are not provided;
- Erroneous or inconsistent information; and
- Lack of detail for items that are provided.

Where such deficiencies exist, the applicant will have to provide information to supplement the original application before permit drafting can advance to the public review stage.

Items clearly needed for a complete application are listed in the permit reviewer's checklist in appendix F. The items in the checklist are based either on regulatory requirements, such as those given in 40 CFR 71.24 and 40 CFR 63.74, or on types of information needed by the permitting agency to begin developing permit conditions. Without these items, the permit writer cannot draft at least some of the relevant permit conditions and the application does not fulfill the requirements of 40 CFR 71.24(e).

Erroneous or inconsistent information could result, for example, when an applicant uses improper or conflicting

assumptions in calculating base-year and post-reduction emissions. In one case, an applicant calculated base-year emissions for a "constant-level" storage tank by assuming that the level of change in the tank was five percent of the total yearly throughput. Yet for calculating post-reduction emissions, the applicant proposed using two percent of the total yearly throughput as the level of change in the tank. No rationale was provided for the inconsistency.

An example of lack of detail would be an application that does not provide enough supporting information. One applicant achieved some early reductions by routing a process vent to a thermal oxidizer. The applicant proposed to monitor achievement of the early reductions claimed by monitoring the firebox temperature of the thermal oxidizer with a thermocouple. However, the applicant did not specify the type, accuracy, and operating range of the thermocouple. The permit writer was unable to verify whether the thermocouple proposed was adequate.

5.2 DRAFTING THE PERMIT

5.2.1 Synthesizing Permit Conditions

The permit writer should begin synthesizing the permit conditions based on the permit conditions proposed by the applicant and information provided in the application. Where the information provided in the application is questionable, inadequate, or inappropriate, the permit writer should make comments to that effect in the draft permit. The permit writer may also note what he or she believes would be adequate or appropriate. The initial draft of the permit containing edits, comments, and questions on the terms and conditions proposed in the permit application would then be sent to the permittee and other reviewers (e.g., State and EPA staff). After discussion with the permittee and reviewers, a second draft of the permit would be prepared. The process would be repeated until a formal draft, ready for public comment, had been developed.

Appendix G shows an example early reductions specialty permit. The format of this example permit has been carefully

developed and reviewed, and is being used for the first group of permits to be issued by EPA to early reductions sources. Its format is similar to other model title V permits and it is recommended that permit writers use this format.

The permit is organized into three major parts, as shown in Figure 5-1. This section discusses a procedure for taking the information in the permit application and drafting each of the three parts.

5.2.1.1 Section A: Source Identification. First, the permit writer should inventory all the emission units and determine the post-reduction fate of each unit, e.g.:

- Routed to a control device;
- Routed to another vent;
- Dismantled;
- Eliminated through a process change; or
- Same as base year.

In Section A, "Source Identification," the permit writer should include a table showing all emission units (including dismantled units) in the early reductions source and their identification numbers.

The primary purpose of this section is to define the early reductions source in detail sufficient to allow an inspector to identify early reductions emission units during a site inspection. To do this, the inspector must be able to locate all emission units and control devices. Usually, the description and identification number of an emission unit coupled with its location on a plot plan of the source would be sufficient. If not, the permit might require the source owner/operator to provide positive identification on the emission units with, for example, tags, labels, or other markings.

SECTION A: SOURCE IDENTIFICATION

SECTION B: SPECIFIC CONDITIONS

1. Alternative Emissions Limitations
2. Other Specific Conditions
3. Monitoring Requirements
4. Recordkeeping Requirements
5. Reporting Requirements
6. Emissions Calculation Procedures
7. Compliance Certification
8. Alternative Operating Scenarios
9. Permit Shield

SECTION C: GENERAL CONDITIONS

1. Annual Fee Payment
2. Permit Renewal and Expiration
3. Transfer of Ownership of Operation
4. Property Rights
5. Operation and Maintenance Requirements
6. General Provisions Requirements
7 Submissions
8. Inspection and Entry
9. Compliance
10. Duty to Provide Information
11. Excess Emissions Due to an Emergency
12. Reopening for Cause
13. Severability Clause
14. Emissions Reductions From Equipment Shutdown or Reduced Operation
15. Permit Deviations
16. Permit Revisions

Figure 5-1. Organization of an Early Reductions Specialty Permit

The permit should state that it is based on the information contained in the original permit application and any additional information received. The permit should state, for example, that it is "based on information contained in the application dated April 29, 1994, as amended on June 5, 1994 and July 14, 1994." The date that a complete application was received from the applicant should be referenced on the permit's cover page.

The permit writer should attach to the draft permit a copy of the source diagram (plot plan) supplied in the application that shows all of the emission units in the early reductions source.

5.2.1.2 Section B: Specific Conditions.

1. Alternative Emission Limitations -- The permit writer should check the AEL's for total and weighted HAP's to make sure they represent 90 percent gaseous and 95 percent particulate HAP reductions from base-year emissions. If correct, these AEL values should be written into the permit.

Next, the permit writer should determine the AEL expiration date, which is exactly six years after the compliance date of the MACT standard that would otherwise be applicable to the early reductions source. The AEL expiration date, the name of the applicable MACT standard, and the compliance date of the applicable MACT standard should all be cited in section B.1. If this date is not yet known, the permit should state that the AEL shall expire six years after the compliance date of the last applicable MACT standard.

When more than one MACT standard applies to an early reductions source, the AEL will not expire until six years after the compliance date for the last applicable MACT standard. For example, assume an early reductions source has emissions units 1, 2, and 3 that will be subject to MACT standard X, which has a compliance date of June 20, 1996. The source also has emission units 4 and 5 that will be affected by MACT standard Y, which has a compliance date of January 1, 1999. The AEL would expire on

January 1, 2005 (six years after MACT standard Y's compliance date).

However, after June 20, 2002 (six years after MACT standard X's compliance date), emission units 1, 2, and 3 will become subject to MACT standard X. Thus, between June 20, 2002 and January 1, 2005, the source must comply with MACT standard X for emission units 1, 2, and 3 yet still include HAP emissions from units 1, 2, and 3 in determining compliance with the AEL. Footnote 1 in the example permit in appendix G contains wording to this effect.

The permit should state that compliance with the AEL's shall be determined on a calendar-year basis. The permit should require that HAP emissions from the early reductions source be computed semiannually, and should reference the calculation procedures section.

2. Other Specific Conditions -- This section provides a place to put conditions on the post-reduction status of the emission units. This section should specify which emission units shall have identification tags, which are to be routed to control devices, and which have been shut down, dismantled, or eliminated through process changes. Note: shut down units must remain so (except that restarting is permitted provided that emissions from restarted units are included in post-reduction emissions calculations for the early reductions source).

The emission units and any control devices should be listed by identification number. The permit in appendix G provides an example of this for several vent streams and a wastewater stream that are routed to control devices. The purpose of these conditions is to make sure that the devices used by the source to achieve the early reductions continue to be used. If a source owner/operator wants the flexibility to use other devices, this can be addressed under section B.7 of the permit, "Alternative Operating Scenarios."

For those emission units that are dismantled or shut down as part of the early reductions, this section should include wording to the following effect:

> Emission units ____, ____, and ____ shall be dismantled (or shut down) and shall not be in HAP service. If the dismantled (shut down) process equipment is restarted or replaced anywhere within the plant site, any HAP emissions from the restarted or replacement equipment shall be counted in the post-reduction emissions from the source.

This prohibits sources from achieving early reductions by shutting down units within the early reductions source, moving them outside the early reductions source to another location within the plant site or building similar new HAP units at the site, and operating them.

Any other specific conditions that do not belong elsewhere in the permit also can be stated here.

3. Monitoring -- The primary objective of monitoring for the early reductions programs is to periodically gather the information needed to estimate HAP emissions within that period. To this end, the permit writer must link the emissions calculation procedures to the monitoring and recordkeeping requirements by making sure that all inputs to the emissions calculations are specified in the monitoring and recordkeeping provisions. Many of these inputs will come from monitored and recorded parameters; others, such as physical properties of compounds, need only be recorded.

To make sure the monitoring data is accurate, the permit writer should include permit conditions to the effect that all monitoring equipment must be installed, calibrated and maintained according to manufacturer's specifications. To make sure the data is representative, the permit should specify that monitoring equipment be installed to provide a representative measure of the monitoring parameter.

To develop monitoring conditions for individual units, the permit writer should first group similar emission units with identical monitoring and recordkeeping requirements. For

example, the applicant may have proposed that all tanks (or at least some tanks) be monitored using the same parameter (e.g., throughput) in the same manner and at the same frequency. There is no need to repetitively list the same requirements individually in such cases.

The next step is to draft a table of monitoring and recordkeeping requirements for the groups of emission units. For each emission unit, or group of emission units, the table should show the:

- Identification number(s);
- Monitoring requirements in terms of the following items, as appropriate:
  - parameters monitored (e.g. number of barges loaded, combustion chamber temperature, HAP concentration),
  - device or instrument for monitoring each parameter, or source of information if not a device (e.g., shipping records, thermocouple),
  - location of device or instrument (e.g. thermowell mounted in the combustion chamber wall below main gas burner),
  - EPA method or other method used (e.g., EPA Method 624),
  - frequency (e.g., continuous, daily, during material shipment); and
- Recordkeeping requirements that ensure that records of all parameters monitored and all inputs to the emissions calculations are kept.

As mentioned above, the primary purpose of monitoring for early reductions is to adequately track actual annual emissions. This is in contrast to monitoring requirements for some MACT and NSPS regulations, which are meant to warn when a short term emission limit is violated. Therefore, adequate monitoring provisions for early reductions can be different from MACT or

NSPS monitoring provisions. These standards can, however, provide a frame of reference for monitoring of similar sources and control devices. Because less significant emission sources make up a proportionally smaller part of the AEL, these sources warrant less rigorous monitoring requirements than do the significant sources.

An inspector performing an on-site review must be able to conclusively identify each monitoring device listed in the permit. To facilitate this, the permit should include, wherever appropriate, the monitoring device type, special features, and location. For example, one source achieved some of its early reductions by installing a scrubber. The applicant proposed that emissions from the scrubber be calculated based on scrubbant water pressure as an indication of whether the scrubber was achieving the targeted level of control. The application stated that the pressure would be monitored by field inspection. However, the applicant did not provide any information on the type of monitoring device. Unless the permit writer pursued this issue with the applicant and obtained device specifications, an inspector at the site would not be able to verify that the correct monitoring device was being used.

Where the source owner/operator proposes periodic sampling of emission units, the permit writer should check the proposed test methods to see if they are EPA methods. If they are not, does the source plan to validate the method through EPA Method 301 validation procedures? For minor units, other non-EPA methods may be sufficient (even if not validated). The permit writer should obtain expert input on whether the proposed methods are adequate.

To make sure HAP emissions are calculated as adequately as possible, calculation procedures must factor in different parameters that affect emissions. Further, monitoring requirements must be designed to ascertain the current status of the different parameters and record the data for subsequent emission calculations.

For example, for storage tanks, the primary monitoring parameter for estimating emissions from internal floating-roof storage tanks may be tank throughput. The integrity of the tank seals also affects emissions, however. Therefore, periodic inspections of tank seal for gaps should also be required by the permit.

The permit should also specify how discovery of a seal gap shall affect the emissions calculations. In the case of an internal floating-roof tank, the permit writer might specify that:

- The internal floating roof and secondary rim seal be inspected annually;
- The primary rim seal, gaskets, and slotted membranes be inspected whenever the tank is emptied for cleaning, but at least once during the term of this permit;
- If gaps are found, specific values that reflect this be used for the rim seal loss factor in the emissions calculation procedure for that quarter; and
- This calculation procedure shall be used for all subsequent quarters until the gap is fixed.

The Appendix G permit provides example language for this situation.

To ensure that enough monitoring data is gathered to adequately track annual emissions, the permit should specify that valid monitoring data covering at least 75 percent of the total operating time of the emissions units must be gathered. Also, all periods of equipment of malfunction must be monitored so that emissions during such periods can be included in the annual emissions total.

4. Recordkeeping and Reporting Requirements -- For recordkeeping, this section should specify that copies of all reports must be kept at least five years. The most recent two years must be kept onsite or must be accessible by computer; the remaining three years of records may be kept offsite.

The permit should also require the following to be kept:

- Records of monitoring parameters specified in the permit;
- Supporting calculations used to determine HAP emissions;
- Records of each startup, shutdown and malfunction in the early reductions source;
- Records of each malfunction of an air pollution control device or a continuous monitoring system;
- Records showing that the procedures in the startup, shutdown, and malfunction plan were followed, and documentation of any deviations from the plan, for all startup, shutdown, and malfunction incidents; and
- For continuous monitoring systems, records showing that the manufacturer's instructions were followed for installation, calibration, and maintenance.

Permit recordkeeping provisions must also require the following source tests records be kept for at least five years:

- Date, place, and time of sampling or measurement;
- Date any analyses were performed;
- Analytical techniques/methods used;
- Operating conditions at the time of sampling or measurement; and
- Results.

For reporting, this section should specify the frequency of reporting and provide the format for reporting. The frequency of reporting should be semiannually unless otherwise necessary. The reporting format provided in the permit should follow the example given in Appendix D.

This section should specify that:

- Semiannual reports shall be submitted by the last day of the month following the end of the calendar half-year (i.e., January 31 or July 31, as appropriate);
- The first report submitted after permit issuance should cover the calendar half-year in which the permit is issued and should cover emissions since the end of the post-reduction year; and
- The first report should include supporting calculations for all reported emissions, using the calculation procedures in the permit (subsequent reports need not include all supporting calculations, unless requested by the permitting authority).

Because of the year-long post-reduction demonstration period, the source will have achieved its early reductions more than a year prior to permit issuance. In addition, the source will have been monitoring the parameters needed for input to the emission calculations more than a year prior to permit issuance (because the applicant proposes the emissions calculation methodology and monitoring parameters).

Thus, the source will have all of the information needed to provide emissions data for the year to date at the time the first semiannual report is required to be submitted by the permit.

Emissions calculations need to be included with the first semiannual report so the permit agency can make sure the permittee is following the permit's calculation procedures properly. The permit should state that the calculations are not required to be submitted with subsequent semiannual reports.

5. Emissions Calculation Procedures -- First, the permit writer should check the emissions calculation procedures proposed by the applicant to make sure that:

- They are consistent with base-year emissions calculations (where parameters such as vapor pressure or the control status of the emission unit are unchanged from the base year);

- They are consistent with any EPA-accepted calculation procedures used, or appropriate documentation is provided for methods that are not EPA-approved;
- They are consistent with the proposed monitoring;
- They are correct; and
- All calculation procedures can be replicated.

Examples of EPA-accepted procedures for selected emissions types can be found in the document "Procedures for Estimating Emissions From Early Reductions Compliance Extensions" (EA-450/3-91-012a, February 1992). If a non-EPA procedure is used by the applicant, the permit writer should verify that all necessary supporting documentation was provided, including how the procedure was derived and rationales for any assumptions made.

Next, the permit writer should verify that all inputs to the calculations, other than assumptions or constants, are included in the monitoring and recordkeeping requirements.

Finally, the permit writer should draft the calculation procedures, including those for total HAP emissions, total weighted HAP emissions, and each individual emission unit. The relevant HAP weighting factors should be listed in the permit, along with the reference from which they were obtained (i.e., 40 CFR 63.74). As with emission sources with the same monitoring requirements, sources with the same calculation procedures should be grouped together. (Because monitoring and calculation procedures are closely linked, these groupings will often be the same.)

Every step in the calculation procedures should be clearly specified so there is no ambiguity about which values are to be input. Steps for calculating averages, summing individual items to obtain a total, and other items that seem obvious should be included.

The permit should include calculation procedures for every unit that emits to the atmosphere. For emission units that are routed to a control device, the permit should list those emission units and state that they shall be routed to that specific control device. Then the procedure for calculating emissions from the control device should be specified.

6. Compliance Certification -- The permit must require the permittee to submit an annual compliance certification signed by a responsible official, as defined in 40 CFR 71.22. The permit must specify that the following items be included in the certification:

- Identification of each permit term or condition that is the basis of the certification; and
- The compliance status for the 12 month period, including whether compliance was continuous or intermittent.

7. Alternative Operating Scenarios -- If the applicant proposes alternative operating scenarios, the permit writer should verify that these can be accommodated under the proposed monitoring, recordkeeping, and emissions calculation provisions. If not, additional monitoring, recordkeeping, and emissions calculation provisions necessary to provide emissions estimates under the alternative scenario(s) must be generated. The permit also must require the source to contemporaneously record in a log the scenario under which it is operating.

Alternative operating scenario suggestions are important for facilities handling a wide array of chemicals. If no alternative operating scenarios are identified in the permit application, frequent revisions to the permit could be required to incorporate changes at the source.

It may also be beneficial to review, via a conference call, some possible scenarios that may be of interest to the applicant. For example, the permittee may want the flexibility to change the

material stored in a given tank, the color of a storage tank, or the type of loading from truck loading to rail car loading without requesting a permit change. The applicant may not realize that the detailed monitoring, recordkeeping, and emissions calculations procedures proposed for the permit (i.e., tank color may be an input to the storage tank emissions calculation procedure) will preclude this flexibility unless alternative operating scenarios are anticipated and included in the permit.

8. Permit Shield -- This section is fairly standard. The language in appendix G can be used as a template. The permit shield may extend to all terms and conditions under the alternative operating scenarios (if any).

5.2.1.3 Section C: General Conditions. The general conditions stem from the early reductions permit rule, and are the same for all sources. The language in the appendix G example permit should be used for all specialty permits. The requirements of 40 CFR part 63, subpart A, "General Provisions", are incorporated into the example permit by reference in section C(6), and in the recordkeeping and reporting requirements of section B.

The General Conditions section contains:

- Standard language on annual fee payment;
- Permit renewal and expiration;
- Transfer of ownership or operation;
- Property rights;
- Operation and maintenance requirements;
- General provisions requirements;
- Submissions of reports and notifications;
- Inspection and entry;

- Compliance;
- Duty to provide information;
- Excess emissions due to an emergency;
- Reopening for cause;
- Severability;
- Emissions reductions from equipment shutdown or reduced operation;
- Permit deviations; and
- Permit revisions.

5.2.2 Effective Permit Writing

Many concepts of effective permit writing are covered in the previous section on synthesizing permit conditions. Several general tips are discussed here.

Permit language should always be simple, clear, objective, and specific. The permit should be a stand-alone document in that all items needed to verify compliance should be listed in the permit. An inspector visiting the early reductions source should not need the permit application to find out how to calculate emissions for an emission unit, or to find out which emission units are routed to a certain control device.

Permit writers should avoid vague, negative, and imprecise language. The following table shows a comparison of language to be used versus language to be avoided:

Avoid this:	Use this:
"should," "would"	"shall," "will"
"...as soon as possible..."	"...within 10 days of..."
"...shall be used as appropriate..."	"...shall be used in the following conditions..."
"This requirement shall not apply to X."	"This requirement applies to A, B, and C."
"...periodically..."	"...weekly..."

5.3 REVISING THE INITIAL DRAFT OF THE PERMIT

Comments on the first version of the draft permit should be solicited from:

- EPA Regional Office staff (e.g., the early reductions contact);
- Early reductions staff at OAQPS;
- Other EPA staff, as appropriate;
- Affected States and Indian tribes;
- The applicant; and
- Other experts, particularly where expert knowledge is needed (for example, on control devices, EPA methods).

Affected States are those within 50 miles of the source or those whose air quality may be affected and that are contiguous to the State in which the source is located. The permit writer should provide these reviewers a copy of the statement of basis for the permit.

As mentioned earlier, the initial draft permit may contain the permit writer's comments and questions and/or the inadequacies or inappropriate permit conditions proposed by the applicant. After discussing these issues or receiving written responses on them from the reviewers, the permit writer should revise the permit. The comment and revision cycle should be repeated until all issues have been resolved and a formal draft permit is ready for public comment.

At this point, a notice that the draft permit is available for public comment must be published in a newspaper local to the source. The public comment period must be at least 30 days. If a hearing on the permit is requested during the public comment period, the permitting agency must publish a notice (in a local newspaper) of the hearing at least 30 days in advance. After the public comment period (including any hearing requested), the permitting agency must respond to any comments and decide whether

the permit should be issued as proposed, revised, or denied. If the permit is revised significantly, it should be re-noticed before it is issued so that the public again has a chance to comment.

APPENDIX A

EXAMPLE TITLE V SPECIALTY PERMIT APPLICATION FOR AN EARLY REDUCTIONS SOURCE

April 1, 1994

Director
Air, Pesticides, and Toxics Management Division
EPA Region IV
345 Courtland Street, N.E.
Atlanta, GA 30365

Re: Title V Specialty Permit Application for Source A at the XYZ Chemical Company, Raleigh, NC

Dear Sir/Madam:

In accordance with Title 40 Part 71 of the Code of Federal Regulations, the XYZ Chemical Company is applying for a Title V Specialty Permit under the Early Reductions Program and requesting a 6-year compliance extension for otherwise applicable standards issued under Section 112(d) of the Clean Air Act. The enclosed permit application and compliance extension request is for a group of individual emission points located within XYZ's synthetic organic chemical manufacturing facility in Raleigh, North Carolina. This group of emission points conforms to the definition of "source" per 40 CFR 63.73(a)(4) and is identified as "Source A." Source A consists of the emission points listed in Table 1-1 of this permit application.

An Enforceable Commitment for Source A was submitted originally to EPA Region IV on April 1, 1992, prior to the proposal of the Hazardous Organic NESHAP. Base-year (1987) HAP emissions from Source A were approved by EPA in revised form on August 17, 1993. The base-year total HAP and weighted HAP emissions from Source A are shown below:

	Total HAP Emissions	Weighted HAP Emissions
Source A	225.2 Mg/yr	722.8 Mg/yr

With this Title V Specialty Permit application, the XYZ Chemical Company is requesting alternative emissions limitations (AEL's) for Source A as shown below:

	Total HAP Emissions	Weighted HAP Emissions
AEL for Source A	22.52 Mg/yr	72.28 Mg/yr

These AEL's represent 90-percent reductions of base-year HAP emissions from Source A.

I hereby certify the following statements:

- Information provided in this permit application represents the best available emissions data for Source A;

- Emissions data are based on information gathered and the belief formed after a reasonable inquiry; and

- Statements and information in this permit application are true, accurate, and complete.

If you have any technical questions regarding the content of this submittal, please contact Mr. Joe Smith (Environmental Affairs Manager) at (919) 555-0000.

Sincerely,

George S. Jones
Plant Manager

Enclosure

cc: (appropriate) State Regulatory Agency
U.S. EPA Emission Standards Division
U.S. EPA Office of Enforcement

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1.0 COMPANY AND SOURCE IDENTIFYING INFORMATION

1.1 COMPANY INFORMATION

The XYZ Chemical Company is a synthetic organic chemical manufacturing facility located at 8910 Industrial Park Drive in Raleigh, North Carolina. The XYZ Chemical Company is submitting this Title V Specialty Permit application under the Early Reductions Program. The authorized representative of this source is the Plant Manager, Mr. George S. Jones. The contact for technical issues regarding this permit application is the Environmental Affairs Manager, Mr. Joe Smith. These persons can be reached by telephone at (919) 555-0000.

1.2 GENERAL DESCRIPTION OF SOURCE A

Source A is defined as a miscellaneous group of emission points located within the contiguous boundaries of the facility at the above address. Source A consists of two process vents (PV-1 and PV-2), a rail car loading rack (L-1), a product storage tank (S-1), and a process wastewater stream (WW-1). The hazardous air pollutant (HAP) emissions from these emission points are the result of raw material and product losses during normal production operations. Source A conforms to the Early Reductions definition of source under 40 CFR 63.73(a)(4).

1.3 IDENTIFICATION OF SOURCE A EMISSION POINTS

Table 1-1 lists all of the emission points included in Source A. This table provides the following information for each emission point: a brief description, identification code assigned by the facility, applicable State permit number, name and CAS number of HAP emitted, HAP weighting factor, base-year HAP emissions, and base-year weighted HAP emissions.

Each emission point is physically labeled with an identification code that corresponds to the codes listed in Table 1-1. This system of physically labeling emission points

TABLE 1-1. IDENTIFICATION OF EMISSION POINTS CONTAINED IN SOURCE A AT THE XYZ CHEMICAL COMPANY

Source A Emission Point Description	Emission Point ID Code	NC Permit Number	HAP Name	CAS Number	HAP Weighting Factor	1987[a] HAP Emissions (Mg/yr)	1987[a] Weighted HAP Emissions (Mg/yr)
Air Oxidation Unit 1 - process vent	PV-1	NC2346R1	Benzene	71432	10	55.09	550.90
EO-1 Carbon Dioxide Vent - process vent	PV-2	NC2258R4	Ethylene Oxide	75218	10	0.20	2.00
PX Loading/Paraxylene Rail Car Loading	L-1	NC2346R1	p-Xylene	106423	1	2.09	2.09
Xylene/Ethylbenzene - storage tank	S-1	NC2346R1	Xylene	95476	1	4.01	4.01
	S-1	NC2346R1	Ethylbenzene	100414	1	15.92	15.92
Waste Acid from the Methyl Chloride Drying Tower - wastewater effluent	WW-1	None	Methanol	67561	1	108.5	108.5
	WW-1	None	Methyl Chloride	74873	1	39.40	39.40
					TOTAL:	225.2	722.8

[a] Base year emissions as documented in the Enforceable Commitment.

allows quick and confident identification of Source A emission points within the facility.

1.4 SITE PLAN

Figure 1-1 shows the contiguous boundary of the XYZ Chemical Company's facility located in Raleigh, North Carolina, and identifies the location of each emission point included in Source A.

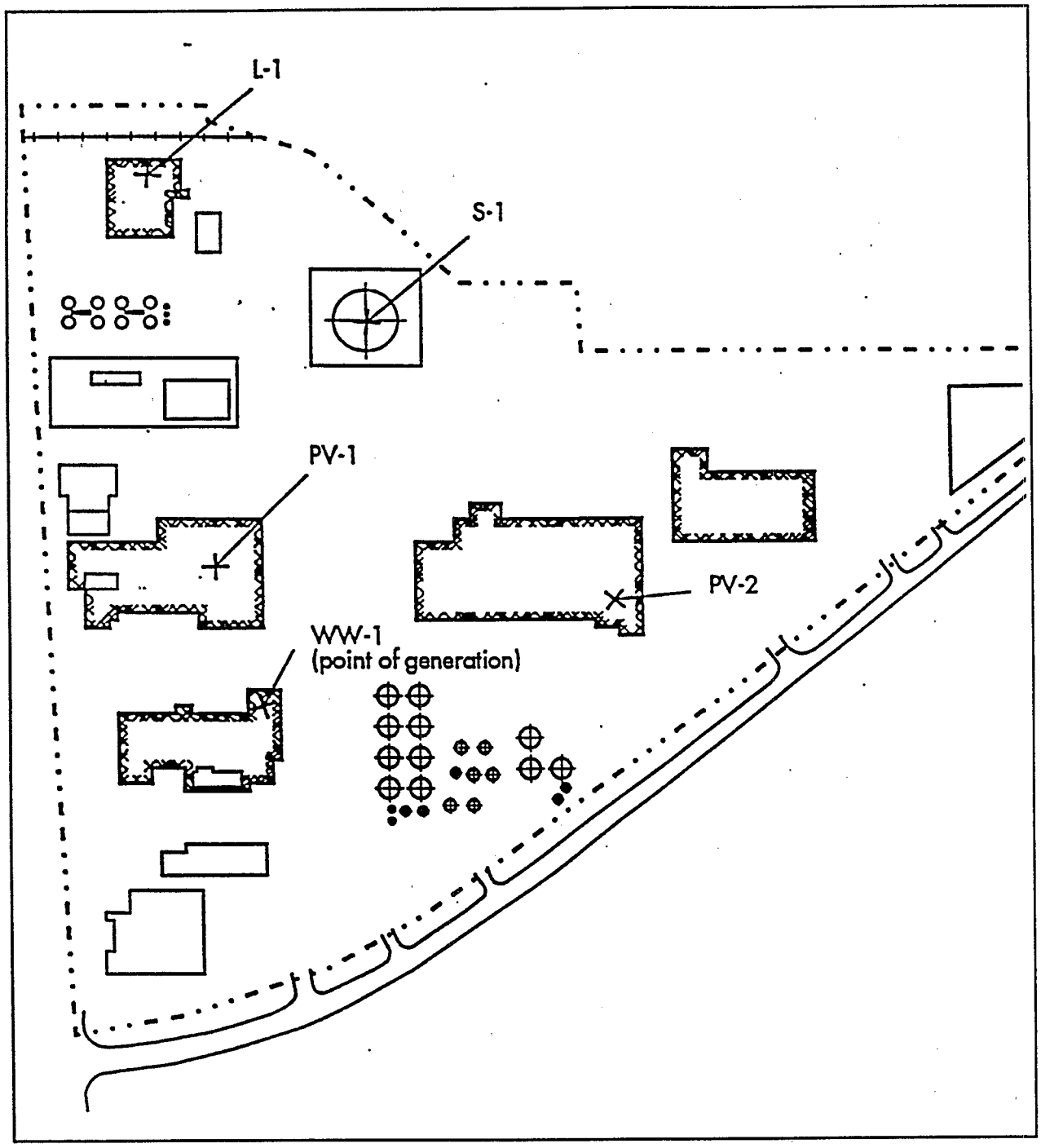

Figure 1-1. XYZ Chemical Company Site Plan - Emission Points Defined as Source A

2.0 EMISSIONS REDUCTION DEMONSTRATION PLAN

Table 2-1 lists the measures implemented to achieve the necessary emissions reductions. This table includes emission point descriptions, emission point identification codes assigned by the facility, description of the emissions reduction measures, emissions reduction measure identification codes assigned by the facility, and the expected efficiency of the emissions reduction measure.

The XYZ Chemical Company plans to demonstrate a 90-percent reduction from base-year HAP emissions by following the monitoring, recordkeeping, and calculation procedures proposed in Section 3.0. The demonstration will be performed by computing the 1994 calendar year emissions from each emission point and summing these emissions to determine the total emissions from Source A. This demonstration will require a point-by-point computation as summarized below. More details on the computation of emissions from each emission point are provided in Section 3.3.

Air Oxidation Unit 1 - (PV-1). The emission stream from this process vent is now routed to a regenerative thermal oxidizer (TO-1). As proposed in Section 3.0, the firebox temperature of TO-1 will be monitored and recorded continuously. The firebox temperatures have been correlated with performance test results to estimate post-reduction HAP emissions for each day in 1994. The daily emissions estimates will be summed to determine the calendar year 1994 emissions.

EO-1 Carbon Dioxide Vent - (PV-2). The HAP emissions stream from this process vent are uncontrolled and are exhausted directly to the atmosphere. The quantity of HAP emissions are directly proportional to the production rate of the Ethylene Oxide Process Unit. Calendar year 1994 HAP emissions will be determined using a HAP emission rate (kg/hr) corresponding to the maximum expected production

TABLE 2-1. EMISSION REDUCTION MEASURES FOR SOURCE A

Source A Emission Point Description	Emission Point ID Code	Emission Reduction Measure Description	Emissions Reduction Measure ID Code	Expected Efficiency of Emissions Reduction Measure
Air Oxidation Unit 1 - process vent	PV-1	Regenerative Thermal Oxidizer, natural gas-fired, 14 MMBtu/hr burner, continuous operation.	TO-1	99.98%
EO-1 Carbon Dioxide Vent - process vent	PV-2	None	None	None
PX Loading/Paraxylene Rail Car Loading	L-1	Refrigerated Condenser, single-stage with knock-out drum, 5-ton rating, intermittent operation.	C-1	80%
Xylene/Ethylbenzene - storage tank	S-1	Internal Floating Roof with primary seals and secondary seals, ungasketed fittings, bolted deck, and 7 columns.	S-IFR-1	97% (overall for the 2 HAP's)
Waste Acid from the Methyl Chloride Drying Tower - wastewater effluent	WW-1	Hard-piped to steam stripper, counter-current flow, steam-to-feed ratio 0.096 kg/kg, 15-ft active packed column, overheads recycled to process.	STST-1	87% (overall for the 2 HAP's)

rate of ethylene oxide over the next year. This conservative emission rate will be multiplied by the recorded hours of process operation.

PX Loading/Paraxylene Rail Car Loading (L-1). Emissions from this loading rack are now controlled by a refrigerated condenser (C-1). As proposed in Section 3.3, an interlock process control system will prevent rail car loading operations when the condenser exit temperature exceeds 32 °F. This condenser exit temperature has been correlated with performance test results and unit mass loading rates to estimate post-reduction HAP emissions for each day in 1994. The daily emissions estimates will be summed to determine the calendar year 1994 emissions.

Xylene/Ethylbenzene Storage Tank (S-1). This storage tank has been retrofitted with an internal floating roof consisting of primary and secondary seals. The 1994 tank throughput will be determined from daily recordkeeping of throughput along with physical properties of the stored material. These inputs will be used to compute 1994 emissions following the calculation procedures included in "Procedures for Establishing Emissions for Early Reduction Compliance Extensions Volume 1 -- Synthetic Organic Chemical Manufacturing, Ethylene Oxide Sterilization, and Chromium Electroplating" (EPA-450/3-91-012a or EPA AP-42).

Waste Acid from the Methyl Chloride Drying Tower - Wastewater Effluent. This wastewater stream is now routed to a steam stripper (STST-1) for HAP removal. As proposed in Section 3.0, the steam-to-feed ratio of STST-1 will be monitored continuously and hourly averages will be recorded. To estimate 1994 calendar year emissions, the steam-to-feed ratio has been correlated with short-term effluent sampling results and fraction-emitted to fraction-measured ratios presented in the EPA document No. EPA-450/3-91-012a.

3.0 PROPOSED PERMIT TERMS AND CONDITIONS

3.1 ALTERNATIVE EMISSIONS LIMITATIONS (AEL)

The XYZ Chemical Company is requesting the following AEL's for the defined Source A:

	Total HAP Emissions	Weighted HAP Emissions
AEL for Source A	22.52 Mg/yr	72.28 Mg/yr

The XYZ Chemical Company will calculate total and weighted HAP emissions semiannually.

3.2 PROPOSED REPORTING REQUIREMENTS

The HAP emissions from Source A will be reported semiannually. The semiannual reports will be submitted to the EPA regional office on or before the last day of each month following the end of a calendar half-year period (January 31 or July 31, as appropriate). The first semiannual report will be submitted after the end of the calendar half-year in which the permit is issued.

Each report will contain the semiannual HAP emissions for Source A and the report covering the second half of a calendar year will contain aggregate HAP emissions for the entire year. The HAP emissions will be calculated using the calculation procedures in Section 3.3 of this document. The semiannual HAP emissions from emission points, PV-1, PV-2, L-1, S-1, and WW-1, will be summed to obtain the total semiannual HAP emissions from Source A. Aggregate HAP emissions will be calculated by adding the total HAP emissions for each calendar half-year.

3.3 EMISSION POINT-SPECIFIC TERMS AND CONDITIONS

For each emission point, the proposed terms and conditions for monitoring, recordkeeping, and emissions calculation procedures are presented individually on the following forms.

EMISSION POINT ID: PV-1

PROPOSED MONITORING, RECORDKEEPING, AND EMISSION CALCULATION PROCEDURES

Emission Point Description: Air Oxidation Unit 1
Emission Reduction Measure ID: TO-1
Emission Reduction Measure Description: Thermal Oxidizer

A. Proposed monitoring:

The XYZ Chemical Company proposes to monitor the firebox temperature of the Thermal Oxidizer (TO-1) and gas flow from PV-1 to TO-1. Selection of these monitoring parameters is consistent with requirements of the HON. The XYZ Chemical Company proposes to install, maintain, calibrate, and operate all monitoring equipment according to the manufacturer's recommended specifications.

The firebox temperature of the thermal oxidizer (TO-1) is monitored with a Type K thermocouple (TIC-PV-1) located on the firebox wall opposite the gas burners. This location was selected because it is the closest location to the combustion zone that provides a reliable indication of combustion zone temperature. The thermocouple indicator is equipped with a continuous wheel chart recorder (TIR-PV-1). Both the thermocouple indicator and wheel chart recorder are located in the Process A Control Room. The firebox temperature will be correlated with performance test data and used as a surrogate indicator of HAP emissions. The firebox temperature of TO-1 will be monitored to determine the number of hours TO-1 is operated in various temperature ranges listed below in Section C.

A pitot tube is installed in the exhaust duct of PV-1 to indicate process vent gas flow to TO-1. The gas flow

indicator (FIR-PV-1) is equipped with a continuous recorder located in the Process A Control Room. The flow indicator will be used to determine the number of hours that gases are routed from PV-1 to TO-1.

B. Proposed recordkeeping:

Daily firebox temperature charts for TO-1 will be maintained in a file located in the Process A Control Room. In addition, the process operator will record the following information in a log book at the end of each work day:

a) Date
b) Number of hours the firebox temperature of TO-1 was maintained in each of the four temperature ranges listed in Section C
c) Number of hours that process gas flowed from PV-1 to TO-1
d) Number of hours that process gas flowed to an uncontrolled vent

C. Proposed calculation procedure for determining emissions:

Daily HAP emissions from PV-1 will be determined using the number of hours TO-1 was operated within each of four firebox temperature ranges along with temperature-dependent emission factors developed from the results of the initial performance test on TO-1.

This performance test was conducted during the period of November 15-17, 1993 to document post-reduction HAP emissions from PV-1. A volatile organic sampling train

EMISSION POINT ID: PV-1

PROPOSED MONITORING, RECORDKEEPING, AND

EMISSION CALCULATION PROCEDURES (continued)

(VOST), Method SW 846 0030, was used to quantify residual benzene concentrations from PV-1 after passing through TO-1. Method SW 846 0030 was selected rather than EPA Methods 18 or 25A because Method SW 846 0030 is more sensitive in measuring minute concentrations of the volatile organic compounds that are expected in combustion exhaust gas. EPA Method 2 was used to quantify gas flow rates during the performance test. The results of the performance test established the following emission factors for the maximum gas flow rate from PV-1 into TO-1:

Firebox Temperature Range (°F)	Emission Factor (kg/hr)
Temp ≥ 1600	0.126
1600 > Temp ≥ 1400	0.314
1400 > Temp ≥ 1200	0.440
1200 > Temp	7.177

Daily HAP emissions from PV-1 will be calculated by multiplying the number of hours that TO-1 was operated within the appropriate temperature range by the corresponding emission factor. The daily emissions value will be recorded into a log maintained by the process operator. At the end of each calendar half-year, these daily emission values will be summed to determine the semiannual HAP emissions from PV-1.

The Thermal Oxidizer is considered to be in an uncontrolled condition when the average hourly firebox temperature is lower than 1200 °F.

EMISSION POINT ID: PV-2

PROPOSED MONITORING, RECORDKEEPING, AND EMISSION CALCULATION PROCEDURES

Emission Point Description: EO-1 Carbon Dioxide Vent
Emission Reduction Measure ID: None
Emission Reduction Measure Description: None

A. Proposed monitoring:

The XYZ Chemical Company proposes to monitor the operating hours of the Ethylene Oxide Process Unit. The XYZ Chemical Company proposes to install, maintain, calibrate, and operate all monitoring equipment according to the manufacturer's recommended specifications. Based on engineering calculations documented in the Enforceable Commitment, the XYZ Chemical Company has demonstrated that HAP emissions from PV-2 are directly proportional to the process production rate. The vent gas flow rate is equal to the by-product production rate of carbon dioxide in the ethylene oxide reactor. The annual production rate of this process has been relatively constant over the past few years.

B. Proposed recordkeeping:

At the end of each work day, the process operator will record in a log book the date and the number of hours the process unit was operated.

C. Proposed calculation procedure for determining emissions:

Daily HAP emissions from PV-2 will be calculated by multiplying the number of hours that the Ethylene Oxide Process Unit was operated by the emission rate (kg/hr) corresponding to the maximum expected production rate of the

EMISSION POINT ID: PV-2

PROPOSED MONITORING, RECORDKEEPING, AND EMISSION CALCULATION PROCEDURES (Continued)

ethylene oxide process unit over the next year, as shown below:

0.0265 kg of HAP per hour of process operation.

The daily emissions value will be recorded into a log maintained by the process operator. At the end of each calendar half-year, these daily emission values will be summed to determine the semiannual HAP emissions from PV-2.

EMISSION POINT ID: L-1

PROPOSED MONITORING, RECORDKEEPING, AND EMISSION CALCULATION PROCEDURES

Emission Point Description: PX Loading/p-xylene Rail Car Loading

Emission Reduction Measure ID: C-1

Emission Reduction Measure Description: Refrigerated Condenser

A. Proposed monitoring:

The XYZ Chemical Company has installed an interlock process control system on L-1 to prevent rail car loading operations when the exit stream temperature of condenser (C-1) exceeds a temperature of 32°F. When this temperature limit is exceeded, the loading pumps are automatically stopped and an audible alarm sounds to alert the process operator to the situation. Loading operations can resume only when the exit stream of C-1 has a temperature of 32°F or less. The XYZ Chemical Company proposes to install, maintain, calibrate, and operate the interlock process control system according to the manufacturer's recommended specifications.

B. Proposed Recordkeeping:

On days when rail cars are loaded with p-xylene, the loading operator will record the following information in a log book at the end of each loading day:

a) Date of rail car loading
b) Total quantity of p-xylene (kg) loaded

EMISSION POINT ID: L-1

PROPOSED MONITORING, RECORDKEEPING, AND EMISSION CALCULATION PROCEDURES (continued)

C. Proposed calculation procedure for determining emissions:

At the end of each day when rail cars are loaded with p-xylene, daily HAP emissions from L-1 will be determined using the quantity of p-xylene (kg) loaded that day and loading emission factors developed from the results of the initial performance test on C-1.

This performance test was conducted during the period November 22-23, 1993 to document post-reduction HAP emissions from L-1. The procedures of EPA Method 18 were followed to gather three samples of gas exiting C-1 in Tedlar bags. The samples were analyzed for p-xylene using gas chromatography and a flame ionization detector. The HAP emission factor reported below is based on the average p-xylene concentration measured in the three samples. The samples were gathered under maximum loading rates (7,000 gallons per hour) and at a maximum C-1 gas exit temperature of 32 °F. These conditions represent a worst-case scenario. The gas flow rate from L-1 to C-1 was measured using EPA Method 2. The results of the performance test established the following controlled emission factor for the maximum flow rate from L-1 to C-1:

0.0043 kg of HAP emissions per 1000 kg of p-xylene loaded

Daily HAP emissions from L-1 will be calculated by multiplying the quantity of p-xylene (kg) loaded that day by the above emission factor. The daily emissions value will be recorded into a log maintained by the loading operator. At the end of each calendar half-year, these daily emission

EMISSION POINT ID: L-1

PROPOSED MONITORING, RECORDKEEPING, AND EMISSION CALCULATION PROCEDURES (continued)

values will be summed to determine the semiannual HAP emissions from L-1.

EMISSION POINT ID: S-1

PROPOSED MONITORING, RECORDKEEPING, AND EMISSION CALCULATION PROCEDURES

Emission Point Description: Xylene/Ethylbenzene Storage Tank

Emission Reduction Measure ID: None

Emission Reduction Measure Description:
Internal floating roof with primary & secondary seals

A. Proposed monitoring:

The XYZ Chemical Company proposes to monitor the quantity of material transferred to S-1 and the integrity of rim seals on the internal floating roof with periodic visual inspections. Selection of these monitoring parameters is consistent with the requirements of the HON. The XYZ Chemical Company proposes to install, maintain, calibrate, and operate all monitoring equipment according to the manufacturer's recommended specifications.

The flow of xylene/ethylbenzene to S-1 is monitored by a Hercules 2100 flow meter equipped with a cumulative flow gauge (FIC-S-1). The flow meter is installed on the pipe conveying xylene/ethylbenzene to storage tank S-1 at a location 4 feet prior to entering S-1. This equipment will determine the volume of xylene/ethylbenzene transferred to tank S-1 from various process units.

Inspections and maintenance of the internal floating roof and secondary rim seal will be conducted annually to ensure proper operation of the equipment. Inspections and maintenance of the primary rim seal will be conducted once every 5 years or when the tank is emptied for periodic cleaning of the tank, which ever occurs first.

EMISSION POINT ID: S-1

PROPOSED MONITORING, RECORDKEEPING, AND EMISSION CALCULATION PROCEDURES (continued)

This inspection and repair program will minimize fugitive HAP emissions resulting from weathered cracks or gaps in the floating roof and rim seals.

B. Proposed recordkeeping:

At the end of each day, the process operator will record in a log book the date and current gauge reading from the flow accumulator. The log book is kept in the Xylenes Process Control Room. In addition, the process operator will record in the log book the date when inspections of the internal floating roof and rim seals was conducted and any findings observed during the inspection.

C. Proposed calculation procedure for determining emissions:

Semiannual HAP emissions from S-1 will be determined using the semiannual throughput (gallons) for S-1 and the internal floating-roof tank emissions calculations given in the EPA document "Procedures for Establishing Emissions for Early Reduction Compliance Extensions" (No. EPA-450/3-91-012a) or "Compilation of Air Pollution Emission Factors" (EPA AP-42).

The semiannual throughput for tank S-1 will be determined by subtracting the accumulator gauge reading at the beginning of the 6-month period from the reading at the end of the period. The resulting value will be the number of gallons of xylene/ethylbenzene transferred to S-1 during the 6-month period.

EMISSION POINT ID: S-1

PROPOSED MONITORING, RECORDKEEPING, AND EMISSION CALCULATION PROCEDURES (continued)

The tank emissions calculations also require the following tank design information and stored material physical properties:

Tank Design Parameters	
Tank height:	48 ft
Tank diameter:	100 ft
Tank capacity:	2,820,000 gallons
Roof and shell color:	Medium gray
Diurnal temperature change:	9.5 °F
Deck fittings:	Uncontrolled
Number of deck support columns:	7
Bolted or welded floating deck:	Bolted
Internal floating roof seal factor for liquid-mounted primary seal with secondary rim seal:	1.6

Stored Material Properties	
Molecular weight of stored material:	106 lb/lb mole
Vapor pressure of stored material:	0.164 psia
Density of stored material:	7 lb/gal

The above information is used to determine emissions from S-1 when the internal floating roof and rim seals are in good working order. When an annual visual inspection of the secondary rim seal reveals gaps between the rim seal and the tank wall, emissions from S-1 are determined by assuming the internal floating roof is equipped with only a primary, liquid-mounted rim seal. The corresponding internal floating roof seal factor will be 3.0.

When a 5-year visual inspection of the primary rim seal reveals gaps between the rim seal and the tank wall,

EMISSION POINT ID: S-1

PROPOSED MONITORING, RECORDKEEPING, AND EMISSION CALCULATION PROCEDURES (continued)

emissions from S-1 are determined by assuming the internal floating roof is equipped with only a primary, vapor-mounted rim seal. The corresponding internal floating roof seal factor will be 6.7.

The semiannual emissions value will be recorded into a log maintained by the process operator.

EMISSION POINT ID: WW-1

PROPOSED MONITORING, RECORDKEEPING, AND EMISSION CALCULATION PROCEDURES

Emission Point Description: Waste acid from the methyl chloride drying tower

Emission Reduction Measure ID: STST-1

Emission Reduction Measure Description: Steam Stripper

A. Proposed monitoring:

The XYZ Chemical Company proposes to monitor the steam flow rate into STST-1, wastewater mass flow rate into STST-1, wastewater feed temperature, and the outlet temperature of the overheads condenser. The organic HAP loading in the wastewater entering the steam stripper is considered constant. This assumption is based on two points: first, the wastewater enters a steam stripper feed tank that is well mixed and has a residence time of 8-hours and, second, three separate analyses of wastewater from this feed tank over the last 18 months indicated less than 10 percent variation from the average of the organic-HAP concentrations. The XYZ Chemical Company proposes to install, maintain, calibrate, and operate all monitoring equipment according to the manufacturer's recommended specifications.

The wastewater feed mass flow rate will be determined using a Spiro XTR rotameter (FIC-WW-1) and the density of wastewater (8.34 lb/gal). This rotameter will be located on the influent pipe, 4 feet prior to entering STST-1. The steam mass flow rate will be determined using an orifice pressure gauge (FIC-WW-2) and steam charts. This pressure gauge will be located on the steam influent pipe, 22 feet prior to entering STST-1. The respective flow indicators (FIR-WW-1 and FIR-WW-2) are connected to a Honeywell Data

Acquisition System (DAS), which collects data from each monitoring parameter once every 2 seconds. The flow rate indicators and the DAS are located in the MC Process Control Room.

The "steam-to-feed ratio" is the ratio of steam mass flow rate to wastewater feed mass flow rate. The steam-to-feed ratio of STST-1 can be correlated with performance test data and used as an indicator for the HAP removal efficiency of STST-1. The steam-to-feed ratio of STST-1 will be monitored to determine the number of hours STST-1 is operated in various steam-to-feed ratio ranges listed below in Section C.

The temperature of the wastewater feed and overheads condenser outlet will be measured using Type J thermocouples. The wastewater feed thermocouple (TIC-WW-1) is located on the influent pipe, 6 feet prior to entering STST-1. The overheads condenser thermocouple (TIC-WW-2) is located in the condensing chamber prior to the overheads discharge. The respective thermocouple indicators (TIR-WW-1 and TIR-WW-2) are connected also to the DAS, which collects data from each monitoring parameter once every 2 seconds. The thermocouple indicators and the DAS are located in the MC Process Control Room.

B. Proposed recordkeeping:

At the end of each day, the process operator will obtain from the DAS hourly-average values for the following parameters:

a) Date

EMISSION POINT ID: WW-1

PROPOSED MONITORING, RECORDKEEPING, AND EMISSION CALCULATION PROCEDURES (continued)

b) Steam-to-feed ratio

c) Number of hours the steam-to-feed ratio was maintained within each of the three steam-to-feed ratio ranges listed below in Section C

d) Wastewater feed temperature

e) Temperature of the overheads condenser outlet

These values will be recorded in a log book by the process operator.

C. Proposed calculation procedure for determining emissions:

Daily HAP emissions from WW-1 will be determined using the number of hours STST-1 was operated within each of three steam-to-feed ratio ranges along with steam-to-feed ratio-dependent emission factors that were developed from the results of the initial performance test on STST-1.

This performance test was conducted during the period November 1-4, 1993 to document post-reduction HAP emissions from WW-1. Using the methodology prescribed in Method 305, the HAP concentrations in the wastewater feed and bottoms streams were determined. Concentration measurements were conducted at a minimum wastewater feed temperature of 35 °C and steam-to-feed ratios of 0.09 and 0.12. Also, the condenser outlet vapor temperature was maintained below 50 °C. The results of the performance test established the following speciated emission factors:

Steam-to-Feed Ratio (kg/kg)	Methanol Emission Factor
steam-to-feed ratio $\geq$ 0.12	1.24 kg/hr

EMISSION POINT ID: WW-1

PROPOSED MONITORING, RECORDKEEPING, AND EMISSION CALCULATION PROCEDURES (continued)

0.12 > steam-to-feed ratio ≥ 0.09	1.36 kg/hr
0.09 > steam-to-feed ratio	12.4 kg/hr

Steam-to-Feed Ratio (kg/kg)	Methyl Chloride Emission Factor
steam-to-feed ratio ≥ 0.12	0.03 kg/hr
0.12 > steam-to-feed ratio ≥ 0.09	0.04 kg/hr
0.09 > steam-to-feed ratio	4.5 kg/hr

Daily HAP emissions from WW-1 will be calculated by multiplying the number of hours that STST-1 was operated within the appropriate steam-to-feed ratio range by the corresponding emission factor. The daily emissions value will be recorded into a log maintained by the process operator. At the end of each calendar half-year, these daily emission values will be summed to determine the semiannual HAP emissions from WW-1.

The steam stripper is considered to be in an uncontrolled condition when the average hourly steam-to-feed ratio is lower than 0.09 kg/kg, or the average daily wastewater feed temperature is lower than 35 °C, or the average daily temperature of the overheads condenser outlet is higher than 50 °C.

4.0 EMISSIONS REDUCTION DEMONSTRATION

Emissions reductions from a source are demonstrated by documenting emissions for a given base year, conducting short-term emissions tests to verify the performance of installed emissions reduction measures, and documenting annual post-reduction emissions. This section provides documentation of base-year emissions and short-term performance tests on emissions reduction measures, only. Documentation of annual post-reduction emissions will be submitted after the end of the post-reduction year as specified in the Permits for Early Reductions Source Rule.

4.1 BASE-YEAR EMISSIONS DOCUMENTATION

Base year (1987) HAP emissions from Source A are presented in Table 1-1 (section 1.3). Documentation for the base-year emissions can be found in the Enforceable Commitment for Source A, which was submitted to EPA Region IV on April 1, 1992, and approved by EPA on August 17, 1993.

4.2 SHORT-TERM POST-REDUCTION TEST RESULTS

Short-term performance testing has been performed for PV-1, L-1, and WW-1. A summary of the post-reduction emissions testing for these emission points is presented below. Performance testing was not necessary to document post-reduction emissions from PV-2 and S-1. Emissions reduction measures were not applied to emission point PV-2; "post-reduction" emissions from this vent are determined using the approach for uncontrolled emissions in Section 3.3. Post-reduction emissions from emission point S-1 can be documented by using the emissions equations for storage tanks with internal floating roofs provided in the either of these EPA documents: EPA-450/3-91-012a or AP-42.

Emission Point ID: PV-1

Summary of Test Results -- During the period of November 15-17, 1993, a performance test was conducted on thermal oxidizer TO-1 to document post-reduction emissions from PV-1. A volatile organic sampling train (VOST), Method SW 846 0030 was used to quantify the residual benzene concentration in PV-1 after passing through TO-1. EPA Method 2 was used to quantify gas flow rates during the performance test. Three test runs were conducted under each of four different operating conditions (varying TO-1 firebox temperatures). The emissions data collected under each operating condition were averaged to yield emission rates for maximum gas flow from PV-1 to TO-1. The individual test run emission rates and average test emission rates are presented below:

TABLE 4-1. SUMMARY OF PERFORMANCE TEST RESULTS FOR TO-1

Average Firebox Temperature (°F)	Emission Rates (kg/hr)			
	Run 1	Run 2	Run 3	Average
1600	0.125	0.120	0.133	0.126
1400	0.325	0.317	0.300	0.314
1200	0.396	0.432	0.492	0.440
Uncontrolled condition	----	----	----	7.177

Applicability of Selected Test Method -- Method SW 846 0030 was used because it is an EPA test method that has been validated for quantifying benzene in combustion gases from an incinerator (thermal oxidizer).

EPA Method 2 was used because it is an EPA test method that is the industry standard for quantifying gas flow rates in exhaust stacks.

Discussion of Test Result Anomalies or Problems -- No problems were encountered during the short-term performance tests that could have influenced the results.

Emission Point ID: L-1

Summary of Test Results -- During the period November 19-20, 1993, a performance test was conducted on condenser C-1 to document post-reduction emissions from L-1. Following the procedures under EPA Method 18, a total of three samples of the product exit gas from the condenser were gathered in Tedlar bags. These three samples were gathered under a single operating condition where the rail car loading rate was 7,000 gallons per hour (maximum) and the product exit gas temperature was maintained at 32 °F (maximum). The samples were analyzed for p-xylene using gas chromatography and a flame ionization detector. The gas flow rate from L-1 to C-1 was measured using EPA Method 2.

The emission rates determined from each gas sample were averaged to yield an overall emission rate. This overall emission rate is used in the emissions estimating procedure for L-1 as described in Section 3.3. The individual test run emission rates and average test emission rates are presented below:

TABLE 4-2. SUMMARY OF PERFORMANCE TEST RESULTS FOR C-1

Average Condenser Exit Temperature (°F)	Emission Rates (kg emissions/kg loaded)			
	Run 1	Run 2	Run 3	Average
32	0.0040	0.0044	0.0045	0.0043

Applicability of Selected Test Method -- Method 18 was used because it is an EPA test method that has been validated for quantifying xylene in gaseous exhaust streams.

EPA Method 2 was used because it is an EPA test method that is the industry standard for quantifying gas flow rates in exhaust streams.

Discussion of Test Result Anomalies or Problems -- No problems were encountered during the short-term performance tests that could have influenced the results.

Emission Point ID: WW-1

Summary of Test Results -- During the period November 1-4, 1993, a performance test was conducted on STST-1 to document post-reduction emissions from WW-1. Using the methodology prescribed in EPA Method 305, the HAP concentrations in the wastewater feed and bottoms streams were determined as an average of three samples. Concentration measurements were conducted at a minimum wastewater feed temperature of 35 °C and steam-to-feed ratio of 0.09 and 0.12. Also, the condenser outlet vapor temperature was maintained below 50 °C. The results of the performance tests established the following speciated emission rates:

TABLE 4-3. SUMMARY OF PERFORMANCE TEST RESULTS FOR STST-1

Average Steam-to-Feed Ratio	Methanol Emission Rates (kg/hr)			
	Run 1	Run 2	Run 3	Average
0.09	1.34	1.35	1.39	1.36
0.12	1.28	1.22	1.22	1.24
Uncontrolled condition	----	----	----	12.4
Average Steam-to-Feed Ratio	**Methyl Chloride Emission Rates (kg/hr)**			
	Run 1	**Run 2**	**Run 3**	**Average**
0.09	0.04	0.03	0.04	0.04
0.12	0.02	0.03	0.03	0.03
Uncontrolled condition	----	----	----	4.5

Applicability of Selected Test Method -- Method 305 is recommended by the HON as the prescribed test method for quantifying HAP's in industrial wastewater streams.

Discussion of Test Result Anomalies or Problems -- No problems were encountered during the short-term performance tests that could have influenced the results.

4.3 POST-REDUCTION YEAR ACTUAL EMISSIONS

(To be supplied after the end of the post-reduction year.)

APPENDIX B

List of Validated Test Methods

List of Validated Test Methods

Introduction

On December 29, 1992 the Administrator promulgated 40 CFR Part 63, "National Emission Standards for Hazardous Air Pollutants for Source Categories: Regulations Governing Compliance Extensions for Early Reductions of Hazardous Air Pollutants." The regulations require that the emission reductions called for be determined by comparing the post-reduction emissions from a source with emissions in a base year. To demonstrate the post-reduction emission reduction, the source owner or operator must present verifiable and actual emission data for both the pre- and post-reduction operations.

These verifiable and actual data will in many cases consist of source test results using validated methods. A validated method is defined as a measurement methodology with a demonstrated precision and bias over the measured concentration of the source's emission. A validated method may be an EPA Test Method, a validated conditional test method, or a test method validated according to the protocol in Method 301 (promulgated with the above regulations). The regulation states that a list of validated methods may be obtained from the Emission Measurement Technical Information Center (EMTIC).

Validated Methods

The Atmospheric Research Exposure and Assessment Lab (AREAL) and Emissions, Monitoring, and Analysis Division have developed an initial list of validated methods and source applicability. The following table is EMTIC's preliminary listing of validated methods; EMTIC is preparing a more complete and more detailed list of methods with validation and applicability status in a computer disk format. The purpose of this methods list is to provide direction for developing or applying validated air toxic emission test methods and provide a means for checking the applicability of proposed methods. This dynamic list is scheduled to be available initially in October 1991 and will be updated as additional methods are validated. The list also will be updated as validated methods are reported to EMTIC by various permitting authorities.

1. EPA Reference, or Test Methods published in the FEDERAL REGISTER. Citations include:

   40 CFR Part 51, Appendix M
   40 CFR Part 52, §52.12 (pertaining to approved SIP's)
   40 CFR Part 60, Appendix A*
   40 CFR Part 61, Appendix B
   40 CFR Part 63, Appendix A
   40 CFR Part 763, Subpt.E, Appendix A
   40 CFR Part 763, Subpt.F, Appendix A

   * Test Method 18 is considered a self validating method. Properly conducted, the method may have broad applicability.

2. EPA conditional test methods as published through EMTIC. Citations include:

   • CTM-001 Determination of Butadiene Emissions. Sampling and Analysis of Butadiene at a Synthetic Rubber Plant. EPA Method 18 procedure was validated for measurement of butadiene in the presence of styrene.

   Contact: Dr. J.C. Pau
   (919) 541-3680

   • CTM-002 Determination of Particulate Matter (Screening Procedure). The screening procedure was evaluated at ammonium nitrate facilities.

   Contact: Mr. J. Brown
   (919) 541-0200

   • CTM-003 Hi-Vol Method for PM. A particulate emission test method was validated for positive pressure bag-house controls. Method is applicable to low concentration, low humidity situations.

   Contact: Ms. C. Sorrell
   (919) 541-1064

   • CTM-004 Determination of Hydrogen Chloride Emissions. Methodology has been validated at Municipal and Hazardous Waste Incinerators.

   Contact: Mr. J.H. Margeson
   (919) 541-2848

   • CTM-005 Condensible Particulate Matter (Revised). The method was validated at wood waste and coal fired boilers.

   Contact: Ms. C. Sorrell
   (919) 541-1064

- CTM-006 Determination of Chromium Emissions from Chromium Electroplaters. This method has been validated for the subject source category.

Contact: Mr. F. Clay
(919) 541-5236

- CTM-008 Determination of Acrylonitrile from Stationary Sources. Determination of Acrylonitrile in Stationary Source Emissions by Impinger Sampling and Gas Chromatography with Nitrogen-Phosphorus Detection. The procedure was validated at a acrylic fiber plant where AN was used as raw material and a AN manufacturing plant.

Contact: Dr. J.C. Pau
(919) 541-3680

- CTM-009 Emission Rates of VOC through Cover Materials. The method was validated for cover membranes at hazardous waste storage, treatment, and disposal facilities.

Contact: Ms. R. Dishakjian
(919) 541-0443

- CTM-010 Determination of Perchloroethylene Content of Wet Waste Materials from filters and Still Bottoms. Method was validated at several perc dry cleaning facilities.

Contact: Mr. A. Wayne
(919) 541-3576

- CTM-011 Determination of Halogenated Organics from stationary sources. The method was validated for halogenated compounds in nonparticulate laden sources.

Contact: Mr. F. Curtis
(919) 541-1063

3. The following test procedures also have been validated for the cited applications:

- Volatile Organic Sampling Train (VOST) Protocol. The VOST has been validated at a hazardous waste incinerator with five specific POHCs.

Contact: Mr. T.J. Logan
(919) 541-2580

- Determination of Selected Nitrogen-Containing Hazardous Pollutants in Complex Matrices by Gas Chromatography with a Nitrogen-Phosphorous Detector. The procedure was validated for outlet streams of a scrubber unit at a chemical for the compounds plantaniline, nitrobenzene, and toluene.

Contact: Dr. J.E. Knoll
(919) 541-2952

- Chrome Analysis at a Ferrochrome Smelter, a Chemical Plant and a Refractory Brick Plant. Various techniques were validated for the determination of Cr^{6+}.

Contact: Dr. J.E. Knoll
(919) 541-2952

- Determination of Chromium Speciation -- Ferrochrome Smelter Dust.

Contact: Dr. J.E. Knoll
(919) 541-2952

- Validation of a Test Method for Formaldehyde Emissions. Three methods: peroxide impinger/ion chromatography (IC), dinitrophenylhydrazine-coated (NPH) cartridge/high performance liquid chromatography (HPLC), and NPH impinger/HPLC. Procedures validated at two formaldehyde manufacturing plants.

Contact: Dr. J.C. Pau
(919) 541-3680

- Method for Determination of Methylene Chloride Emissions at Stationary Sources.

Contact: Dr. J.E. Knoll
(919) 541-2952

- Analytical Method Evaluation for Measuring Ethylene Oxide Emissions from Commercial Dilute-Acid Hydrolytic Control Units.

Contact: Mr. J.H. Margeson
(919) 541-2848

- Semi-Volatile Organic Sampling Train Method (Semi-VOST) for measuring concentrations of principal organic hazardous constituents (POHCs) with boiling points greater than 100°C that are emitted from hazardous waste incinerators. The method was validated on 5 deuterated organic compounds (d_5-pyridine, d_8-toluene, d_5-chlorobenzene, d_{10}-o-xylene, and d_2-tetrachloroethane).

Contact: Mr. J.H. Margeson
(919) 541-2848

- Modified Method Five (MM5) Test Method for PCs and PCFs. The method has been validated at a municipal waste combustor (MWC).

Contact: Dr. J.C. Pau
(919) 541-3680

- Methodology for Measuring Emissions of Chlorinated Solvents From Stationary Sources. An EPA Method 18 procedure was validated at several sources.

Contact: Dr. J.C. Pau
(919) 541-3680

- Thin Layer X-Ray Powder Diffraction (XR) Methods for Semiquantitative Analysis of Asbestos Cement Pipe Industry Emissions: Analysis of Emission Samples by XR and Electron Microscopy.

  Contact: Mr. T.J. Logan
  (919) 541-2580

- Method for Determining Asbestos Mass Emission Rate From Stationary Sources.

  Contact: Mr. T.J. Logan
  (919) 541-2580

- Methods for Determining the Polychlorinated Biphenyl Emissions from Incineration and Capacitor and Transformer Filling Plants.

  Contact: Dr. J.C. Pau
  (919) 541-3680

- An application of EPA Method 111 for the determination of Benzene From Stationary Sources.

  Contact: Dr. J.E. Knoll
  (919) 541-2842

- Procedures for Measuring Hexavalent Chromium Emissions from Hazardous Waste Incinerators.

  Contact: Dr. J.E. Knoll
  (919) 541-2842

APPENDIX C

Sources of Information on Test Methods

Sources of Information on Test Methods

The purpose of this appendix is to suggest several sources of information about test methods for HAP's. A complete reference for each document is listed here, as well as how it can be obtained. Discussions of why the methods or databases of methods were developed and how they are applicable to EPA and permit applicants are also presented.

Stationary Source Sampling and Analysis Directory

The Stationary Source Sampling and Analysis Directory (SSADAIR), Version 2.1, is a menu-driven program for personal computers developed at Radian Corporation for the U.S. EPA Atmospheric Research and Exposure Assessment Laboratory (AREAL). For further information on how to obtain a copy of this directory, contact Mr. Merrill Jackson at AREAL, (919) 541-2559. The SSADAIR includes a database of physical properties and sampling and analytical considerations for chemical compounds that are potential air pollutants. The SSADAIR was created primarily to help regulators decide whether proposed sampling and analytical methods are appropriate for a particular chemical. The SSADAIR can also be very useful to facilities that must perform source testing in order to obtain or comply with a permit. This database may help plant officials and contractors avoid performing costly sampling and analyses that may not yield acceptable data.

The SSADAIR (originally called the "Problem POHC Database") was developed at Southern Research Institute under contract to the EPA. The list of chemical compounds included in the database is a composite of those given in the Appendix VIII list and its revision, Appendix IX of the Resource Conservation and Recovery Act, and the 1990 Clean Air Act list of toxic air pollutants. All information for pertinent physical properties and best available sampling and analytical methodology was compiled. Much of this information was obtained from laboratory and field studies and analytical judgement. Examples of this information

include considerations such as whether or not a compound can be separated and detected by a gas chromatographic method or if a compound decomposes during sampling or analysis. The validation status for sampling and analytical methods is provided where possible. For a small number of analytes, a validation protocol that involves dynamic spiking of analytes in the field was followed. Where this information is available, a source for the information, usually an EPA report, is cited. In other cases, a complete sampling and analytical method has not been validated, but some laboratory experiments or validation of an analytical procedure has been performed, and this information is cited by report number.

Also included in this report are University of Dayton Research Institute (URI) Thermal Stability Classes and Thermal Stability Rankings, which provide an indication of the ease of incineration of a compound. Database records containing information about compounds can be accessed by the compound's name or CAS registry number, by physical property, or by problem areas. Physical properties include URI Thermal Stability, molecular weight, boiling or melting point, combustion rank, or a combination of any two properties. Problem areas include analysis, sampling, or compound hazards.

EPA's Clean Air Act Air Toxics Database

This database was developed by Lawrence H. Keith of Radian Corporation and Mary M. Walker of Mary M. Walker and Associates and was published by Lewis Publishers/CRC Press, Inc., Boca Raton, Florida in 1992. The database was edited and adapted for electronic publication from EPA's Report No. EPA-450/4-91-021, "Screening Methods for the Development of Air Toxics Emission Factors." The database addresses the questions of how to sample and analyze the 189 hazardous air pollutants (HAP's) on the Clean Air Act list. Some of the methods referenced in this database are not yet validated for the air toxics, may not have been used with some of the air toxics, and must be modified and then verified before they can be used with confidence. However, all the methods in this database represent the best estimate at this

time for methods that can be used for sampling and analysis of the air toxics. For some of the HAP's, existing sampling and analytical methodologies are directly pertinent to the analyte of interest in stationary sources, and the performance parameters for the compounds have been completely defined. For some of the 189 HAP's, data were available to substantiate part or all of the performance of analytical methodology, but no information was available to establish whether the compound could be sampled quantitatively. For a significant percentage of the HAP's, assignment to a sampling and analytical methodology could be made tentatively only on the basis of chemical or physical correspondence to other compounds that have been sampled and analyzed with the methodology. The purpose of this database is to identify methods with the broadest applicability to the HAP's.

Environmental Monitoring Methods Index

The Environmental Monitoring Methods Index (EMMI) is an information retrieval tool consisting of software programs and on-line manuals. It was developed by EPA's Engineering and Analysis Division (EA) within EPA's Office of Water. EMMI is an automated inventory of information on environmentally significant analytes monitored by EPA and methods for their analysis. The database includes information on more than 2600 analytes from over 80 regulatory and non-regulatory lists and lists more than 900 analytical methods. EMMI includes analytes from the Clean Air Act as well as from the Clean Water Act, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), Superfund Amendments and Reauthorization Act (SARA), and the Safe Drinking Water Act (SDWA).

The database provides a comprehensive cross-reference between analytes and analytical methods and contains information on related laws and organizations and additional databases for further information. Hardware requirements for using EMMI are an IBM PC or compatible with a hard drive having 8 megabytes of available space and 200K RAM at the OS prompt, a monochrome or color monitor, a keyboard or mouse, and a printer able to print 165 columns of compressed text. Software requirements are PC-OS

or MS-OS Version 2.0 or later and EMMI System Software Version 1.0 or later. Software support is provided by the EPA EA Sample Control Center at (703) 557-5040.

A list of validated test methods is available through the Emission Measurement Technical Information Bulletin Board (EMTIC BBS), which is part of the EPA's Technology Transfer Network (TTN). To access the EMTIC BBS, the user needs a computer, a modem, and a communication package capable of communication at either 1200, 2400 or 9600 baud, 8 data bits, 1 stop bit, and no parity (8-N-1). The BBS telephone number is (919) 541-5742. To retrieve the document from the EMTIC BBS, reference the menu "File Transfers" and choose option <D> EMTIC Documents. Then choose <L> EMTIC Guideline Documents, where you will find the list of validated test methods. The WordPerfect file is called G-015.WPF. The file should be downloaded to your computer's hard drive or to a particular disk, wherever you, as a user, wish to place your file. See Appendix B for the materials that can be obtained through the EMTIC BBS.

APPENDIX D

Options for Estimating HAP Emissions Below the Detection Limit of the Measurement Method

Options for Estimating HAP Emissions Below the Detection Limit of the Measurement Method

Should a HAP known to be emitted be emitted at levels below the test method detection limit, the applicant has several options for quantifying those emissions. These options are explained below.

- Base-Year Emissions Below the Detection Limit

  - The applicant may use another estimation method, such as engineering calculations or material balance data, to document an "actual" emission level.

  - The applicant may use the detection limit of the method to establish emissions. This should only be used if no emissions reduction will be claimed for the emission point, and emissions from the base year to the post-reduction year have not increased (i.e., the post-reduction emissions value must be the same as the base-year emissions value).

  - The applicant may use the post-reduction emissions value for the base-year emissions estimate. This should be used only if post-reduction emissions of the HAP have been detected and measured by a method more sensitive than the method used for base-year emissions, and if post-reduction emission levels can be shown to be the same or less than base year levels.

- Post-Reduction Emissions Below the Detection Limit

  - The applicant may assume an emissions level equal to the detection limit of the method for the HAP in question.

  - Where emission controls have been applied, it may be possible to deduce post-reduction emissions for a nondetectable HAP by using the same percent reduction as was achieved on another similar compound that <u>was</u> detected in the emission stream (the applicant must show the control would be expected to achieve the same reduction on both the detectable and nondetectable HAP).

  - The applicant may use another emissions estimation method to quantify "actual" emissions of the HAP. The alternate method must be documented as a valid, accurate means of estimating the HAP emissions.

- Both Base-Year and Post-Reduction Emissions Below the Detection Limit

  - The applicant may use another emissions estimation method to quantify "actual" emissions of the HAP. The alternate method must be documented as a valid, accurate means of estimating the HAP emissions.

  - The applicant may use the detection limit of the test method to establish emissions, provided the base-year and post-reduction estimate is the same. Where a more sensitive test method (i.e., lower HAP detection limit) is used for post-reduction emissions compared to the method used to measure base-year emissions, the applicant cannot use the detection limits of the respective methods to establish emissions. This would produce an emissions reduction solely due to the differing detection limits of the methods. In such cases, the applicant may use the detection limit of either test method to establish both base-year and post-reduction emissions. The applicant should provide evidence that emissions have not increased from the base year to the post-reduction year.

APPENDIX E

Emissions from Startups, Shutdowns, and Malfunctions

Emissions from Startups, Shutdowns, and Malfunctions

The purpose of this appendix is to discuss how startup, shutdown, and malfunction emissions from an early reductions source may be handled in the Specialty Permit.

The definition of "actual emissions" in the Early Reductions Rule does not include excess emissions from a malfunction or startup and shutdown associated with a malfunction [§63.71]. Only emissions from "routine" startups and shutdowns, such as those due to plant turn-around or routine maintenance, can be considered part of the emissions from an early reductions source and, therefore, eligible for a compliance extension. Malfunction emissions of HAPs would be subject to the requirements of the general provisions under title 40, part 63 of the Code of Federal Regulations.

The Specialty Permit applicant has two choices for handling emissions from routine startups and shutdowns: either consider such emissions to be part of the early reductions source, or exclude them from the source. If the applicant considers such emissions to be part of the source, these emissions need to be quantified and included in the base-year emissions, demonstration of post-reduction emissions, and periodic calculation of emissions for compliance and reporting purposes. The applicant should make clear in the submission of base-year emissions that startup and shutdown emissions have been included. The applicant should also make clear in the permit application how such emissions will be quantified and calculated into the periodic computation of total source emissions.

Regardless of whether an applicant considers routine startup and shutdown emissions to be part of the early reductions source, the applicant will be required to prepare a Startup, Shutdown, and Malfunction Plan within a year of issuance of the specialty permit. This plan would include procedures for operating and maintaining the source during periods of startup, shutdown, and malfunction, and a program of corrective action for malfunctioning process and air pollution equipment. If an applicant includes routine startup and shutdown emissions in the

early reductions source, then the Startup, Shutdown, and Malfunction Plan need only address malfunction emissions and any startup and shutdown emissions associated with a malfunction (if any). The requirement for this plan is part of the NESHAP General Provisions [§63.6(e)(3)] and applies to all sources subject to a section 112 standard. Such a startup/shutdown/ malfunction plan would not be part of a Specialty Permit.

As EPA reviews base-year submittals and permit applications, a determination will be made on which approach the applicant selected for handling startup and shutdown conditions. Specialty Permit terms and conditions will therefore reflect this determination. If the applicant did consider these emissions part of the source, the permit will specify, based on the proposed terms in the application, how such emissions should be quantified and summed into the periodic calculation of total emissions. If an applicant did not consider such emissions to be part of the source, emissions from routine startups and shutdowns will not be counted against the AEL.

APPENDIX F

Review Checklist for Permit Applications

APPLICATION COMPLETENESS REVIEW CHECKLIST

1. Does the application include:	Yes	No	Comments
• Identifying information:			
- Company name, telephone number, address?	☐	☐	_____
- If different from company,			
- plant name, telephone number, address?	☐	☐	_____
- Owner's name, telephone number, agent?	☐	☐	_____
- Plant contact name and telephone number?	☐	☐	_____
• Source Description:			
- General source description?	☐	☐	_____
- Site plan of contiguous facility with detailed identification of the source and the emission units?	☐	☐	_____
- Identification of emission units, including identification numbers and short descriptive titles?	☐	☐	_____
- A statement showing that the source fits one of the definitions in 40 CFR 63.73?	☐	☐	_____

APPLICATION COMPLETENESS REVIEW CHECKLIST
(Continued)

- Plan for Achieving Emissions Reductions:
  - Table (or other listing) of all emission units and corresponding control measures used to reduce emissions? ☐ ☐ _____

- Proposed Permit Terms and Conditions:
  - Alternative emissions limitations (AEL) for total and weighted HAPs? ☐ ☐ _____
  - Additional emissions limitations? (not required) ☐ ☐ _____
  - Monitoring (for each emission unit)? Parameters to be monitored, and for each parameter, device, frequency, and method or procedure, as applicable. ☐ ☐ _____
  - Recordkeeping (for each emission unit)? ☐ ☐ _____
  - Emissions calculation procedures (for each emission unit)? ☐ ☐ _____
  - Performance testing, including test methods (if applicable)? ☐ ☐ _____
  - Reporting requirements (including periodic compliance certifications)? ☐ ☐ _____
  - Alternative operating scenarios? (not required) ☐ ☐ _____

APPLICATION COMPLETENESS REVIEW CHECKLIST
(Continued)

- Emissions Reduction Demonstration:
  - Base-year emissions documentation:
    - Base year chosen? ☐ ☐ _____
    - Actual emissions of HAPs from each emission unit during base year? ☐ ☐ _____
    - Data supporting the derivation of each emissions estimate? ☐ ☐ _____
    - If supporting data are not source test data, a statement of why source testing not performed? ☐ ☐ _____
    - Evidence that the base-year emissions are not substantially greater than emissions in other years before the emissions reduction? ☐ ☐ _____
    - Emissions during base-year do not exceed allowable levels in any applicable regulations or permit conditions? ☐ ☐ _____
  - Post-reduction emissions documentation:
    - Short-term test results? ☐ ☐ _____

- The following items, which are part of the post-reductions emissions documentation, will be submitted later and should not keep the initial permit application submittal from being declared complete:
  - Actual emissions of HAPs from each emission unit during post-reduction year;
  - Data supporting the derivation of each emissions estimate;
  - If supporting data are not source test data, a statement of why source testing was not performed;
  - Evidence that there was no increase in radionuclide emissions from the source; and
  - Emissions during post-reduction year do not exceed allowable levels in any applicable regulations or permit conditions.

2. Is the proposed AEL correct (i.e., 90% reduction of gaseous HAPs and 95% reduction of particulate HAPs)? ☐ ☐ _____

APPLICATION COMPLETENESS REVIEW CHECKLIST
(Continued)

3. Is the post-reduction demonstration consistent with the base-year demonstration in terms of:

- Source definition? ☐ ☐ _____
- Emission units? ☐ ☐ _____
- HAPs emitted? ☐ ☐ _____
- Methodology used to estimate emissions? ☐ ☐ _____

COMPLETENESS DETERMINATION:

- Application complete enough for permit development to proceed ☐ Completeness letter sent: _____
- Application not complete ☐ Notification of incomplete application, with list of incomplete items, sent: ____

APPENDIX G

EXAMPLE DRAFT SPECIALITY PERMIT

DRAFT
TITLE V SPECIALTY PERMIT

Company Name:	The XYZ Chemical Company
Mailing Address:	8910 Industrial Park Drive, Raleigh, NC
Company Representative(s):	Mr. Joe Smith, Technical Contact Mr. George Jones, Plant Manager
Phone Number:	(919) 555-0000
SIC Number:	0286
Facility Type:	__X__Permanent ____Temporary
Facility Location:	8901 Industrial Park Drive, Raleigh, NC
Permit No.:	_____
Type of Permit:	Early Reductions Specialty Permit
Application Date:	April 1, 1994
Permit Effective Date: (Date of Issuance)	_____
Expiration Date:	_____
Permitting Authority:	Environmental Protection Agency Region IV
Regional Office Contact:	Director, Air, Pesticides, and Toxics Management Division

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DRAFT
TITLE V SPECIALTY PERMIT
AIR PERMIT NO. _____

Permit Effective Date: _____
(Date of Issuance)

Expiration Date: _____

SECTION A: SOURCE IDENTIFICATION

In accordance with section 112(i)(5) of the Clean Air Act, as amended; title 40, part 63, subpart D of the Code of Federal Regulations; and title 40, part 71, subpart B of the Code of Federal Regulations, the permittee

THE XYZ CHEMICAL COMPANY, RALEIGH, NC

is hereby authorized to operate air emission units and control equipment comprising the Early Reductions Source, which includes the emission units and associated equipment listed in Table A-1, in accordance with the specific and general conditions of this permit.

Table A-1. Emission Unit Identification

Emission Unit	ID #
Thermal Oxidizer - The following vent is routed to TO-1: Air Oxidation Unit I	TO-1
EO-1 Carbon Dioxide Vent - Process Vent	PV-2
Condenser - The following unit is routed to C-1: Px Loading/Paraxylene Rail Car Loading	C-1
Xylene/Ethylbenzene - Storage Tank	S-1
Condenser - The following unit is routed to C-2: Steam Stripper; Wastewater effluent is hard piped to the steam stripper	C-2

This permit is based on information contained in the application dated April 29, 1994 received from The XYZ Chemical Company, on any plans, specifications, previous applications, data referenced by that application, and other information submitted in support

of that application, all of which are filed with the EPA Region IV Office in Atlanta, Georgia (the Permitting Authority).

The emission units comprising the Early Reductions Source described are also identified in the diagram attached to this permit.

SECTION B: SPECIFIC CONDITIONS

In accordance with section 112(i)(5) of the Clean Air Act and title 40, part 63, subpart D of the Code of Federal Regulations (Early Reductions Rule), this permit grants each emission unit in the Early Reductions Source a six-year extension from the compliance date of the otherwise applicable standard(s) promulgated under section 112(d) of the Clean Air Act. In lieu of complying with applicable section 112(d) standard(s), The XYZ Chemical Company accepts the following Alternative Emission Limitations (AEL's), monitoring, recordkeeping, emission calculation, and reporting requirements for the Early Reductions Source. In addition to implementing a compliance extension granted under title 40, part 63, subpart D of the Code of Federal Regulations, this permit also implements the General Provisions requirements of title 40, part 63, subpart A of the Code of Federal Regulations for each emission unit in the Early Reductions Source.

1. Alternative Emission Limitations (AEL's)

The AEL's for the Early Reductions Source described in Section A are:

22.52 Mg/calendar year of Total Gaseous Hazardous Air Pollutants
72.28 Mg/calendar year of Weighted Gaseous Hazardous Air Pollutants

The AEL's shall be effective until six years after the compliance date for the last standard promulgated under section 112(d) of the Clean Air Act that is applicable to any emission unit in the Early Reductions Source.[1] The AEL's shall expire on April 22, 2003, (six years after April 22, 1997, the applicable compliance date for emission units in the Early Reductions Source, which are subject to the National Emission Standards for Organic Hazardous Air Pollutants from the Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry).

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1. Note that the compliance extension for each emission unit included in the Early Reductions Source expires six years after the compliance date of an applicable section 112(d) standard. However, the AEL's do not expire until six years after the compliance date for the last section 112(d) standard that applies to the Early Reductions Source. Therefore, periods of time may occur when emissions from certain units are: (a) subject to an applicable section 112(d) standard; and (b) included in determining compliance with the AEL's.

The AEL's will be effective beyond the term of this permit and therefore, the AEL's shall be renewed when this permit is incorporated into the facility's comprehensive title V permit.

Compliance with the AEL's shall be determined on a calendar year basis by summing hazardous air pollutant (HAP) emissions from each emission unit included in the Early Reductions Source for each semiannual period during the calendar year. Semiannual emissions shall be determined in accordance with section B.6 of this permit.

2. Other Specific Conditions

Each emission unit in the Early Reductions Source shall be uniquely identified such as through a tag, label, or other marking on the equipment or shall be uniquely identifiable from a plot plan or other drawings available at the Early Reductions Source.

The XYZ Company shall meet the following other specific conditions:

a. Emission unit PV-1, the air oxidation unit 1 vent, is routed to a thermal oxidizer (TO-1)

b. Emission unit L-1, the paraxylene loading operation vent, is routed to a condenser (C-1). When the exit stream temperature of condenser (C-1) exceeds a temperature of 32°F, the loading pumps will automatically stop and an audible alarm will be sounded to alert the process operator.

c. Emission unit WW-1, the wastewater effluent, is hard-piped to a steam stripper (STST-1). The steam stripper vent is routed to a condenser (C-2).

3. Monitoring Requirements

For emission units included in the Early Reductions Source, the permittee shall monitor and keep records of the parameters indicated in Table B-1 below. To ensure that the monitoring equipment meets the accuracy requirements specified in Table B-1 below, all monitoring equipment shall be installed, calibrated, and maintained.

a. According to the manufacturer's specifications, or other written procedures that provide adequate assurance that the equipment would reasonably be expected to monitor accurately;

b. In a manner consistent with good air pollution control practices during all periods while emissions are generated.

Monitoring equipment shall be maintained to provide valid monitoring data for at least 75 percent of the total operating time of each significant emission unit, consisting of units TO-1, C-1, S-1, and C-2. Data obtained from properly functioning monitoring equipment that meets applicable accuracy requirements shall be considered valid.

4. Recordkeeping Requirements

The permittee shall keep copies of all applicable reports and records required under this permit for at least 5 years. All applicable records shall be maintained in such a manner that they can be readily accessed. The most recent 2 years of records shall be maintained on site, at the Early Reductions Source, or shall be accessible from a central location by computer. The remaining 3 years of records may be retained offsite. Records may be maintained in hard copy or computer-readable form including, but not limited to, paper, microfilm, computer, floppy disk, magnetic tape, or microfiche. The permittee shall keep the following records relating to emission units included in the Early Reductions Source:

a. Records of the monitoring parameters indicated in Table B-1;

b. Records of the supporting calculations used to determine semiannual HAP and weighted HAP emissions;

c. Records of the occurrence and duration of each startup, shutdown, and malfunction of operation of an emission unit within the Early Reductions Source;

d. Records of the occurrence, duration, and cause (if known) of each malfunction of air pollution equipment or monitoring equipment used to comply with the AEL's or monitoring provisions of this permit;

e. After the effective date of the permittee's startup, shutdown, and malfunction plan (see section C.5.b) and for each startup, shutdown or malfunction that occurs after that date, records indicating that the procedures in the permittee's startup, shutdown, and malfunction plan were followed, and documentation of actions taken that are not consistent with the plan; and

f. For monitoring equipment used to comply with the monitoring requirements of this permit, records

documenting the completion of installation, calibration checks, and maintenance.

5. Reporting Requirements

The XYZ Company shall submit to the permitting authority semiannual reports of the performance of the Early Reductions Source, one for each half of the calendar year. The semiannual reports shall be submitted to the permitting authority within thirty-one days after the end of the six-month period covered (July 31 for the report covering January 1 through June 30 and January 31 for the report covering July 1 through December 31). The format of the semiannual emissions report is displayed on page(s) following Table B-1 below. The XYZ Company shall submit to the permitting authority semiannual reports for the Early Reductions Source as follows:

a. The first semiannual report for a calendar year, covering January 1 through June 30, shall include:

(i) A description of any deviations from permit requirements that occurred during the reporting period and that were not previously reported, the probable cause of such deviations, and corrective actions or preventive measures taken;

(ii) A description of any malfunction of processes, air pollution control equipment, or monitoring equipment that occurred during the reporting period, the date and duration of the incidents, and the probable cause and actions taken to remediate such incidents; and

(iii) Either:

total HAP emissions for the Early Reductions Source for the first half of the calendar year, as determined by using the calculation procedures described in section B.6;

or

except for the first semiannual report submitted under this permit, a certification by a responsible official that total HAP emissions from the Early Reductions Source during the reporting period would be 40 percent or less of the AEL's (less than 9.01 Mg of gaseous HAP's and 28.91 Mg of weighted gaseous HAP's), based on the results of monitoring for emission units TO-1, C-1,

S-1 and C-2 and information related to emissions for the other emission units in the Early Reductions Source.

b. The second semiannual report for a calendar year, covering July 1 through December 31 shall include:

(i) A description of any deviations from permit requirements that occurred during the reporting period and that were not previously reported, the probable cause of such deviations, and corrective actions or preventive measures taken;

(ii) A description of any malfunction or processes, air pollution control equipment or monitoring equipment that occurred during the six-month reporting period, the date and duration of the incidents, and the probable cause of the incidents, and actions taken to remediate such incidents;

(iii) Total HAP emissions for the Early Reductions Source for the second half of the calendar year (or for the entire calendar year if emissions were not reported for the first six-months of the calendar year in the previous semiannual report), as determined by using the calculation procedures in section B.6; and

(iv) A certification for the calendar year reporting period of the Early Reductions Source's compliance with respect to the AEL's and all other terms and conditions of this permit. The certification shall include identification of each term or condition that is the basis of the certification, the compliance status, and whether compliance was continuous or intermittent (except for the AEL's).

The first semiannual report submitted under this permit must contain HAP emissions for the calendar half year, or for the full year (if it is the first report under this permit) and all supporting calculations for HAP emissions. After the first semiannual emissions report, a certification statement may be substituted for the report covering the first six-month period of a calendar year (see section B.5.a.(iii) above). If the permitting authority determines that these calculations are deficient or incomplete, the permittee shall correct the deficiencies and resubmit the calculations. Supporting

calculations for HAP emissions will be required in subsequent reports only when an alternative method need be included. Any violation of an AEL shall be reported (by phone call or facsimile transmission) to the permitting authority within 24 hours of detection. This initial notification shall be followed by written notification within 30 days.

Table B-1. Monitoring And Recordkeeping Requirements

Emission Unit	ID #	Monitoring Requirement	Recordkeeping Requirement
Thermal Oxidizer The following vent is routed to TO-1: Air Oxidation Vent 1	TO-1	Parameter: Firebox temperature Device: The K Thermocouple with an accuracy ± 1 percent interfaced to a Data Acquisition System Location: On the firebox wall opposite the gas burners Frequency: Continuous at a minimum rate of one reading per 15 min. Parameter: Gas flow to thermal oxidizer Device: Pitot Tube with an accuracy of ± 5 percent interfaced to a Data Acquisition System Frequency: Continuous at a minimum rate of one reading per 15 min.	The following information shall be recorded in a log book at the end of each work day: a. Date; b. Hourly-average firebox temperature; c. Number of hours that process gas flowed from PV-1 to TO-1; and d. Number of hours that process gas flowed to an uncontrolled vent. The hourly-average firebox temperature shall be obtained from the Data Acquisition System.

Table B-1. Monitoring And Recordkeeping Requirements (continued)

Emission Unit	ID #	Monitoring Requirement	Recordkeeping Requirement
Condenser The following unit is routed to C-1: Paraxylene Railcar Loading Operation	C-1	Parameter: Quantity (in kilograms) of p-xylene loaded Device: Weigh Scales with an accuracy of ± 2 percent Frequency: At the end of each loading operation Parameter: Exit stream temperature of condenser (C-1) Device: Type T thermocouple with an accuracy of ± 1 percent interfaced to an interlock process control system Frequency: Continuous at a minimum rate of one reading per 15 min.	On days when rail cars are loaded with p-xylene, the loading operator shall record the following information in a log book at the end of the loading day: a. Date of rail car loading; and b. Total quantity of p-xylene (in kilograms) loaded. Additional records indicating all periods of time when the condenser exit temperature exceeded 32°F shall be kept and maintained.

Table B-1. Monitoring And Recordkeeping Requirements (continued)

Emission Unit	ID #	Monitoring Requirement	Recordkeeping Requirement
Xylene/ Ethylbenzene - Storage Tank	S-1	Parameter: Volume (gallons) transferred to Tank S-1 Device: Flowmeter with an accuracy of ± 3 percent equipped with a cumulative flow gauge Location: On the conveying pipe at a location four feet prior to entering S-1 Frequency: At the end of each day Parameter: Condition of the internal floating roof tank Procedure: Inspections of: (a) the internal floating roof, primary rim seal and secondary rim seal for holes, tears or other openings; (b) the ability of the gaskets to close off the liquid surface; and (c) the open area in the slotted membrane. Frequency: The internal floating roof and secondary rim seal shall be inspected annually. The primary rim seal, gaskets, and slotted membranes shall be inspected whenever the tank is emptied for cleaning but at least once during the term of this permit	At the end of each day, the process operator shall record in a log the date and current gauge reading from the flow accumulator. Records indicating physical properties such as density, HAP partial pressures, and chemical composition of the material stored shall be kept and maintained. In addition, the process operator shall record in the log the date when inspections of the internal floating roof and rim seals were conducted and any findings observed during the inspection related to holes, tears or other openings in the internal floating roof, primary rim seal, secondary rim seal, gaskets, and slotted membranes. Records indicating repair of any holes, tears or other openings in the internal floating roof, primary rim seal, secondary rim seal, gaskets, and slotted membranes shall be kept and maintained.

Table B-1. Monitoring And Recordkeeping Requirements (continued)

Emission Unit	ID #	Monitoring Requirement	Recordkeeping Requirement
Condenser The following vent is routed to C-2: Steam Stripper Vent (Wastewater effluent is hard-piped to STST-1)	C-2 STST-1	Parameter: Wastewater feed flow rate Device: Rotameter with an accuracy of ± 3 percent interfaced to a Data Acquisition System Location: Influent pipe, four feet prior to entering the steam stripper Frequency: Continuous at a minimum rate of one reading per 15 min. Parameter: Steam flow rate Device: Orifice Pressure Gauge with an accuracy of ± 5 percent interfaced to a Data Acquisition System Location: Steam influent pipe, 22 feet prior to entering the steam stripper Frequency: Continuous at a minimum rate of one reading per 15 min. Parameter: Steam and wastewater feed temperature Device: Type J Thermocouple with an accuracy of ± 1 percent interfaced to a Data Acquisition System Frequency: Continuous at a minimum rate of one reading per 15 min. Parameter: Overhead condenser (C-2) outlet temperature Device: Type J thermocouple with an accuracy of ± 1 percent interfaced to a Data Acquisition System Frequency: Continuous at a minimum rate of one reading per 15 min.	At the end of each day, hourly-average values for the following parameters shall be obtained from the Data Acquisition System; a. Date; b. Steam-to-feed ratio; c. Number of hours the steam-to-feed ratio was maintained within each of the following three steam-to-feed ranges: ≥ 0.12, < 0.12 and ≥ 0.09; and < 0.09; d. Steam temperature; e. Wastewater feed temperature; and f. Temperature of the overheads condenser outlet. The hourly-average values of the above parameter shall be recorded in a log book.

EARLY REDUCTIONS SEMIANNUAL EMISSIONS REPORT FOR THE XYZ CHEMICAL COMPANY, RALEIGH, NC
AIR PERMIT NO.: _____

Date: _____

Semiannual Period: _____

Total Emissions For This Semiannual Period: _____

SEMIANNUAL PERIOD	HAP EMISSIONS (Mg)	WEIGHTED HAP EMISSIONS (Mg)
TOTAL		

AEL's: **22.52 Megagrams/calendar year of unweighted HAP's**
72.28 Megagrams/calendar year of weighted HAP's

Detailed Description Of Emissions For This Semiannual Period:

EMISSION UNIT ID #	HAP EMISSIONS (Mg)	WEIGHTED HAP EMISSIONS (Mg)
TO-1		
PV-2		
C-1		
S-1		
C-2		

6. Emission Calculation Procedures

The calculation procedures described below shall be used to quantify emissions from each emission unit. Total unweighted HAP emissions shall be computed by calculating the emissions from each emission unit as specified in this section and then summing the emissions from each emission unit.

Total weighted emissions for each emission unit shall be calculated by multiplying the calculated pollutant-specific emissions by the appropriate weighting factor for the pollutant and then summing all weighted emissions data. The following equation shall be used to calculate total weighted emissions:

$$WE = \sum_{i=1} (E_i F_i)$$

where,

- WE = total weighted emissions,
- E_i = total unweighted emissions of pollutant i from all emission units, and
- F_i = weighting factor for pollutant i (obtained from Table 1 in title 40, section 63.74 of the Code of Federal Regulations).

Data recorded during an emergency or malfunction (either of the process equipment, emission reduction equipment, or monitors) shall not be used in determining actual emissions. Actual emissions for such periods shall be calculated as if there were no emergency or malfunction (i.e., assuming the equipment had operated normally). However, periods of excess emissions, not due to an emergency or malfunction, must be calculated and reported as actual emissions.

The XYZ Company shall use the weighting factors listed in Table B-2 to compute weighted emissions:

Table B-2. HAP Weighting Factors

HAP	CAS #	M. W.	Weighting Factor
Benzene	71432	78	10
Ethylene Oxide	75218	44	10
p-Xylene	106423	106	1
Xylene	95476	106	1
Ethylbenzene	100414	106	1

Emission Calculation Procedures for TO-1

Semiannual HAP emissions from TO-1 shall be determined using the number of hours TO-1 was operated within each of four firebox temperature ranges listed below, along with temperature-dependent emission factors. Hourly-average firebox temperature shall be obtained from the Data Acquisition System interfaced to Type K thermocouple.

The following emission factors shall be used for emission calculations:

Firebox Temperature Range (°F)	Emission Factor (kg/hr)
Temp ≥ 1600	0.126
1600 > Temp ≥ 1400	0.314
1400 > Temp ≥ 1200	0.440
1200 > Temp (uncontrolled operation)	7.177

Semiannual HAP emissions from TO-1 shall be calculated by adding semiannual controlled and semiannual uncontrolled emissions. Semiannual controlled emissions shall be calculated by multiplying the number of hours TO-1 was operated within a given temperature range by the corresponding emission factor. Semiannual uncontrolled emissions shall be computed by multiplying the number of hours process gas was routed to an uncontrolled vent by the emission factor for uncontrolled operation.

Emission Calculation Procedures for PV-2

Semiannual HAP emissions from PV-2 shall be assumed to be 0.0575 Mg.

Emission Calculation Procedures for C-1

Semiannual HAP emissions from C-1 shall be determined by multiplying the quantity of p-xylene (kg) loaded during the semiannual period by loading emission factor presented below:

0.0043 kg of p-xylene emissions per 1000 kg of p-xylene loaded

Emission Calculation Procedures for S-1

Semiannual HAP emissions from emission unit S-1 shall be determined using the emission calculation procedures shown below. Individual transfers into tank S-1 during a semiannual period shall be summed to obtain the semiannual throughput. The semiannual throughput shall be used to compute semiannual emissions.

$$L_T = L_W + L_R + L_F + L_D$$

where,

L_T = total loss (Mg/semiannual period),
L_W = withdrawal loss (Mg/semiannual period),

$$L_W = \frac{0.943QCW_L}{2205D} \left[1 + \left(\frac{N\,C\,F\,C}{D}\right)\right] \frac{M_{vi}\,P_i}{M_v P}$$

$$L_R = 0.5\ K_R\ D\ P * M_{vi}\ K_C\ \frac{P_i}{2205\ P}$$

$$L_F = 0.5\ F_F\ P * M_{vi}\ K_C\ \frac{P_i}{2205\ P}$$

$$L_D = 0.5\ S_D\ K_D\ D^2\ P * M_{vi}\ K_C\ \frac{P_i}{2205\ P}$$

L_R = rim seal loss (Mg/semiannual period),
L_F = fitting loss (Mg/semiannual period),
L_D = deck seam loss (Mg/semiannual period),
D = tank diameter (ft),
Q = product average throughput (bbl/semiannual period),
C = product withdrawal shell clingage factor ($bbl/10^3\ ft^2$),
W_L = density of the product (lb/gal),
N_C = number of columns (dimensionless),
F_C = effective column diameter (ft),
K_R = rim seal loss factor (lb mole/ft yr),

P^* = the vapor pressure function (dimensionless)
= $(P/P_A) / ((1 + (1 - P/P_A)^{0.5})^2)$,
P = true vapor pressure of the material stored (psia),
P_i = partial pressure of the specific HAP (psia),
P_A = atmospheric pressure (psia),
M_{vi} = average molecular weight of the stored material vapor (lb/lb-mole),
K_C = product factor = 1.0 for volatile organic HAP's,
S_D = deck seam length factor (ft/ft^2),
K_D = deck seam loss factor, and
F_F = the total deck fitting loss factor (lb mole/yr) =,

$$\sum_{i\,1}^{n} (N_{Fi} K_{Fi})$$

where,
N_{Fi} = number of fittings of a particular type (dimensionless),
K_{Fi} = deck fitting loss factor for a particular type fitting (lb mole/yr), and
n = number of different types of fittings (dimensionless).

The equations presented above shall be used to establish emissions from freely vented internal floating roof tanks in conjunction with the following tank design information presented in Table B-3 below, unless otherwise approved by the permitting authority:

Table B-3. Tank Design Data

Tank Parameter	S-1
Tank Internal Diameter (D, ft)	100
Rim Seal Type	Liquid mounted primary seal plus secondary seal
Number of Columns (N_C)	7
Effective column diameter (Fc, ft)	1
Tank Capacity (gal)	2,820,000
Diurnal Temperature Change (°F)	9.5
Rim seal loss factor (K_R, lb mole/ft yr)	1.6[1,2]
Product Factor (K_C)	1

Table B-3. Tank Design Data (continued)

Tank Parameter	S-1
Shell Clingage Factor (C, bbl/1000 ft)	0.0015
Deck Fitting Loss Factor (F_F)	600
Deck Seam Loss Factor (K_D, lb-mole/ft yr)	0.34
Deck Seam Length Factor (F_D)	0.2

1 When annual visual inspections of the secondary rim seal reveal gaps between the rim seal and the tank wall, it shall be assumed that the internal floating roof is equipped with only a primary, liquid-mounted rim seal. The rim seal loss factor shall then be taken as 3.0. This factor shall be used to calculate emissions for the semiannual period in which a defect in the secondary seal is detected and for subsequent semiannual periods until the defect is fixed.

2 When visual inspections of the primary rim seal, gaskets, and slotted membranes reveal gaps between the rim seal and the tank wall or inability of gaskets to close off liquid surface or greater than 10 percent open area in slotted membranes, it shall be assumed that the internal floating roof is equipped with only a primary, vapor-mounted rim seal. The rim seal loss factor shall be taken as 6.7. This factor shall be used to calculate emissions for the semiannual period in which a defect in the primary seal or gaskets or slotted membranes is detected and for subsequent semiannual periods until the defect is fixed.

The vapor pressure, P, of the material stored in tank S-1 shall be obtained from recordkeeping requirement.

Emissions Calculation Procedures for C-2

Semiannual HAP emissions from C-2 shall be determined using the number of hours STST-1 steam stripper was operated within each of the three steam-to-feed ratio ranges shown below along with steam-to-feed ratio dependent emission factors.

The following emission factors shall be used in emission calculations:

Steam-to-Feed Ratio (kg/kg)	Methanol Emission Factor
steam-to-feed ratio ≥ 0.12	1.24 kg/hr
0.12 > steam-to-feed ratio ≥ 0.09	1.36 kg/hr
0.09 > steam-to-feed ratio (uncontrolled operation)	12.4 kg/hr

Steam-to-Feed Ratio (kg/kg)	Methyl Chloride Emission Factor
steam-to-feed ratio ≥ 0.12	0.03 kg/hr
0.12 > steam-to-feed ratio ≥ 0.09	0.04 kg/hr
0.09 > steam-to-feed ratio (uncontrolled operation)	4.5 kg/hr

The hourly wastewater feed mass flow rate shall be determined by dividing the hourly volumetric flow data obtained from the rotameter by the density of wastewater (8.34 lb/gal). The hourly steam mass flow rate shall be determined using hourly volumetric flow rate obtained from the orifice pressure gauge, the hourly steam temperature, and steam tables such as those found in the Chemical Engineers' Handbook published by McGraw-Hill. The hourly steam-to-feed ratio is the ratio of hourly steam mass flow rate to hourly wastewater feed mass flow rate. Semiannual HAP emissions from C-2 shall be calculated by multiplying the number of hours STST-1 was operated within a given steam-to-feed ratio range by the corresponding emission factor.

The steam stripper shall be considered to be at the uncontrolled condition when the average hourly steam-to-feed ratio is lower than 0.09 kg/kg, or the average daily wastewater feed temperature is lower than 35°C, or the average daily temperature of the overheads condenser outlet is higher than 50°C.

7. Compliance Certification

The permittee shall certify annually that the Early Reductions Source has complied with the requirements of this permit. The certification shall describe the following:

a. the permit terms or conditions that constitute the basis of the certification; and

b. the compliance status for the preceding calendar year, including whether compliance was continuous or intermittent (except for the AELs').

The compliance certification shall be signed by a responsible official as defined by title 40, section 71.22 of the Code of Federal Regulations. The compliance certification shall be submitted to the permitting authority.

8. Alternative Operating Scenarios

Since The XYZ Company has not identified any alternative operating scenarios, any changes to the methods of operation identified in this permit will require a permit revision (see section C.17).

9. Permit Shield

Compliance with the terms and conditions of this permit shall be deemed compliance with title 40, part 63, subpart D of the Code of Federal Regulations, the Early Reductions Rule. In addition:

a. Nothing in this permit shall alter or affect: (i) the liability of the Early Reductions Source for any violation of applicable requirements, prior to or at the time of permit issuance; (ii) applicable acid rain requirements; (iii) the ability of the EPA to obtain information under section 114; (iv) provisions of sections 112(r) and 303 of the Clean Air Act (emergency orders); or (v) provisions of title 40, section 63.1(a)(3) of the Code of Federal Regulations.

b. Issuance of this permit does not relieve the Early Reductions Source from an obligation to file a timely and complete permit application for a comprehensive title V permit as required under an approved title V permit program. Such an application shall reference this permit, and this permit subsequently will be incorporated into a comprehensive title V permit issued to The XYZ Company.

c. In accordance with title 40, section 71.25(d)(2) of the Code of Federal Regulations, the permit shield is extended to all permit terms and conditions for alternate operating scenarios or those that allow increases and decreases in hazardous air pollutant emissions pursuant to emissions trading provisions.

SECTION C: GENERAL CONDITIONS

1. Annual Fee Payment

The permittee is not required to pay a fee for this specialty permit issued under the authority of title 40, part 71 of the Code of Federal Regulations. However, a State may establish a permit fee under title 40, part 70 of the Code of Federal Regulations, once the State receives approval of their title V permit program as authorized by the Clean Air Act Amendments of 1990.

2. Permit Renewal and Expiration

a. This permit is issued for a term of five years and shall expire on (date: five years after permit issuance), except as provided in paragraph "b" below. However, the compliance extension and AEL's in this permit have been granted to extend beyond this five-year term, to April 22, 2003. Therefore, upon or before expiration, the terms and conditions of this permit shall be renewed through incorporation into a comprehensive permit issued to the facility containing the Early Reductions Source by a State/local program approved under title V of the Clean Air Act or a Federal program under title 40, part 71, subpart B of the Code of Federal Regulations. Once this specialty permit has been incorporated into the facility's comprehensive title V permit, the appropriate State/local agency will be designated as the permitting authority.

b. In the event that a timely and complete application for a comprehensive title V permit has been submitted but the permitting authority has failed to issue or deny the comprehensive permit prior to expiration of this permit, this permit shall not expire until the comprehensive permit for the facility containing the Early Reductions Source has been issued or denied.

3. Transfer of Ownership or Operation

Title 40, section 71.26(c)(1)(iv) of the Code of Federal Regulations specifies that a change in ownership or operational control of this Early Reductions Source shall be treated as an administrative permit amendment provided that no other change in the permit is required and a written agreement has been submitted to the permitting authority identifying the specific date for transfer of permit responsibility, coverage, and liability between the current and new permittee. If these stipulations are

not met, the new owner or operator shall obtain a new permit from the permitting authority.

4. Property Rights

This permit does not convey any property rights of any sort, or any exclusive privilege.

5. Operation and Maintenance Requirements

a. General Requirements

(i) The operation and maintenance requirements in this section are enforceable, independent from the other terms and conditions of this permit, including the alternative emissions limitations.

(ii) At all times, including periods of startup, shutdown, and malfunction, the permittee shall operate and maintain the Early Reductions Source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with good air pollution control practices for minimizing emissions.

(iii) After a startup, shutdown, and malfunction plan is developed and implemented as described in paragraph "b" below, the permittee shall operate and maintain the Early Reductions Source (including associated air pollution control equipment and monitoring equipment) during periods of startup, shutdown, and malfunction in accordance with the procedures specified in such plan.

(iv) Before and after a plan is in place, the permittee shall ensure that any malfunction that occurs is repaired as soon as practicable after its occurrence. To ensure immediate repair or parts replacement for routine monitoring equipment malfunctions identified by the plan, the permittee shall keep the spare parts necessary for routine repairs of the affected equipment readily available at the Early Reductions Source.

(v) The permitting authority will determine whether the operation and maintenance procedures being used by the Early Reductions

Source are acceptable based on information available to the permitting authority. This information may include, but is not limited to, monitoring results, review of operation and maintenance procedures (including procedures specified in the startup, shutdown, and malfunction plan), review of operation and maintenance records, and inspection of the Early Reductions Source.

b. Startup, Shutdown, and Malfunction Plan

The permittee shall develop and implement, no later than one year after permit issuance, a written startup, shutdown, and malfunction plan (plan) that describes in detail procedures for operating and maintaining the Early Reductions Source during periods of startup, shutdown, and malfunction (an event), and a program of action for correcting the malfunctioning processes, air pollution control equipment and monitoring equipment covered by this permit. The plan shall also identify all routine or otherwise predictable malfunctions of air pollution control equipment and monitoring equipment required by this permit. For the identified malfunctions, the plan shall specify procedures for repairing control equipment malfunctions as soon as possible and for repairing or replacing malfunctioning monitoring equipment immediately.

In developing a startup, shutdown, and malfunction plan, the permittee may use the Early Reduction Source's standard operating procedures manual, or an Occupational Safety and Health Administration or other plan meeting all the requirements for a startup, shutdown, and malfunction plan specified by this permit. The permittee shall comply with the plan at all times during Early Reductions Source operation.

c. Startup, Shutdown, and Malfunction Recordkeeping and Reporting Requirements

(i) Recordkeeping Requirements

When actions taken by the permittee during a startup, shutdown, or malfunction (including actions to correct a malfunction) are consistent with the procedures specified in the affected Early Reductions Source's startup, shutdown, and malfunction plan, the permittee shall keep records for that event demonstrating that the procedures specified in the plan were followed. These records may

take the form of a "checklist," or other effective form of recordkeeping, which confirms that the procedures and other specifications of the startup, shutdown, and malfunction plan were followed during that event. In addition, the permittee shall keep records of the occurrence and duration of each startup, shutdown, or malfunction of operation and each malfunction of air pollution control equipment or monitoring equipment.

If an action taken by the permittee during a startup, shutdown, or malfunction (including an action taken to correct a malfunction) is not consistent with the procedures specified in the Early Reduction Source's startup, shutdown, and malfunction plan, the permittee shall record the actions taken for that event.

The permittee shall keep the written startup, shutdown, and malfunction plan on record after it is developed, to be made available for inspection, upon request, by the permitting authority for the life of the Early Reductions Source or until the Early Reductions Source is no longer subject to any provisions of title 40, part 63 of the Code of Federal Regulations. In addition, if the startup, shutdown, and malfunction plan is revised, the permittee shall keep previous (i.e. superseded) versions of the startup, shutdown, and malfunction plan on record, to be made available for inspection, upon request by the permitting authority, for a period of 5 years after each revision of the plan.

(ii) Reporting Requirements

When the permittee takes actions during an event that are consistent with the plan, the permittee shall confirm in the next semiannual emission report that actions taken during the relevant reporting period during periods of startup, shutdown, and malfunction, were consistent with the Early Reduction Source's startup, shutdown and malfunction plan.

When the permittee takes actions (or fails to take actions) during an event, and such actions (or inactions) affect a significant emission unit, as identified in section B.3 of this permit, (or the control equipment or monitoring equipment for such unit) and are inconsistent with the terms of the plan, the permittee shall report the actions taken for that event by a telephone call (or facsimile [FAX] transmission) made to the permitting authority within 2 working days after commencing actions inconsistent with the plan followed by a letter within 30 days after the end of the event. This report shall fully describe the event and all remedial actions taken during the event's duration. Additionally, when malfunctioning monitoring equipment is involved in an event, such report shall either certify that the malfunctioning monitoring equipment has been repaired, or shall include a plan of action for repairing such equipment as soon as possible.

d. Revision of the Startup, Shutdown, and Malfunction Plan

The EPA may require reasonable revisions to a plan if it finds that the plan:

(i) Does not address a startup, shutdown, or malfunction event that has occurred;

(ii) Fails to provide for the operation of the Early Reductions Source (including associated air pollution control equipment and monitoring equipment) during a startup, shutdown, or malfunction event in a manner consistent with good air pollution control practices for minimizing emissions at least to the levels required for compliance with the AEL's and other terms of this permit; or

(iii) Does not provide adequate procedures for correcting malfunctioning process and/or air pollution control equipment as quickly as practicable.

The permittee shall also revise the plan within 45 days after the occurrence of an event that meets the characteristics of a malfunction but was not addressed or was inadequately addressed in the startup, shutdown, and malfunction plan at the time the plan was

developed. The revisions made shall include detailed procedures for operating and maintaining the Early Reductions Source during similar malfunction events and a program of corrective action for similar malfunctions of process, air pollution control, or monitoring equipment.

6. General Provisions Requirements

In addition to complying with the terms and conditions of this permit, the Early Reductions Source shall also comply with the provisions of the General Provisions, title 40, part 63, subpart A of the Code of Federal Regulations shown on Table C-1. These sections shall apply to the Early Reductions Source as if they were expressly stated in this permit. Other sections of the General Provisions not listed in the table or not specifically incorporated within this permit do not apply to the Early Reductions Source.

Table C-1. General Provisions Requirements Incorporated By Reference

Title 40, part 63, subpart A CFR Citation	Subject
63.2	Definitions
63.3	Units and Abbreviations
63.4(b)	Circumvention
63.12	State authority and delegations
63.13	Addresses of State Air Pollution Control Agencies and EPA Regional Offices to which information submittals are required
63.15	Availability of information and confidentiality

7. Submissions

a. Reports, test data, monitoring data, notifications and applications shall be submitted to the following agency:

Early Reductions Officer
EPA Region IV
345 Courtland Street, N.E.
Atlanta, GA 30365

b. Any document submitted shall be certified as being true, accurate and complete by a responsible corporate official as defined by title 40, section 71.22 of the Code of Federal Regulations. The certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

8. Inspection and Entry

Upon presentation of credentials and other documents as may be required by law, the permittee shall allow authorized representatives of the permitting authority to perform the following:

a. enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the permit,

b. have access to and copy, at reasonable times, any records that must be kept under conditions of the permit,

c. inspect, at reasonable times, facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under the permit, and

d. sample or monitor, at reasonable times, substances or parameters for the purpose of determining compliance with this permit.

9. Compliance

The permittee must comply with all of the conditions of this permit. A violation of an alternative emission limitation, as well as any other requirement established in this permit, is subject to an enforcement order issued under section 113 of the Clean Air Act. Any permit noncompliance constitutes a violation of the Clean Air Act and is grounds for enforcement action or for permit termination, revocation and reissuance, or revision.

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

10. Duty to Provide Information

The permittee shall furnish to the permitting authority, within a reasonable time, any information that the permitting authority may request in writing to determine whether cause exists for revising, revoking and reissuing, or terminating the permit, or to determine compliance with the permit. Upon request, the permittee shall also furnish to the permitting authority copies of records that the permittee is required to keep under the permit, or for information claimed to be confidential, the permittee may furnish such records directly to the permitting authority along with a claim of confidentiality.

11. Duty to Supplement or Correct

The permittee, upon becoming aware that any relevant facts were omitted or incorrect information was submitted in the permit application or other information submitted in support of the application, shall promptly submit such supplementary facts or corrected information.

12. Excess Emissions Due to an Emergency

Until such time as the permittee's startup, shutdown, and malfunction Plan (required under section C.6 of this permit) is in effect, the permittee may seek to establish that noncompliance with the AEL's under this permit was due to an emergency.[2] To do so, the permittee shall demonstrate the affirmative defense of emergency through properly signed, contemporaneous operating logs, or other relevant evidence that:

a. an emergency occurred and that the permittee can identify the cause(s) of the emergency,

b. the permitted facility was being properly operated at the time of emergency,

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2. An "emergency" means any situation arising from sudden and reasonably unforeseeable events beyond the control of this Early Reductions Source, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes this Early Reductions Source to exceed an AEL under this permit, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventative maintenance, careless or improper operation, or operator error.

c. during the period of the emergency, the permittee took all reasonable steps to minimize levels of emissions that exceeded an AEL or could cause exceedance of an AEL later in the calendar year, and

d. the permittee submitted notice of the emergency to the permitting authority within 2 working days of the time when AEL's were exceeded due to the emergency or within 30 days of the beginning of the emergency for cases where emissions from the emergency do not immediately violate the AEL's but would (or may) be responsible for its violation later in the calendar year. This notice must contain a description of the emergency, any steps to mitigate emissions, and corrective actions taken.

13. Reopening for Cause

The permitting authority will reopen and revise this permit as necessary to remedy deficiencies in the following circumstances:

a. The permitting authority determines that this permit contains a material mistake or inaccurate statements were made in establishing the AEL's or other terms or conditions of this permit.

b. The permitting authority determines that the permit must be revised or revoked to assure compliance with the applicable requirements.

Reopenings shall not be initiated before a notice of intent to reopen is provided to the permittee by the permitting authority at least 30 days in advance of the date that this permit is to be reopened, except that the permitting authority may provide a shorter time period in the case of an emergency.

Proceedings to reopen and modify or issue this permit shall follow the same procedures that apply to initial permit issuance and shall affect only those parts of this permit for which cause to reopen exist. Such reopening shall be made as expeditiously as practicable.

All permit conditions remain in effect until such time as the permitting authority takes final action. The filing of a request by the permittee for a permit revision, revocation and reissuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

14. Severability Clause

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this

permit to any circumstance, is held invalid, the application of such provision to other circumstances and the remainder of this permit, shall not be affected thereby.

15. Emission Reductions from Equipment Shutdown or Reduced Operation

If emission reductions are achieved by shutting down process equipment and the shutdown equipment is restarted or replaced anywhere within the facility containing the Early Reductions Source, any hazardous air pollutant emissions from the restarted or replacement equipment shall be counted in the post-reduction emissions from the Early Reductions Source.

If lower rates or hours are used to achieve all or part of the emission reduction, any hazardous air pollutant emissions that occur from a compensating increase in rates or hours from the same activity elsewhere within the plant site which contains the Early Reductions Source shall be counted in the post-reduction emissions from the Early Reductions Source.

16. Permit Deviations

All instances of deviation from permit requirements shall be reported. Any instance of deviation involving a significant emission unit, as identified in section B.3 of this permit, shall be reported within 30 days of each deviation. Any instance of deviation involving all other emission units shall be reported along with the applicable semiannual report. Deviation reports shall include the probable cause of deviation and any corrective actions or preventive measures taken.

17. Permit Revisions

After issuance of this permit, permit revision will not be required for physical changes at the Early Reductions Source that do not violate the AEL's and do not violate or alter the monitoring, recordkeeping, emission calculation, or reporting requirements stated in section B of this permit. Any other planned changes to emission units or associated equipment within the Early Reductions Source that are not accommodated by the terms and conditions of this permit or any planned changes to the terms and conditions of this permit cannot be implemented until the permittee complies with the permit revision/administrative amendment procedures of the Permits for Early Reductions Sources Rule, i.e., title 40, part 71, subpart B of the Code of Federal Regulations (or after this specialty permit is incorporated into a comprehensive title V permit for the facility containing the Early Reductions Source, the applicable permit revision procedures governing such a comprehensive title V permit). Changes subject to this requirement include:

a. process or operational changes to emission units or associated air pollution control equipment or monitoring equipment;

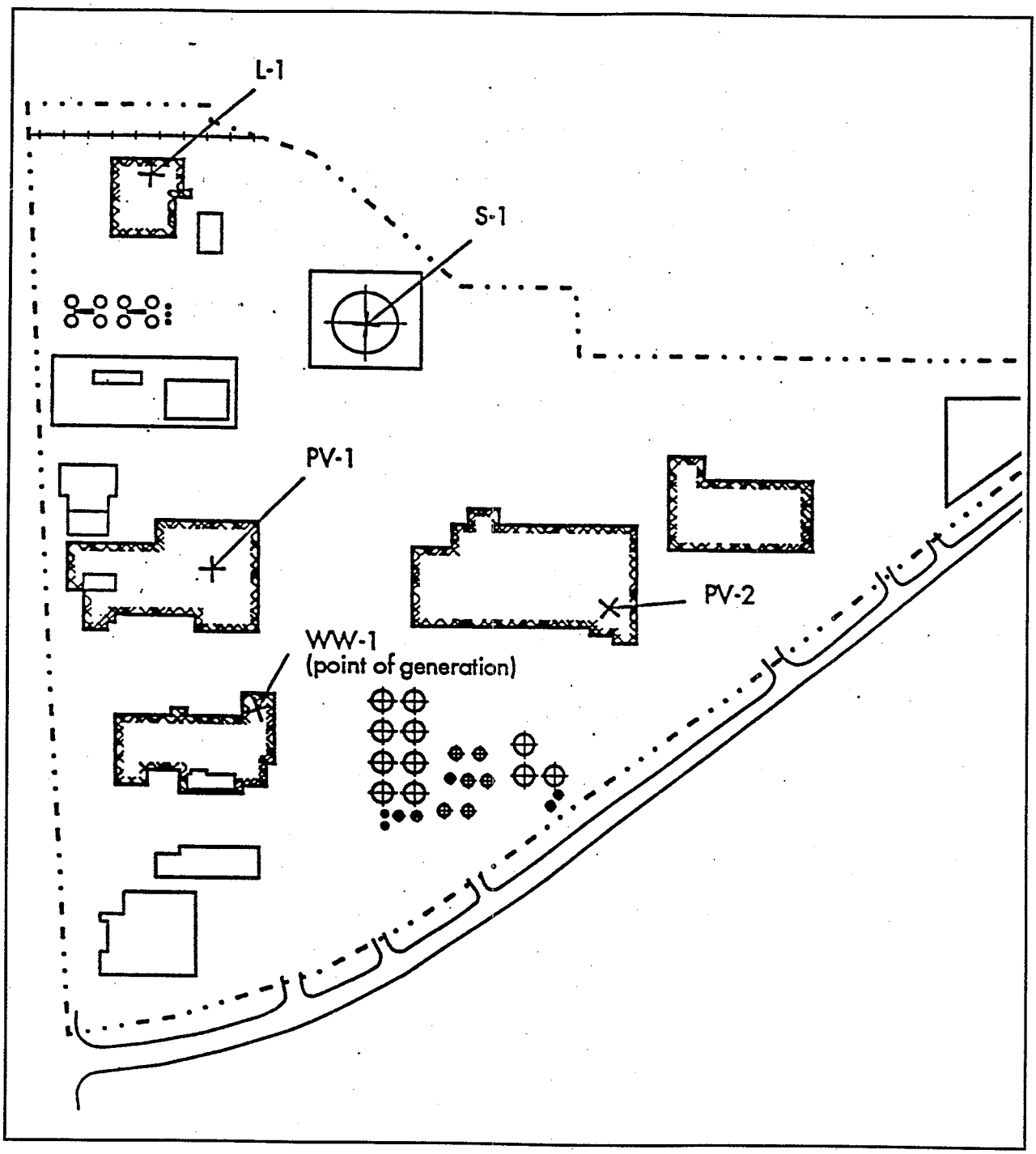
b. physical changes or additions to emission units or air pollution control equipment or monitoring equipment; and

c. changes to any permit term or condition.

SITE PLAN

THE XYZ COMPANY

RALEIGH, NC



XYZ Chemical Company Site Plan - Emission Points Defined as Source A

APPENDIX H

Example Emissions Reduction Demonstration

February 1, 1995

Director
Air, Pesticides, and Toxics Management Division
EPA Region IV
345 Courtland Street, N.E.
Atlanta, GA 30365

Re: Post-Reduction Emissions Demonstration
XYZ Chemical Company

Dear Sir/Madam:

In accordance with title 40 part 71 of the Code of Federal Regulations, we are submitting the post-reduction demonstration for our Early Reduction's source. Our source, identified as "Source A," includes a group of emission points located within XYZ's synthetic organic chemical manufacturing facility in Raleigh, North Carolina. The enclosed post-reduction emissions demonstration, Section 4.3, is the final component of the Title V Specialty Permit application, which was originally submitted on April 1, 1994. This post-reduction emissions demonstration will show that Source A has met the terms of XYZ Chemical Company's enforceable commitment.

As indicated in our permit application, the alternative emission limitation (AEL) requested for Source A is:

	Total HAP Limit	Weighted HAP Limit
AEL for Source A	22.52 Mg/yr	72.28 Mg/yr

With this submittal, the XYZ Chemical Company demonstrates that emissions during the first year of the post-reduction period (calendar year 1994) were less than or equal to the AEL. The 1994 annual emissions are presented below:

	Total HAP Emissions	Weighted HAP Emissions
Post-Reduction Emissions from Source A	18.73 Mg/yr	63.82 Mg/yr

These post-reduction emissions represent greater than a 90 percent reduction from base year emissions as required to qualify for a compliance extension.

I hereby certify the following statements:

- Information provided in this submittal represents the best available emissions data for Source A;
- Emissions data are based on information gathered and the belief formed after a reasonable inquiry; and
- Statements and information in this post-reduction documentation are true, accurate, and complete.

If you have any technical questions regarding the content of this submittal, please contact Mr. Joe Smith (Environmental Affairs Manager) at (919) 555-0000.

Sincerely,

George S. Jones
Plant Manager

Enclosure

cc: (appropriate) State Regulatory Agency
U.S. EPA Emission Standards Division
U.S. EPA Office of Enforcement

4.3 POST-REDUCTION DEMONSTRATION

This section documents the actual emissions from Source A during the 1994 calendar year. Since Source A made an enforceable commitment, the post-reduction year is January 1, 1994 through December 31, 1994. A brief description of the procedures used to determine emissions from each emission unit is provided in this section. The monitoring, recordkeeping, and emission calculation procedures proposed in Section 3 of our permit application (April 1, 1994) were used to determine emissions. The table presented below provides a summary of the 1994 annual emissions for each emission unit.

DESCRIPTION	EMISSION UNIT ID #	HAP EMISSIONS (Mg)	WEIGHTED HAP EMISSIONS (Mg)
Air Oxidation Unit 1 - process vent	PV-1	4.78	47.8
EO-1 Carbon Dioxide Vent - process vent	PV-2	0.23	2.3
PX Loading/Paraxylene Rail Car Loading	L-1	0.334	0.334
Xylene/Ethylbenzene - storage tank	S-1	0.337	0.337
Waste Acid from the Methyl Chloride Drying Tower - wastewater effluent	WW-1	13.05	13.05
	TOTAL	18.73	63.82
	AEL	22.52	72.28

EMISSION UNIT ID: PV-1

POST-REDUCTION EMISSION DEMONSTRATION

Emission Unit Description:	**Air Oxidation Unit 1**
Emission Reduction Measure ID:	**TO-1**
Emission Reduction Measure Description:	**Thermal Oxidizer**

Emissions from PV-1 were established based on the short-term test results and control device parameters monitored in 1994. A summary of these results is presented in Section 4.2 of this permit application. Test results were used to correlate the firebox temperature of TO-1 with benzene emissions, which is the only HAP emitted from PV-1. Emission factors were developed for four firebox temperature ranges at maximum gas flow from PV-1 to TO-1. The firebox temperature was monitored using a thermocouple interfaced to a Honeywell Data Acquisition System. At the end of each work day, the process operator recorded the date, hours TO-1 operated in each temperature range, hours gas flowed from PV-1 to TO-1, and the hours of gas flow during periods when TO-1 was not in operation. A copy of a daily log sheet for PV-1 is attached to this post-reduction demonstration.

The first step in computing daily HAP emissions was to multiply the number of hours gas flowed to TO-1 within each temperature range by the corresponding emission factor. To determine the daily total, the daily emissions corresponding to each temperature range were summed. The annual emissions were calculated by multiplying the number of total number of hours that gas flowed to TO-1 within each temperature range by the emission factor for the corresponding firebox temperature. The table below presents the annual emissions calculations. A summary of the annual emissions is presented on the following page. Note that the total operating hours is less than 8,760. The difference is accounted for in scheduled and unscheduled maintenance shut-downs and holidays.

Temperature (°F)	Emission Factor (kg/hr)		Hours (hrs)		Annual Emissions (Mg)
Temp ≥ 1600	0.126	x	3,872	=	0.488
1600 > Temp ≥ 1400	0.314	x	2,593	=	0.814
1400 > Temp ≥ 1200	0.440	x	1,170	=	0.515
1200 > Temp	7.177	x	412	=	2.96
	Total:		8,047		4.78

PV-1 ANNUAL EMISSIONS	
HAP Emissions (Mg of benzene)	Weighted HAP Emissions (Mg of benzene)
4.78	47.8

EMISSION UNIT ID: PV-2

POST-REDUCTION EMISSION DEMONSTRATION

Emission Unit Description:	**EO-1 Carbon Dioxide Vent**
Emission Reduction Measure ID:	**None**
Emission Reduction Measure Description:	**None**

Annual emissions from PV-2 are assumed to be 0.23 Mg. This value represents the maximum emissions from this vent. The emission factor (i.e. 0.0265 kg/hr) used for the base year estimate, was multiplied by the maximum number of hours of operation (i.e. 8,760 hrs). The emission factor was developed based on the maximum production rate and as demonstrated in the base year emission estimate, emissions from PV-2 are directly proportional to the production rate.

PV-2 ANNUAL EMISSIONS	
HAP Emissions (Mg of ethylene oxide)	Weighted HAP Emissions (Mg of ethylene oxide)
0.23	2.3

EMISSION UNIT ID: L-1

POST-REDUCTION EMISSION DEMONSTRATION

Emission Unit Description:	**PX Loading/p-xylene, Rail Car Loading**
Emission Reduction Measure ID:	**C-1**
Emission Reduction Measure Description:	**Refrigerated Condenser**

Post-reduction emissions were determined based on short-term test results. A summary of the test results is presented in Section 4.2 of this permit application. The test results were used to correlate the condenser exit temperature to HAP emissions, which yielded a controlled emission factor based on the quantity of p-xylene loaded. The refrigerated condenser is equipped with an interlock process control system that prevents rail car loading when the condenser exit temperature exceeds 32°F. Therefore, emissions are zero when the condenser exit temperature exceeds 32°F. As discussed in Section 3.3, the quantity of p-xylene loaded and the condenser exit stream temperature were monitored, and records were kept of the date of any loading operations and the total quantity of p-xylene loaded on that day. A copy of a daily log sheet for L-1 is attached to this post-reduction demonstration. Daily HAP emissions were determined by multiplying the quantity of p-xylene loaded by the controlled emission factor. Calendar year 1994 HAP emissions were determined by summing the daily quantities of p-xylene loaded and multiplying this sum by the emission factor. The emission calculations for L-1 is presented below and a summary of the annual emissions is presented on the following page.

L-1 Annual HAP Emissions = (Kilograms of p-xylene loaded in 1994) x (emission factor)

L-1 Annual HAP Emissions = (7.77×10^7 kg loaded) x (0.0043 kg emissions/1,000 kg loaded)

L-1 ANNUAL EMISSIONS	
HAP Emissions (Mg of p-xylene)	Weighted HAP Emissions (Mg of p-xylene)
0.334	0.334

EMISSION UNIT ID: S-1

POST-REDUCTION EMISSION DEMONSTRATION

Emission Unit Description:	**Xylene/Ethylbenzene Storage Tank**
Emission Reduction Measure ID:	**None**
Emission Reduction Measure Description:	**Internal floating roof with primary and secondary seals**

Post-reduction emissions are based on the tank throughput and procedures provided in AP-42, as modified for the Early Reductions Program in "Procedures for Establishing Emissions for Early Reduction Compliance Extensions" (No. EPA-450/3-91-012a). The volume transferred to the tank and the condition of the tank and seals were monitored as discussed in Section 3.3 of this permit application. After each transfer, the operator logged the date and gauge reading from the flow accumulator. The date of tank and seal inspections was recorded including any observed problems. A copy of a daily log sheet for S-1 is attached to this post-reduction demonstration. Physical properties such as vapor pressure, chemical composition, and liquid density used in emission calculations are the same as those used in the base year calculations. The calculation of xylene emissions from S-1 is shown on the following page. Ethylbenzene emissions, which were the only other HAP emissions from S-1, were calculated using the same procedures and inputs except for vapor pressures. Ethylbenzene emissions and total annual emissions are provided following the xylene calculations.

DETAILED EMISSION CALCULATIONS

Procedures

Internal floating roof tank emission calculations given in EPA-450/3-91-012a

Parameters

Throughput (Q):	2,100,420 bbls
Tank diameter (D):	100 ft
Shell clingage factor (C):	0.0015
Density of stored material (W_l):	7.00 lb/gal
Number of columns (N_c):	7
Effective column diameter (F_c):	1 ft
Molecular weight of component i (M_{vi}):	106 lb/lb-mole xylene 106 lb/lb-mole ethylbenzene
Molecular weight of material (M_v):	106 lb/lb-mole
Partial pressure of components i (Pi):	0.0330 psia, xylene 0.131 psia, ethylbenzene
Vapor pressure of material (P):	0.164 psia
Vapor pressure function (P*):	0.00282
Atmospheric pressure (P_a):	14.6 psia
Rim seal loss factor (K_r):	1.6
Deck fitting loss factor (F_f):	819.5
Deck seam loss factor (K_d):	0.34
Deck seam length factor (F_d):	0.2
Product factor (K_c):	1

Calculations (Xylene)

$$L_t = L_w + L_r + L_f + L_d$$

$$L_w = \frac{0.943\ Q\ C\ W_l}{2205\ D}\ [1 + (\frac{N_c\ F_c}{D})]\ \frac{M_{vi}\ P_i}{M_v\ P}$$

$$L_w = \frac{0.943(2,100,420)(0.0015)(7.00)}{2205(100)}\ [1+\frac{(7)(1)}{(100)}]\ \frac{((106)(0.033))}{((106)(0.164))}$$

$$L_w = 0\ 0203\ Mg$$

$$L_r = 0.25\ K_r\ D\ P^*\ M_{vi}\ K_c\ \frac{P_i}{2205\ P}$$

$$L_r = (0.25)\ (1.6)\ (100)\ (0.00282)\ (106)\ (1)\ \frac{(0.033)}{2205(0.164)}$$

$$L_r = 0.00437\ Mg$$

$$L_f = F_f\ D\ P^*\ M_{vi}\ K_c\ \frac{P_i}{2205\ P}$$

$$L_f = (819.5)\ (100)\ (0.00282)\ (106)\ (1)\ \frac{(0.033)}{2205(0.164)}$$

$$L_f = 0.0224\ Mg$$

$$L_d = K_d\ F_d\ D\ P^*\ M_{vi}\ K_c\ \frac{P_i}{2205\ P}$$

$$L_d = (0.340)\ (0.2)\ (100)\ (0.00282)\ (106)\ (1)\ \frac{(0.033)}{2205(0.164)}$$

$$L_d = 0.0186\ Mg$$

$$L_t = (0.0203 + 0.00437 + 0.0224 + 0.0186)\ Mg$$

L_t = 0.0657 Mg of xylene

ETHYLBENZENE EMISSIONS

L_t = (0.0807 + 0.0174 + 0.0889 + 0.0737) Mg

L_t = 0.261 Mg of ethylbenzene

S-1 ANNUAL EMISSIONS		
HAP	HAP Emissions (Mg)	Weighted HAP Emissions (Mg)
Xylene	0.0744	0.0744
Ethylbenzene	0.263	0.263
Total	0.337	0.337

EMISSION UNIT ID: WW-1

POST-REDUCTION EMISSION DEMONSTRATION

Emission Unit Description:	**Waste acid from the methyl chloride drying tower**
Emission Reduction Measure ID:	**STST-1**
Emission Reduction Measure Description:	**Steam Stripper**

Post-reduction emissions were determined based on process parameters and short-term performance testing, which are summarized in Section 4.2 of this permit application. Results from testing were used to correlate the steam-to-feed ratio to methanol and methyl chloride emissions. Based on the tests, three emission factors were developed for each HAP representing three ranges of steam-to-feed ratio. Concentration measurements were conducted at minimum wastewater temperatures and steam-to-feed ratios to avoid underestimating emissions, and thereby address possible loading variations throughout the year.

The wastewater flow rate, steam flow rate and temperature, wastewater temperature at the inlet to STST-1, and the condenser outlet temperature of STST-1 were monitored as proposed in Section 3.3 of this permit application. The equipment monitoring these parameters is interfaced with a data acquisition system (DAS). At the end of each work day, the process operator determined and recorded hourly-averages of i) the steam-to-feed ratio, ii) time of operation within each of the three steam-to-feed ranges, iii) steam inlet temperature, iv) the wastewater feed temperature, and v) the condenser outlet temperature. Included in this post-reduction demonstration is a copy of a daily log sheet for WW-1 showing the hourly-averages of these parameters.

The hourly steam-to-feed ratio was determined by dividing the hourly steam mass flow rate by the hourly wastewater feed mass flow rate. The hourly steam mass flow rate was determined using the hourly volumetric rate obtained from the orifice pressure gauge, the hourly steam feed temperature, and steam tables available in Reference 1. The hourly wastewater feed mass flow rate was determined by dividing the hourly volumetric flow by the density of wastewater (8.34 lb/gal).

Daily emissions were determined by determining the number of hours STST-1 was operated during that day within each of the three steam-to-feed ratio ranges and multiplying those hours by the corresponding emission factors. Annual emissions for the 1994 calendar year are shown on the following page. These emissions were determined using the same procedure for calculating daily emissions, except the total number of hours of operation for 1994 was used instead of the hours of operation in one day.

EMISSION UNIT ID: WW-1 (continued)

Methanol Emissions

Steam-to-feed ratio (kg/kg)	Emission Factor (kg/hr)		Annual Hours (hrs)		Emissions (Mg)
Ratio ≥ 0.12	1.24	x	6,345	=	7.87
0.12 > Ratio ≥ 0.09	1.36	x	2,312	=	3.14
0.09 > Ratio	12.4	x	103	=	1.28
	Total:		8,760		12.3

Methyl Chloride Emissions

Steam-to feed ratio (kg/kg)	Emission Factor (kg/hr)		Annual Hours (hrs)		Emissions (Mg)
Ratio ≥ 0.12	0.03	x	6,345	=	0.190
0.12 > Ratio ≥ 0.09	0.04	x	2,312	=	0.0925
0.09 > Ratio	4.50	x	103	=	0.464
		Total:	8,760		0.747

WW-1 ANNUAL EMISSIONS		
HAP	HAP Emissions (Mg)	Weighted HAP Emissions (Mg)
Methanol	12.3	12.3
Methyl Chloride	0.747	0.747
Total	13.047	13.047

References

1. Chemical Engineers' Handbook, Fifth Edition. Perry, R.H. and Chilton, C.H. McGraw-Hill Book Company. New York, New York.

LOG SHEETS

DAILY LOG FOR THERMAL OXIDIZER TO-1
EMISSION UNIT ID: PV-1

Date	Number of Hours Temperature ≥ 1600	Number of Hours 1600 > Temperature ≥ 1400	Number of Hours 1200 > Temperature	Initials
12/28/94	14	10	0	EBS
12/29/94	13	9	2	EBS
12/30/94	15	9	0	EBS
Total this page	42	28	2	EBS

PARAXYLENE LOADING LOG
EMISSION UNIT ID: L-1

Date	Quantity Loaded (kg)	Initials	Date	Quantity Loaded (kg)	Initials
11/2/94	3,500,000	ART			
11/29/94	400,000	ART			
12/15/94	2,240,000	ART			

XYLENE/ETHYLBENZENE STORAGE TANK LOG
EMISSION UNIT ID: S-1

Date	Gauge Reading (bbl)	Initials	Date	Gauge Reading (bbl)	Initials
12/22/94	35,593	JES			
12/27/94	29,533	JES			
12/29/94	42,949	JES			
12/30/94	40,325	JES			

ANNUAL TANK INSPECTION
FOR THE
XYLENE/ETHYLBENZENE STORAGE TANK
EMISSION UNIT ID: S-1

Date	Condition of paint[a]		Condition of seals[a]		Condition of deck fittings[a]		Other comments	Initials
5/12/93	2	MINOR PEELING ON LADDER	1	NO GAPS VISIBLE	1		1st ANNUAL INSPECTION	EBS
5/1/94	2	MINOR PEELING VARIOUS LOCATIONS	1	NO GAPS	1		NONE	EBS

a
1 = good
2 = fair
3 = poor
4 = bad

DAILY LOG FOR STEAM STRIPPER STST-1
EMISSION UNIT ID: WW-1

Date:____

Time	Wastewater Feed Rate (kg/hr)	Steam Flow Rate (kg/hr)	Steam-to-Feed Ratio (kg/kg)	Wastewater Feed Temperature (°F)	Steam Feed Temperature (°F)	Condenser Outlet Temperature (°F)	Initials
0000	5,452	676	0.133	95	235	52	RTT
0100	5,452	676	0.124	95	235	52	RTT
0200	5,400	676	0.125	95	235	52	RTT
0300	5,400	676	0.125	94	235	52	RTT
0400	5,400	676	0.125	94	230	50	RTT
0500	5,463	675	0.125	95	230	50	RTT
0600	5,530	675	0.122	95	230	50	RTT
0700	6,085	676	0.111	95	235	52	RTT
0800	6,100	676	0.111	96	235	52	BNM
0900	6,100	675	0.111	97	230	50	BNM
1000	5,830	677	0.116	95	238	53	BNM
1100	5,800	677	0.117	95	238	53	BNM
1200	6,100	675	0.111	96	235	52	CFT

Sub-Total (this page) of Steam-to-Feed Temperature

Number of Hours Steam-to-Feed Ratio ≥ 0.12	Number of Hours 0.12 > Steam-to-Feed Ratio ≥ 0.09	Number of Hours 0.09 > Steam-to-Feed Ratio	Initials
9	4	0	CFT

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA-453/R-95-007	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE Enabling Document for Permits for Early Reductions Sources		5. REPORT DATE September, 1995
		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS Office of Air Quality Planning and Standards Environmental Protection Agency Research Triangle Park, North Carolina 27711		10. PROGRAM ELEMENT NO.
		11. CONTRACT/GRANT NO. 68D10117
12. SPONSORING AGENCY NAME AND ADDRESS Director, Office of Air Quality Planning and Standards Office of Air and Radiation U.S. Environmental Protection Agency Research Triangle Park, North Carolina 27711		13. TYPE OF REPORT AND PERIOD COVERED
		14. SPONSORING AGENCY CODE EPA/200/04
15. SUPPLEMENTARY NOTES		

16. ABSTRACT

On November 21, 1994, EPA promulgated a rule establishing an interim federal permit program for companies participating in the Early Reductions Program (59 FR 59921). This document provides practical information on interpretation of the rule and its implementation, and includes an example permit application and permit.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air Pollution Hazardous Air Pollutants Early Reductions Operating Permits	Air Pollution Control	13B

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