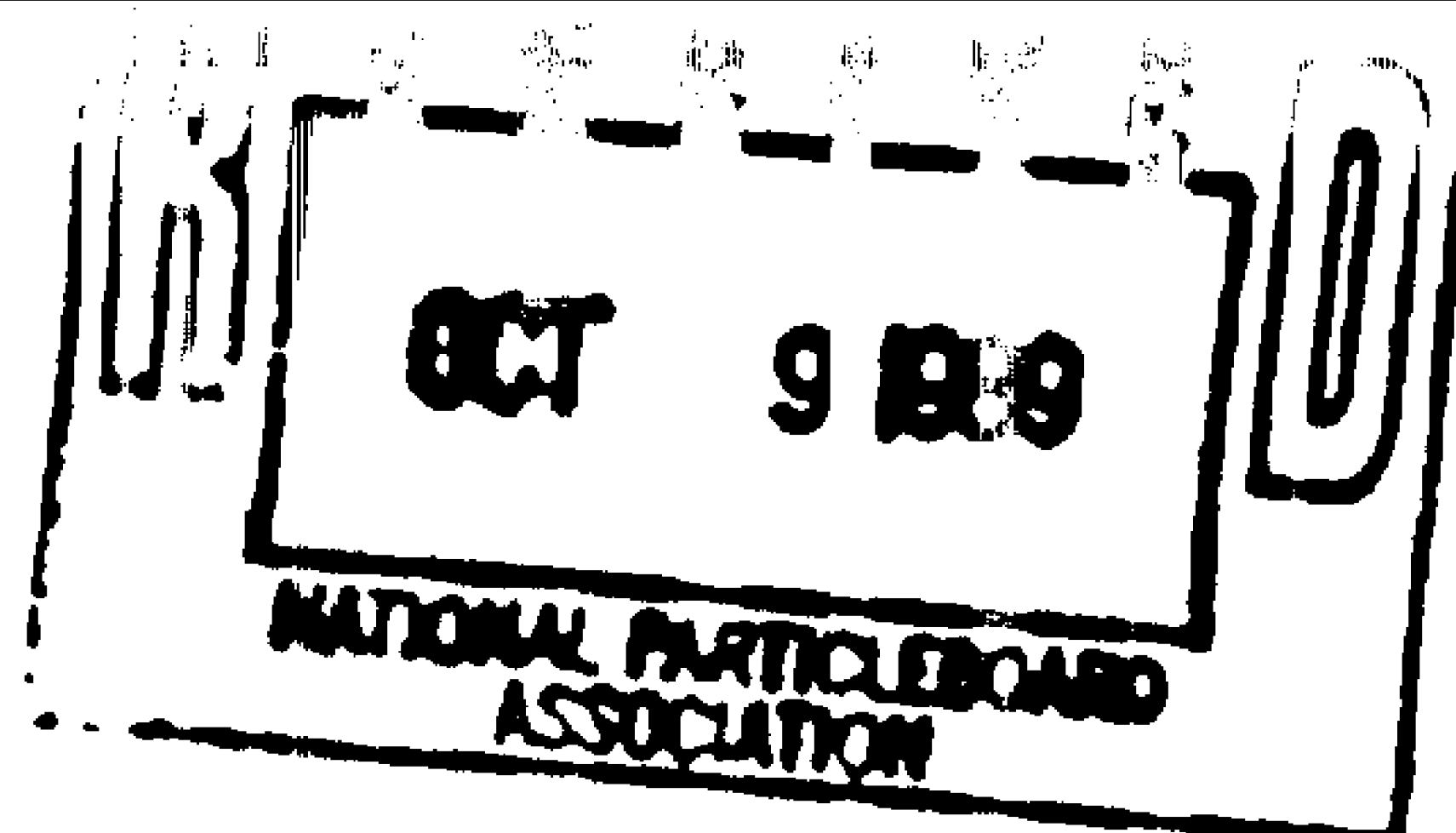




EPA-450/

-89-

**CANCER RISK FROM OUTDOOR EXPOSURE
TO AIR TOXICS**

**U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711**

External Review Draft

September 1989

TABLE 2-6 (concluded)

UNIT RISK FACTORS USED TO COMPARE CANCER RISK

POLLUTANT	EPA CLASSIFICATION ^a	UNIT RISK FACTORS ($\mu\text{g}/\text{m}^3$) ⁻¹	REFERENCE
76. 1,1,2,2-Tetrachloro-ethane	C	5.8×10^{-5}	3
77. Thiourea	B2	5.5×10^{-4}	3
78. Toxaphene	B2	3.2×10^{-3}	3
79. 1,1,2-Trichloroethane	C	1.6×10^{-5}	3
80. Trichloroethylene	B2	1.7×10^{-6}	2
81. 2,4,6-Trichlorophenol	B2	5.7×10^{-6}	3
82. Vinyl chloride	A	4.1×10^{-6}	2 ^c
83. Vinylidene chloride	C	5.0×10^{-5}	1

^a For a discussion of how EPA evaluates suspect carcinogens and more information on these classifications, refer to "Guidelines for Carcinogen Risk Assessment" (51 Federal Register 33992). The EPA classifications used in this report are:

A = proven human carcinogen

B = probable human carcinogen (B1 indicates limited evidence from human studies; B2 indicates sufficient evidence from animal studies but inadequate evidence from human studies)

C = possible human carcinogen

^b Based on inhalation study. Oral study suggests a unit risk factor of 3.3×10^{-3} .

^c Oral studies suggest a unit risk factor of 4.2×10^{-5} . U.S. Environmental Protection Agency, Office of Research and Development, Office of Health and Environmental Assessment. Health Effects Assessment Summary Tables First Quarter FY89. January 1989.

References

1. Integrated Risk Information System.
2. Office of Health and Environmental Assessment.
3. U.S. Environmental Protection Agency. Hazardous Waste TSD - Background Information for Proposed RCRA Air Emission Standards, Volume II - Appendices. Preliminary Draft. March 1988. pp. E-8 through E-13.
4. Draft Supplemental Rule for Hazardous Waste Incinerators. Appendix B, Unit Risks for Carcinogenic Constituents.
5. IEMP-Philadelphia. Developed from EPA's Drinking Water Criteria Document. 3/2/84.
6. U.S. EPA, Office of Solid Waste.
7. Southeast Chicago Study.

TABLE 3-27

RISK FACTORS

POLLUTANT	May 1985	June 1988	% Change
Acrylamide	1.7×10^{-5}	1.1×10^{-3}	+6400
Benzene	6.9×10^{-6}	8.3×10^{-6}	+20
BaP	3.3×10^{-3}	1.7×10^{-3}	-48
Beryllium	4.0×10^{-4}	2.4×10^{-3}	+500
1,3-Butadiene	4.6×10^{-7}	2.8×10^{-4}	+60770
Cadmium	2.3×10^{-3}	1.8×10^{-3}	-22
Chloroform	1.0×10^{-5}	2.3×10^{-5}	+130
Chromium	2.2×10^{-4}	1.2×10^{-4}	-45
Ethylene dibromide	5.1×10^{-7}	2.2×10^{-7}	-57
Ethylene oxide	3.6×10^{-6}	1.0×10^{-6}	-72
Formaldehyde	6.1×10^{-6}	1.3×10^{-5}	+113
Gasoline vapors	7.5×10^{-7}	6.6×10^{-7}	-12
Methyl chloride	1.4×10^{-7}	3.6×10^{-6}	+2,470
Methylene chloride	1.8×10^{-7}	4.7×10^{-7}	+161
Nickel (subsulfide)	3.3×10^{-4}	4.8×10^{-4}	+45
Perchloroethylene	1.7×10^{-6}	5.8×10^{-7}	-66
Propylene oxide	1.2×10^{-4}	3.7×10^{-5}	-97
Styrene	2.9×10^{-7}	5.7×10^{-7}	+97
Trichloroethylene	4.1×10^{-6}	1.7×10^{-6}	-59
Vinyl chloride	2.6×10^{-6}	4.1×10^{-6}	+58
Vinylidene chloride	4.2×10^{-5}	5.0×10^{-5}	+19

TABLE 1. KNOWN HUMAN CARCINOGENS (Continued)

Proposed

Substance	CAS No. ^a	End Use/Processes/Production	Unit Risk Factor ^b	In Maryland ^f (lb/year)			Total
				Used	Produced	Handled	
Tobacco smoke ^j		Malignant tumors of the respiratory tract and upper digestive tract are causally related to smoking various forms of tobacco. Malignant tumors of the bladder, renal pelvis, and pancreas are causally related to smoking cigarettes. ^k					
Treosulfidione ^j	299-75-2	Produced only in Denmark since 1969. Used in human medicine for treating ovarian cancer.					
Vinyl chloride	75-01-4	Used in the production of plastics, and the synthesis of other chemicals. Vinyl chloride - vinyl acetate copolymers are used in the manufacture of vinyl asbestos floor tiles. Annual production is about 7 billion pounds for the monomer and 5 billion pounds for the homopolymer.	4.1×10^{-6}				

^a American Chemical Society Chemical Abstract Service Registry Number. Source used here: Registry of Toxic Effects of Chemical Substances, NIOSH, 1978 edition.

^b Probability of contracting cancer if exposed to $1 \mu\text{g}/\text{m}^3$ of a carcinogen for 70 years. Source: Personal Communication, M.A. Iuvellio to Mike Husetzina, EPA/OWPS/PWJ. March 1985. These factors are subject to change and should be confirmed with EPA's Carcinogen Assessment Group before use.

^c Methylene compounds of commercial importance.

^d Source for 97 percent of all arsenic products.

^e Represents 94 percent of U.S. consumption.

^f Source: Maryland Toxic Substance Registry System - Office of Environmental Programs, Science and Health Advisory Group, Chemical Inventory 1983, Quarterly by Chemical for State of Maryland. (Blanks indicate the substance was not included in 1983 survey.)

^g Source: IARC Monographs on the Evaluation of the Carcinogenic Risk of Chemicals to Humans: Vol. 1-38. International Agency for Research on Cancer.

^h Source: The Condensed Chemical Dictionary, Tenth Edition, Van Nostrand Reinhold Company, New York, 1981.

ⁱ Source: The Merck Index, Ninth Edition, Merck and Company, Rahway, New Jersey, 1976.

^j Listed by IARC but not by NTP.

^k Listed by NTP but not by IARC.

Source: (Unless otherwise noted) Third Annual Report on Carcinogens: Summary, National Toxicology Program, U.S. Department of Health and Human Services, September 1983.

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03-03-87

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ing process, the AALs have not been employed as strict ambient exposure standards.

In general, the states have used the AALs as guides, and if the limit for a pollutant is exceeded then the industry and regulatory agency tend to develop a mutually acceptable plan to reduce exposure. One difficulty is that the AALs are often derived by a unit or agency other than that which handles the permitting process (e.g., the Department of Public Health versus the Department of Environmental Protection/Management). The permitting group is usually not firmly bound by the AALs; the AAL is just one of a number of factors to be considered in the permit process, which essentially is a risk management process (8).

Another aspect of the air toxics issue is the implementation of SARA Title 313, which requires reporting of routine emissions (in pounds per year) to communities. What do these numbers mean in terms of human health? Risk communication is likely to be a major challenge for the industries and states, and it is likely that major differences of

deriving estimates of these emissions. How this may then affect the derivation of AALs and the permitting process remains to be seen.

In summary, the EPA air toxics strategy has led to the development of a highly decentralized approach for the regulation of air toxics at the state level. This in turn has led to the derivation of highly variable acceptable-exposure guidelines for mutagens, carcinogens, teratogens, and systemic toxicants. Such interstate variability in AALs for toxic substances may lead to differential protection of the public health from air toxics, confuse the public about air pollution and health concerns, and undercut the credibility of public health and environmental regulatory agencies.

It is interesting to note that while EPA encouraged the development of such divergence in air toxics regulatory approaches and implementation at the state level, the Food and Drug Administration funded a National Academy of Sciences (NAS) assessment of the federal process of risk assessment. The goal was to determine if greater consistency could be achieved across agen-

sions—especially those concerning the regulation of chronic health hazards. This effort resulted in the publication of the highly influential work, *Risk Assessment in the Federal Government: Managing the Process* (11).

Thus, while the NAS report addressed the lack of agreement in assessing risk at the federal level and recommended ways to minimize it, EPA was encouraging just the opposite with respect to air toxics regulation at the state level. For example, the NAS committee strongly recommended "that uniform inference guidelines be developed for the use of federal regulatory agencies in the risk assessment process" (12). Although there can be compelling reasons for different emission regulations in different regions and states, EPA should strongly encourage the development of consistent risk assessment methodologies that assist the risk manager in the final decision-making process.

References

- (1) Calabrese, E. J. *Methodologic Approaches to Deriving Environmental and Occupational Health Standards*; Wiley: New York, 1978.

TABLE 2

Highest and lowest ambient air levels (AALs) standardized to a 24-h averaging time by compound for representative known and probable human carcinogens, in $\mu\text{g}/\text{m}^3$.

Compound	Original AAL	Standardized highest AAL	Original AAL	Standardized lowest AAL	Ratio standardized highest/lowest AAL
Acrylonitrile	15 (NY)	257	0.15 (MA)	0.15	1713
Arsenic and compounds as As	0.67 (NY)	11.5	0.0002 (RI)	0.0034	3382
Benzene	100 (NY, RI)	1718	1.2 (MA)	1.2	1432
Epichlorohydrin	33.3 (NY)	572	2.7 (MA)	2.7	212
Ethylene dibromide	1500 (VA)	1500	0.045 (NC)	0.773	1940
Ethylene oxide	450 (IN)	160	0.01 (RI)	0.17	941
Formaldehyde	7.2 (Philadelphia)	123.7	0.77 (MA)	0.77	161
Nickel subsulfide	24 (NV)	8.54	0.0017 (NC)	0.029	294
PCBs	1.67 (NY)	28.7	0.0081 (MA)	0.0081	3543
Vinyl chloride	6.57 (Philadelphia)	112.9	0.038 (NC)	0.65	174

*The original AALs and their averaging times were obtained from Reference 4. These substances are all classified in IARC groups 1 or 2A. AALs were standardized to 24-h averaging times for convenience based on information provided in Reference 11. Annual averaging times are in reality more appropriate for chronic endpoints such as carcinogenicity. These figures are highest and lowest standardized AALs; other state and local agencies may have had higher or lower original AALs. When unstandardized highest and lowest AALs are compared, the differences are generally larger.

TABLE 3

Highest and lowest ambient air levels (AALs) standardized to a 24-h averaging time by compound for representative noncarcinogens, in $\mu\text{g}/\text{m}^3$.

Compound	Original AAL	Standardized highest AAL	Original AAL	Standardized lowest AAL	Ratio standardized highest/lowest AAL
Acetone	35.6 (NY)	611.7	11.8 (CT, SD)	4.2	146
Ammonia	0.36 (NY)	6.186	0.024 (MA)	0.024	258
Ethylene glycol	2.978 (NY)	1.06	0.17 (MA)	0.17	8.2
N-hexane	30 (VA)	30	1.8 (ND)	0.64	47
Napthalene	0.167 (NY)	2.87	0.014 (MA)	0.014	205
Phenol	0.456 (Philadelphia)	7.84	0.095 (IN)	0.034	230
Toluene	7.5 (NY)	128.9	0.051 (MA)	0.051	2527
Xylenes	1.45 (NY)	24.91	0.0592 (MA)	0.0592	421

*The original AALs and their averaging times were obtained from Reference 4. Units are standardized to 24 h for comparison, based on information provided in Reference 11. These figures are highest and lowest standardized AALs; other state and local agencies may have had higher or lower original AALs. When unstandardized highest and lowest AALs are compared, the differences are generally larger.

Vista Chemical Company

900 Threadneedle
Houston, Texas 77079
(713) 588-3000

P.O. Box 19029
Houston, Texas 77224
Fax (713) 588-3236

July 5, 1990

Meredith Scheck
The Vinyl Institute
155 Route 46 West
Wayne, NJ 07470

Dear Meredith,

We are being told by the State of Mississippi the unit risk factor for VCM is 4.2×10^{-5} /microgram/m³. Multiplication of the unit risk factor by the fence line concentration provides a worst case estimate of risk from a particular facility.

As state air toxic programs become prevalent, the unit risk factor will be more of an issue. I am interested in others' experience or knowledge on what factor is being used to estimate risk from their facilities.

If you could poll the members I would appreciate it.

Sincerely,

Joe Ledvina
Joe Ledvina

cc: FGJ

JOE
DEL STILL DEBATING
AIR TOX.-LOOKING TO
FED TO GUIDE, **VISTA**
THOUGHT ATTACHED
WOULD HELP-LET US
KNOW WHAT YOU FIND

FRANK
(Georgia Guff)



STATE OF MISSISSIPPI
DEPARTMENT OF ENVIRONMENTAL QUALITY
RAY MABUS
GOVERNOR

June 20, 1990

Mr. Frank G. Jeanson
Senior Environmental Coordinator
Vista Polymers
P.O. Box 91
Aberdeen, Mississippi 39730

Dear Mr. Jeanson:

Re: Facility No. 1840-00014
Aberdeen, Mississippi

Based on your letter dated June 18, 1990, we understand that a net decrease in vinyl chloride emissions of 11,000 lbs/yr is expected upon completion of both the Slurry Stripping Optimization Project (SSOP) and the Control System Replacement Project (SRP). We further understand that the CSRP will increase production by 40 MM lbs/yr and 5,825 lbs/hr (maximum daily production capacity).

Since the NESHAP vinyl chloride emission limitation for the reactor opening loss and residual vinyl chloride is 0.00042 lbs/dry solid lb of PVC resin produced, the production capacity increase would cause an increase in the amount of vinyl chloride emissions allowed of 2.4 lbs/hr and 18,800 lbs/yr. We propose issuance of a construction permit which maintains the allowable vinyl chloride mass emission rate at current levels. Thus, the permit will limit vinyl chloride emissions from reactor opening loss and residual vinyl chloride to 0.00038 lbs/dry solid lb of PVC resin.

We plan to recommend issuance of this permit to the Permit Board on Tuesday, June 26, 1990. I have enclosed a draft permit. Your comments before Tuesday are welcome.

This permit action is in regard to the SSOP and CSRP projects only. Pursuant to our June 15, 1990, meeting, action on the company's request for permit action to become a minor source is on hold. We plan no further action until the company provides information to resolve concerns over carcinogenic emissions and appropriate emission limitations.

If you have any questions, please let me know.

Very truly yours,

Jay H. Barkley

North Air Emissions Section

JHB:sr
Enclosure

BUREAU OF POLLUTION CONTROL, P.O. BOX 10385, JACKSON, MS 39289-0385, (601) 961-5171

VAB.0001165189

(F) 2.11

FG + KWS

See questions

RWS,

see memo,

FGS

**STATE OF MISSISSIPPI
AIR POLLUTION CONTROL
PERMIT**

TO CONSTRUCT AIR EMISSIONS EQUIPMENT

THIS CERTIFIES THAT

Vista Polymers
Hwy. 25
Aberdeen, Mississippi

has been granted permission to construct air emissions equipment to comply with the emission limitations, monitoring requirements and other conditions set forth herein. This permit is issued in accordance with the provisions of the Mississippi Air and Water Pollution Control Law (Section 49-17-1 et. seq., Mississippi Code of 1972), and the regulations and standards adopted and promulgated thereunder.

Issued this ____ day of ____, 19__

MISSISSIPPI ENVIRONMENTAL QUALITY PERMIT BOARD

DRAFT

**DIRECTOR, BUREAU OF POLLUTION CONTROL
MISSISSIPPI DEPARTMENT OF ENVIRONMENTAL QUALITY**

Permit No. 1840-00014

~~This statement is addressed by~~
~~sources are permitted~~
~~All of our particulate~~

DRAFT

PART I

Page 2 of 6
Permit No. 1840-00014

PART I
GENERAL CONDITIONS

What's this mean?

Particulate wastes can't be piled up, such that the wind could blow them around into surrounding water.

1. The plans, specifications, schedules, dates and other data submitted to the Permit Board are filed with and considered as a part of this permit.
2. All air pollution control facilities shall be designed and constructed such as to allow proper operation and maintenance of this permit.
3. The necessary facilities shall be constructed so that solids removed in the course of control of air emissions may be disposed of in a manner such as to prevent the solids from becoming windborne and to prevent the materials from entering State waters.
4. The air pollution control facilities shall be constructed such that diversion from or bypass of collection and control facilities is not needed except (i) where unavoidable to prevent loss of life or severe property damage or (ii) when approved by the Mississippi Environmental Quality Board.
5. The construction of facilities shall be performed in such a manner as to reduce both point source and fugitive dust emissions to a minimum.
6. The permittee shall allow the Mississippi Department of Environmental Quality Bureau of Pollution Control and the Mississippi Environmental Quality Permit Board and/or their representatives upon presentation of credentials:
 - a. To enter upon the permittee's premises where an air emission source is located or in which any records are required to be kept under the terms and conditions of this permit; and
 - b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any air emission.
7. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to:
 - a. Violation of any terms or conditions of this permit;
 - b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts, or
 - c. A change in any condition that requires either a temporary or permanent reduction or elimination of authorized air emissions.

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PART I

Page 3 of 6

Permit No. 1840-00014

8. Except for data determined to be confidential under the Mississippi Air & Water Pollution Control Law, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Mississippi Department of Environmental Quality Bureau of Pollution Control.
9. The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion or personal rights, nor any infringement of Federal, State or local laws or regulations.
10. Nothing herein contained shall be construed as releasing the permittee from any liability for damage to persons or property by reason of the installation, maintenance, or operation of the air cleaning facility, or from compliance with the applicable statutes of the State, or with local laws, regulations, or ordinances.
11. This permit is non-transferable.
12. This permit is for air pollution control purposes only.
13. Approval to construct will expire should construction not begin within one (1) year of the issuance of this permit, or should construction be suspended for one (1) year or more.
14. Prior to startup of air emissions equipment at this source, a Performance Evaluation Permit must be obtained. The permittee shall submit certification by a professional engineer registered in the State of Mississippi that construction completed in accordance with the approved plans and specifications and a written request for the permit.

What does this mean for VCSM?

This page and the previous page are standard issue for permits. This statement is directed towards new air ems. equipment such as baghouses, scrubbers etc. since we are not starting up any of this equipment this statement would not apply to us.

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PART II
Page 4 of 6
Permit No. 1840-00014

PART II EMISSION LIMITATIONS AND MONITORING REQUIREMENTS

Beginning ISSUANCE DATE, the permittee is authorized to modify the operating control system of air emissions equipment for the emission of air contaminants from the Vinyl Chloride Reaction and Storage Process, Process Code AI, including:

<u>Emission Point No.</u>	<u>Description</u>
AI-001	Railcar Unloading Stations
AI-002	PVC Reactor D-300
AI-003	PVC Reactor D-400
AI-004	PVC Reactor D-500
AI-005	PVC Reactor D-600
AI-006	PVC Reactor D-700
AI-007	PVC Reactor 741
AI-008	PVC Reactor 742
AI-009	PVC Reactor 743
AI-010	PVC Reactor 744
AI-011	PVC Reactor 745
AI-012	Evacuation Jet - Old Module
AI-013	Evacuation Jet - New Module
AI-014	Slurry Dump Systems - Old Module
AI-015	Slurry Dump Systems - New Module
AI-016	Slurry Dump Systems - 745 Reactor
AI-017	Slurry Dump Systems - D-700 Reactor
AI-018	Slurry Blend Tank 550
AI-019	Slurry Blend Tank 551
AI-020	Slurry Blend Tank 552
AI-021	Slurry Blend Tank 553
AI-022	Slurry Blend Tank 646
AI-023	Slurry Blend Tank 647
AI-024	Slurry Blend Tank 648
AI-025	Slurry Blend Tank 649
AI-026	Slurry Blend Tank 650
AI-027	Slurry Blend Tank 651
AI-028	Slurry Blend Tank 652
AI-029	Slurry Blend Tank 653
AI-030	Slurry Blend Tank 654
AI-031	Slurry Blend Tank 655
AI-032	Slurry Blend Tank 407
AI-033	Slurry Blend Tank 501
AI-034	Slurry Blend Tank 502
AI-035	Slurry Blend Tank 747
AI-036	Normal Kill Solution Mix Tank
AI-037	Normal Kill Solution Charge Tank
AI-038	Suspending Agent Tank D-103
AI-039	Slurry Blend Tank (Low Mol)

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PART II

Page 5 of 6

Permit No. 1840-00014

**PART II
EMISSION LIMITATIONS AND MONITORING REQUIREMENTS**

Continued from Page 4 of 6

The air emissions equipment, specifically, the PVC Reactors, Emission Points AI-002 through AI-011, shall be modified to comply with the emission limitations and monitoring requirements specified below.

EMISSION LIMITATIONS

* Vinyl Chloride 0.00038 lb/dry solid lb of polyvinyl chloride resins, including latex resins, verifiable by 40 CFR 61.67(g)(6).

* This emission limitation is to ensure that at the proposed maximum daily production capacity of 62,000 lbs/hr there will not be an increase in the vinyl chloride mass emission rate allowed by NESHA, given the current maximum daily production capacity of 56,375 lbs/hr.

EMISSION MONITORING

The permittee shall comply with 40 CFR 61.68.

RECORDKEEPING & REPORTING REQUIREMENTS

The permittee shall comply with 40 CFR 61.70 and 61.71.

PERFORMANCE TESTING

Demonstration of compliance shall be by testing in accordance with 40 CFR 61.67(g)(6) and submittal of the test report. For the purpose of compliance demonstration, the permittee shall operate at the maximum rate.

Initial compliance shall be demonstrated during the performance evaluation period.

We need to
review project with
Tay to find out
what this means

RVCN data?

We talked about this
before. I told him about
our daily RVCN report.
He said that it
would be sufficient
for this section.


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PART III

Page 6 of 6

Permit No. 1840-00014

PART III OTHER REQUIREMENTS

- (1) The operator of the equipment covered by this permit shall operate and maintain this equipment to assure that the emission rates will not, at any time, exceed the rates allowed by the Mississippi Air Emission Regulations.
- (2) The permittee shall comply with all applicable National Emission Standards for Hazardous Air Pollutants (NESHAPS), 40 CFR 61, Subpart A - General Provisions and Subpart F - Vinyl Chloride.
- (3) A pretest conference at least thirty (30) days prior to the scheduled test date is needed to ensure that all test methods and procedures are acceptable to the Bureau of Pollution Control. Also, the Bureau of Pollution Control must be notified prior to the scheduled test date. At least TEN (10) DAYS notice should be given so that an observer may be scheduled to witness the test(s).

SR-154C

VAB.0001165195