MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

SEPTEMBER 19, 2005

PERMIT TO INSTALL
251-04

ISSUED TO
IKO, MONROE, INC.

LOCATED AT
1151 WEST ELM STREET
MONROE, MICHIGAN

IN THE COUNTY OF
MONROE

STATE REGISTRATION NUMBER
A4074

The Air Quality Division has approved this Permit to Install, pursuant to the delegation of authority from the Michigan Department of Environmental Quality. This permit is hereby issued in accordance with and subject to Section 5505(1) of Article II, Chapter I, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Pursuant to Air Pollution Control Rule 336.1201(1), this permit constitutes the permittee's authority to install the identified emission unit(s) in accordance with all administrative rules of the Department and the attached conditions. Operation of the emission unit(s) identified in this Permit to Install is allowed pursuant to Rule 336.1201(6).

DATE OF RECEIPT OF ALL INFORMATION REQUIRED BY RULE 203: **March 16, 2005**	
DATE PERMIT TO INSTALL APPROVED: **September 19, 2005**	SIGNATURE: **G. Vinson Hellwig**
DATE PERMIT VOIDED:	SIGNATURE:
DATE PERMIT REVOKED:	SIGNATURE:

PERMIT TO INSTALL

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Common Abbreviations / Acronyms

Common Acronyms		Pollutant/Measurement Abbreviations	
AQD	Air Quality Division	Btu	British Thermal Unit
ANSI	American National Standards Institute	°C	Degrees Celsius
BACT	Best Available Control Technology	CO	Carbon Monoxide
CAA	Clean Air Act	dscf	Dry standard cubic foot
CEM	Continuous Emission Monitoring	dscm	Dry standard cubic meter
CFR	Code of Federal Regulations	°F	Degrees Fahrenheit
COM	Continuous Opacity Monitoring	gr	Grains
EPA	Environmental Protection Agency	Hg	Mercury
EU	Emission Unit	hr	Hour
FG	Flexible Group	H_2S	Hydrogen Sulfide
GACS	Gallon of Applied Coating Solids	hp	Horsepower
GC	General Condition	lb	Pound
HAP	Hazardous Air Pollutant	m	Meter
HVLP	High Volume Low Pressure *	mg	Milligram
ID	Identification	mm	Millimeter
LAER	Lowest Achievable Emission Rate	MM	Million
MACT	Maximum Achievable Control Technology	MW	Megawatts
MAERS	Michigan Air Emissions Reporting System	NOx	Oxides of Nitrogen
MAP	Malfunction Abatement Plan	PM	Particulate Matter
MDEQ	Michigan Department of Environmental Quality	PM-10	Particulate Matter less than 10 microns diameter
MIOSHA	Michigan Occupational Safety & Health Administration	pph	Pound per hour
MSDS	Material Safety Data Sheet	ppm	Parts per million
NESHAP	National Emission Standard for Hazardous Air Pollutants	ppmv	Parts per million by volume
NSPS	New Source Performance Standards	ppmw	Parts per million by weight
NSR	New Source Review	psia	Pounds per square inch absolute
PS	Performance Specification	psig	Pounds per square inch gauge
PSD	Prevention of Significant Deterioration	scf	Standard cubic feet
PTE	Permanent Total Enclosure	sec	Seconds
PTI	Permit to Install	SO_2	Sulfur Dioxide
RACT	Reasonable Available Control Technology	THC	Total Hydrocarbons
ROP	Renewable Operating Permit	tpy	Tons per year
SC	Special Condition Number	µg	Microgram
SCR	Selective Catalytic Reduction	VOC	Volatile Organic Compounds
SRN	State Registration Number	yr	Year
TAC	Toxic Air Contaminant		
VE	Visible Emissions		

* For High Volume Low Pressure (HVLP) applicators, the pressure measured at the HVLP gun air cap shall not exceed ten (10) pounds per square inch gauge (psig).

GENERAL CONDITIONS

1. The process or process equipment covered by this permit shall not be reconstructed, relocated, or modified, unless a Permit to Install authorizing such action is issued by the Department, except to the extent such action is exempt from the Permit to Install requirements by any applicable rule. **[R336.1201(1)]**

2. If the installation, construction, reconstruction, relocation, or modification of the equipment for which this permit has been approved has not commenced within 18 months, or has been interrupted for 18 months, this permit shall become void unless otherwise authorized by the Department. Furthermore, the permittee or the designated authorized agent, shall notify the Department via the Supervisor, Permit Section, Air Quality Division, Michigan Department of Environmental Quality, P.O. Box 30260, Lansing, Michigan 48909, if it is decided not to pursue the installation, construction, reconstruction, relocation, or modification of the equipment allowed by this Permit to Install. **[R336.1201(4)]**

3. If this Permit to Install is issued for a process or process equipment located at a stationary source that is not subject to the Renewable Operating Permit program requirements pursuant to R336.1210, operation of the process or process equipment is allowed by this permit if the equipment performs in accordance with the terms and conditions of this Permit to Install. **[R336.1201(6)(b)]**

4. The Department may, after notice and opportunity for a hearing, revoke this Permit to Install if evidence indicates the process or process equipment is not performing in accordance with the terms and conditions of this permit or is violating the Department's rules or the Clean Air Act. **[R336.1201(8), Section 5510 of Act 451, PA 1994]**

5. The terms and conditions of this Permit to Install shall apply to any person or legal entity that now or hereafter owns or operates the process or process equipment at the location authorized by this Permit to Install. If the new owner or operator submits a written request to the Department pursuant to R336.1219 and the Department approves the request, this permit will be amended to reflect the change of ownership or operational control. The request must include all of the information required by subrules (1)(a), (b), and (c) of R336.1219. The written request shall be sent to the District Supervisor, Air Quality Division, Michigan Department of Environmental Quality. **[R336.1219]**

6. Operation of this equipment shall not result in the emission of an air contaminant which causes injurious effects to human health or safety, animal life, plant life of significant economic value, or property, or which causes unreasonable interference with the comfortable enjoyment of life and property. **[R336.1901]**

7. The permittee shall provide notice of an abnormal condition, start-up, shutdown, or malfunction that results in emissions of a hazardous or toxic air pollutant which continue for more than one hour in excess of any applicable standard or limitation, or emissions of any air contaminant continuing for more than two hours in excess of an applicable standard or limitation, as required in Rule 912, to the Department. The notice shall be provided no later than two business days after start-up, shutdown, or discovery of the abnormal condition or malfunction. Written reports, if required, must be filed with the Department within 10 days after the start-up or shutdown occurred, within 10 days after the abnormal conditions or malfunction has been corrected, or within 30 days of discovery of the abnormal condition or malfunction, whichever is first. The written reports shall include all of the information required in Rule 912(5). **[R336.1912]**

8. Approval of this permit does not exempt the permittee from complying with any future applicable requirements which may be promulgated under Part 55 of 1994 PA 451, as amended or the Federal Clean Air Act.

9. Approval of this permit does not obviate the necessity of obtaining such permits or approvals from other units of government as required by law.

10. Operation of this equipment may be subject to other requirements of Part 55 of 1994 PA 451, as amended and the rules promulgated thereunder.

11. Except as provided in subrules (2) and (3) or unless the special conditions of the Permit to Install include an alternate opacity limit established pursuant to subrule (4) of R336.1301, the permittee shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of density greater than the most stringent of the following. The grading of visible emissions shall be determined in accordance with R336.1303. **[R336.1301]**

    a) A six-minute average of 20 percent opacity, except for one six-minute average per hour of not more than 27 percent opacity.

    b) A visible emission limit specified by an applicable federal new source performance standard.

    c) A visible emission limit specified as a condition of this permit to install.

12. Collected air contaminants shall be removed as necessary to maintain the equipment at the required operating efficiency. The collection and disposal of air contaminants shall be performed in a manner so as to minimize the introduction of contaminants to the outer air. Transport of collected air contaminants in Priority I and II areas requires the use of material handling methods specified in R336.1370(2). **[R336.1370]**

13. The Department may require the permittee to conduct acceptable performance tests, at the permittee's expense, in accordance with R336.2001 and R336.2003, under any of the conditions listed in R336.2001. **[R336.2001]**

SPECIAL CONDITIONS

Emission Unit Identification

Emission Unit ID	Emission Unit Description	Stack Identification
EU-BOILER	84 MM BTU maximum heat input per hour natural gas and No. 2 fuel oil-fired boiler	SV-BOILER
EU-DIGESTER	Pressurized vessel containing revolving disks used to recover wood fibers	NA
EU-DEFIBRATOR	Pressurized steaming vessel where chips are softened	NA
EU-DISKFILTER	Process water handling tank equipped with a disk filter to remove solids	NA
EU-FIBERTANK	Wood fiber storage tank controlled by the boiler	SV-BOILER
EU-MECHANICAL PULPER	Primary recycled paper repulper	NA
EU-BROKE PULPER	Secondary fiber repulper used to breakdown off-spec product	NA
EU-CHIP STORAGE	Wood chip storage area	NA
EU-PAPER MACHINE	Cylinder paper machine with vacuum and press rollers	SV-WETEND1, SV-WETEND2, SV-WETEND3, SV-DRYEND1, SV-DRYEND2, SV-DRYEND3, SV-DRYEND4, SV-DRYEND5, SV-DRYEND6, SV-VACUUM
EU-PULP MIX	Wood fiber and recycled pulp slurry mixing vault	NA
EU-PULP STORAGE1	Intermediate storage chest that holds the recycled pulp slurry located in the basement of the facility	NA
EU-PULP STORAGE2	Mixing vault where the recycled paper pulp is mixed with the pulp produced from wood chips located in the basement of the facility	NA
EU-PULP STORAGE3	Final holding chest where the combined pulp is stored until needed by the paper machine located in the basement of the facility	NA
EU-WASHER	Chip washing tank	NA
EU-COVWATERTANKS	Outside covered water storage tank controlled by carbon filter or equivalent control	SV-CARBON
EU-UNCOVWATERTANKS	Outside uncovered water storage tanks	NA
Changes to the equipment described in this table are subject to the requirements of R336.1201, except as allowed by R336.1278 to R336.1290.		

Flexible Group Identification

Flexible Group ID	Emission Units Included in Flexible Group	Stack Identification
FG-PAPERLINE	EU-BOILER, EU-DEFIBRATOR, EU-DIGESTER, EU-DISKFILTER, EU-FIBERTANK, EU-MECHANICAL PULPER, EU-BROKE PULPER, EU-PAPER MACHINE, EU-PULP MIX, EU-PULP STORAGE1, EU-PULP STORAGE2, EU-PULP STORAGE3, EU-WASHER	NA

The following conditions apply to: EU-BOILER

Emission Limits

	Pollutant	Equipment	Limit	Time Period	Testing/ Monitoring Method	Applicable Requirement
1.1a	NOx	EU-BOILER	0.14 lb/ MM BTU[1]	Test Protocol	GC 13	**R336.1205(1)(a) and (3)**
1.1b	NOx	EU-BOILER	0.20 lb/ MM BTU[2]	Test Protocol	GC 13	**R336.1205(1)(a) and (3)**
1.1c	SO_2	EU-BOILER	0.53 lb/ MM BTU[2]	Test Protocol	GC 13	**R336.1205(1)(a) and (3), 40 CFR 52.21 (c) and (d)**
1.1d	SO_2	EU-BOILER	20.0 pph[2]	Test Protocol	GC 13	**R336.1205(1)(a) and (3), 40 CFR 52.21 (c) and (d)**
1.1e	SO_2	EU-BOILER	21.9 tpy[3]	12-month rolling as determined at the end of each calendar month	SC 1.4, SC 1.7, SC 1.8	**R336.1205(1)(a) and (3), 40 CFR 52.21 (c) and (d)**

[1] Emission factor based on firing natural gas
[2] Emission factor based on firing No. 2 fuel oil with a heating value of 131,350 BTU/gallon and a sulfur content of 0.50%
[3] Emission limit based on the firing of No. 2 fuel oil only

Material Usage Limits

1.2 The permittee shall burn only the exhaust gas from the wood fiber storage tank, natural gas, and No. 2 fuel oil in EU-BOILER. **[R336.1205(1)(a) and (3), R336.1225, R336.1702, R336.1901]**

1.3 The No. 2 fuel oil usage for EU-BOILER shall not exceed 6,768 gallons of No. 2 fuel oil per day. **[R336.1205(1)(a) and (3), 40 CFR 52.21(c) and (d)]**

1.4 The No. 2 fuel oil usage for EU-BOILER shall not exceed 617,580 gallons of No. 2 fuel oil per 12-month rolling time period as determined at the end of each calendar month. **[R336.1205(1)(a) and (3), 40 CFR 52.21(c) and (d)]**

Process/Operational Limits

1.5 The permittee shall maintain and operate EU-BOILER according to the procedures outlined in the preventative maintenance, malfunction abatement, odor reduction plan specified in Appendix 1 or alternate plan as approved in writing by the AQD District Supervisor. **[R336.1901, R336.1910, R336.1911]**

Recordkeeping/Reporting/Notification

1.6 The permittee shall keep, in a satisfactory manner, daily, monthly and previous 12-month rolling No. 2 fuel oil usage records for EU-BOILER, as required by SC 1.3 and 1.4. All records shall be kept on file for a period of at least five years and made available to the Department upon request. **[R336.1205(1)(a) and (3), 40 CFR 52.21 (c) and (d)]**

1.7 The permittee shall keep, in a satisfactory manner, monthly and previous 12-month rolling SO_2 emission records for EU-BOILER while firing No. 2 fuel oil, as required by SC 1.1e. All records shall be kept on file for a period of at least five years and made available to the Department upon request. **[R336.1205(1)(a) and (3), 40 CFR 52.21 (c) and (d)]**

1.8 The permittee shall keep the following information for each fuel oil shipment for EU-BOILER:

a) Sulfur Content, in percent by weight

b) BTU per gallon

c) Quantity of fuel oil received

The records shall be kept in a format acceptable to the AQD District Supervisor. All records shall be kept on file for a period of at least five years and made available to the Department upon request. **[R336.1205(1)(a) and (3), 40 CFR 52.21 (c) and (d)]**

Stack/Vent Restrictions

	Stack & Vent ID	Maximum Diameter (inches)	Minimum Height Above Ground Level (feet)	Applicable Requirement
1.9a	SV-BOILER	48	56	**R336.1901, 40 CFR 52.21 (c) and (d)**
	The exhaust gases shall be discharged unobstructed vertically upwards to the ambient air.			

The following conditions apply to: EU-FIBERTANK

Process/Operational Limits

2.1 The exhaust gases from EU-FIBERTANK shall be routed to the boiler for incineration. **[R336.1205(1)(a) and (3), R336.1225, R336.1702, R336.1901]**

The following conditions apply to: EU-CHIPSTORAGE

Material Limts

3.1 The permittee shall maintain no more than 1200 tons of wood chips in EU-CHIPSTORAGE per seven day rolling time period. **[R336.1901]**

3.2 The permittee shall maintain a minimum of three storage piles in conjunction with EU-CHIPSTORAGE. **[R336.1901]**

3.3 The permittee shall maintain EU-CHIPSTORAGE as specified in the preventative maintenance, malfunction abatement and odor reduction plan in Attachment 1 or alternate plan as approved in writing by the AQD District Supervisor. **[R336.1901]**

Recordkeeping/Reporting/Notification

3.4 The permittee shall keep, in a satisfactory manner, daily and previous seven day rolling wood chip delivery and usage records for EU-CHIPSTORAGE, as required by S.C. 3.1. All records shall be kept on file for a period of at least five years and made available to the Department upon request. **[R336.1901]**

The following conditions apply to: EU-PAPERMACHINE

Stack/Vent Restrictions

	Stack & Vent ID	Maximum Diameter (inches)	Minimum Height Above Ground Level (feet)	Applicable Requirement
4.1a	SV-VACUUM	12	60	**R336.1225, R336.1901**
4.1b	SV-WETEND1	51.6	43	**R336.1225, R336.1901**
4.1c	SV-WETEND2	51.6	43	**R336.1225, R336.1901**
4.1d	SV-WETEND3	51.6	43	**R336.1225, R336.1901**
4.1e	SV-DRYEND1	51.6	43	**R336.1225, R336.1901**
4.1f	SV-DRYEND2	51.6	43	**R336.1225, R336.1901**
4.1g	SV-DRYEND3	51.6	43	**R336.1225, R336.1901**
4.1h	SV-DRYEND4	51.6	43	**R336.1225, R336.1901**
4.1i	SV-DRYEND5	51.6	43	**R336.1225, R336.1901**
4.1j	SV-DRYEND6	51.6	43	**R336.1225, R336.1901**
	The exhaust gases shall be discharged unobstructed vertically upwards to the ambient air.			

The following conditions apply to: EU-WASHER

Material Limit

5.1 The permittee shall only use fresh river water or potable water at ambient temperature in EU-WASHER. **[R336.1225, R336.1901]**

5.2 The permittee shall not convey chips to EU-WASHER unless the conveyor belt along the top of the building is covered in a manner approved by the AQD District Supervisor. **[R336.1225, R336.1901]**

The following conditions apply to: EU-COVWATERTANKS

Process/Operational Limits

6.1 The permittee shall maintain and operate EU-COVWATERTANKS according to the procedures outlined in the preventative maintenance, malfunction abatement, odor reduction plan specified in Appendix 1, or an alternate plan approved by the AQD District Supervisor. **[R336.1901, R336.1910, R336.1911]**

6.2 The permittee shall only use EU-COVWATERTANKS to hold process water from the paperline in emergency situations as described in the preventative maintenance, malfunction abatement, odor reduction plan specified in Appendix 1, or an alternate plan approved by the AQD District Supervisor. **[R336.1901]**

Equipment

6.4 The permittee shall not discharge water into EU-COVWATERTANKS unless the carbon filter, or equivalent control approved by the District Supervisor, is installed, maintained, and operated in a satisfactory manner. **[R336.1205(1)(a) and (3), R336.1901]**

Recordkeeping/Reporting/Notification

6.5 The permittee must notify the AQD District Supervisor, or designated District staff, within 24 hours after an emergency situation has warranted the use of EU-COVWATERTANKS as described in the preventative maintenance, malfunction abatement, odor reduction plan. **[R336.1901]**

The following conditions apply to: EU-UNCOVWATERTANKS

Process/Operational Limits

7.1 The permittee shall not use EU-UNCOVWATERTANKS to store water for any reason. **[R336.1901]**

The following conditions apply to: FG-PAPERLINE

Material Usage Limits

8.1 The permittee shall not produce more than 220 air dried tons per day of felt paper in FG-PAPERLINE. **[R336.1205(1)(a) and (3), R336.1225, R336.1702, R336.1901]**

8.2 The permittee shall not use more than 50% by weight of wood fiber to produce felt paper per day in FG-PAPERLINE. **[R336.1205(1)(a) and (3), R336.1225, R336.1702, R336.1901]**

8.3 The permittee shall maintain clean steam for all the applicable emission units in FG-PAPERLINE. **[R336.1225, R336.1901]**

8.4 The permittee shall inspect every load of chips used in FG-PAPERLINE for odors in order to establish trends relating to odor. This includes checking for wood types known to be more odorous in the pile, like cherry wood. **[R336.1225, R336.1702, R336.1901]**

8.5 Only process water generated by the equipment covered under FG-PAPERLINE shall be used in FG-PAPERLINE. **[R336.1225, R336.1901]**

Process/Operational Limits

8.6 The permittee shall not operate FG-PAPERLINE unless the preventative maintenance, malfunction abatement, odor reduction plan specified in Appendix 1, or an alternate plan approved by the AQD District Supervisor, is implemented and maintained. If the preventative maintenance, malfunction abatement, odor reduction plan fails to address or inadequately addresses an event at the time the plan is initially developed, the owner or operator shall revise the preventative maintenance, malfunction abatement, odor reduction plan within 45 days after such an event occurs and submit the revised plan to the AQD District Supervisor **[R336.1225, R336.1901, R336.1910, R336.1911]**

8.7 The permittee shall maintain the chip storage piles and recycled paper used in FG-PAPERLINE according to the procedures outlined in the preventative maintenance, malfunction abatement, odor reduction plan specified in Appendix 1 or alternate plan as approved in writing by the AQD District Supervisor. **[R336.1901, R336.1910, R336.1911]**

8.8 The recycled paper intermediate storage chest, the pulp mixing vault, and the final holding chests associated with FG-PAPERLINE shall remain covered at all times, except as described in the preventative maintenance, malfunction abatement, odor reduction plan specified in Appendix 1 or alternate plan as approved in writing by the AQD District Supervisor. **[R336.1225, R336.1901]**

Equipment

8.9 The permittee shall not operate FG-PAPERLINE, except for the boiler, unless the disk filter is installed, maintained, and operated in a satisfactory manner. **[R336.1205(1)(a) and (3), R336.1901]**

Testing

8.10 Upon request by the AQD District Supervisor, determination of dilutions-to-thresholds for the FG-PAPERLINE, by measurement at owner's expense, utilizing an odor panel study approved by the Department, will be required. No less than 60 days prior to performing the determination, a complete plan shall be submitted to the AQD. The final plan must be approved by the AQD prior to performing the determination. Verification of the dilutions-to-thresholds includes the submittal of a complete report of the measurement results to the AQD within 60 days following the last date of the determination. **[R336.1901]**

Recordkeeping/Reporting/Notification

8.11 The permittee shall keep, in a satisfactory manner, daily records of the amount of felt paper produced, in air dried tons, for FG-PAPERLINE as required by SC 8.1. All records shall be kept on file for a period of at least five years and made available to the Department upon request. **[R336.1205(1)(a) and (3), R336.1225, R336.1702, R336.1901]**

8.12 The permittee shall keep, in a satisfactory manner, the daily records of the approximate amount of recycled material and wood fiber used in the production of felt paper for FG-PAPERLINE as required by SC 8.2. All records shall be kept on file for a period of at least five years and made available to the Department upon request. **[R336.1205(1)(a) and (3), R336.1225, R336.1702, R336.1901]**

8.13 The applicant shall keep a material safety data sheet and/or a material specification sheet for all treatment/additive materials used by FG-PAPERLINE. At a minimum, these records shall include information regarding the VOC content, density, and solids weight fraction of each treatment/additive materials used. The records shall be kept in a format acceptable to the AQD District Supervisor. All records shall be kept on file for a period of at least five years and made available to the Department upon request. **[R336.1205(1)(a) and (3), R336.1225, R336.1702, R336.1901]**

APPENDIX 1

PREVENTATIVE MAINTENANCE,
MALFUNCTION ABATEMENT PLAN, AND
ODOR REDUCTION PLAN

FOR

IKO MONROE INCORPORATED,
MONROE, MICHIGAN

Preventative Maintenance,

Malfunction Abatement Plan, and

Odor Reduction Plan

For

IKO Monroe Incorporated
Monroe, Michigan

Updated: August 31, 2005

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APPENDICES

EXECUTIVE SUMMARY

This document presents solutions and preventative measures that will be taken by IKO Monroe to reduce or eliminate the odor concerns associated with the facility's paper production line processes, including the wood chip thermo-mechanical pulping process. This Preventative Maintenance, Malfunction Abatement, and Odor Reduction (PM/MA/OR) Plan will not address odor concerns related to the asphalt saturator line. This Plan will be revised and updated to include the asphalt saturator line (and be re-approved by MDEQ) before the commencement of operation of the asphalt saturator line in order to fully comply with Condition 11. B. of Consent Order No. 34-2001, issued by the Michigan Department of Environmental Quality (MDEQ).

As detailed in the Permit to Install application submitted October 12, 2004, IKO is planning to make several improvements to the Monroe facility paper production line operations that will help to reduce or eliminate potential odors from the facility. Some of these improvements include:

- Routing the wood fiber storage tank exhaust to the facility's existing process boiler in order to combust (i.e. control) the emissions
- Significantly increasing the amount of fresh water entering the process (and reducing the amount of water that is recycled)
- Increasing the height of the paper machine vacuum stack from 30 feet to 60 feet
- Introducing a Wood Chip Management and Outdoor Paper Storage Plan (CMP)

Computer dispersion modeling, using conservative assumptions and emission rates, was performed in support of the October 12, 2004 PTI application in order to determine compliance with Michigan Rule 225 and to investigate the potential odors caused by the paper production line processes at the facility. The results of the modeling analyses indicate that ground level concentrations will be below the Rule 225 screening levels and limits of odor detection, and the processes are therefore in compliance with Rule 901.

1.0 INTRODUCTION

IKO Monroe, Inc. ("IKO Monroe"), a manufacturer of roofing products which incorporates recycled paperboard, is an existing facility located at 1151 West Elm Avenue in the City of Monroe, Michigan. IKO Monroe, as agreed upon with the Michigan Department of Environmental Quality, (MDEQ) has applied for a Permit to Install to re-start the existing paper production line. In support of that application (submitted October 12, 2004) and to satisfy Condition 11.B. of Consent Order No. 34-2001, IKO has prepared this Preventative Maintenance, Malfunction Abatement, and Odor Reduction (PM/MA/OR) Plan. This plan includes measures for proper equipment maintenance and operational procedures that will help to prevent emissions from the paper production line that may be odorous. This plan specifies feasible and realistic odor prevention strategies, which will be put into place prior to start-up of the facility and will continue during operation of the paper production line.

The IKO Monroe manufacturing facility processes repulped paper and wood chip fibers into paperboard that is used as a roofing felt material. In addition, the facility contains a roofing felt asphalt saturator line (currently permitted under Permit No. 100-98) where a portion of the roofing felt may be saturated with asphalt for use as a roofing product. At this time, however, the asphalt saturator line will remain idled, and will not be re-started until an updated and revised version of this PM/MA/OR Plan is submitted and approved by the MDEQ, which will include measures to reduce and control odorous emissions from the asphalt saturator line. Therefore, at this point in time, the odor reduction strategy for the asphalt saturator line, will be to not operate this equipment, thus eliminating emissions altogether.

The paper production line process includes a mechanical pulping process to produce recycled paper pulp, a thermo-mechanical pulping (TMP) process to produce wood chip pulp, a wood fiber storage tank, a paper machine, and a process boiler. As required by paragraph 11.C. of AQD Consent Order No. 34-2001, a Rule 901[1] compliance demonstration was included in the PTI

[1] *Michigan Rule 901 is designed to ensure that processes do not result in undesirable impacts, including a loss of economic value, injury to human health, animal life or plant life of significant value, or unreasonable interference with the comfortable enjoyment of life and property.*

application for the paper production line (which includes the "wood chip/paper system"). The Rule 901 compliance demonstration addresses potential odors from the two pulping processes, the associated wood chip pulp storage tank, and the overall paper production process.

This document provides qualitative information on potential odors from the manufacturing processes at the facility and IKO's plans to address these issues. These plans are intended to assist the facility in complying with Rule 901 by reducing odors from the facility's process operations.

Section 2.0 of this document contains a description of the paper production line process operations. Section 3.0 discusses compliance with Michigan Rule 901 and a summary of the odor concerns and planned improvements related to the paper production process. Section 4.0 provides detailed information about the potential odor sources and efforts IKO will take to minimize odors from process operations.

This document also contains several Appendices. Appendix A contains excerpts from the dispersion modeling section from the Paper Production Line PTI application submitted to the MDEQ-AQD in October 2004 (sections related to odor only). Appendices B through E contain detailed Preventative Maintenance, Malfunction Abatement Plans for the various potential odor sources at the facility, as well as a Wood Chip and Outdoor Paper Storage Plan and Facility Inspection Checklists. Please note that the detailed Plans in the Appendices should be considered dynamic plans that may require alterations after the facility resumes operation in order to provide the most effective odor reduction strategies through reasonable methods. Any alterations would be approved by the MDEQ-AQD District Supervisor before implementation.

2.0 PROCESS DESCRIPTION

Two main manufacturing processes are conducted at the IKO Monroe facility - the paper production process and the roofing felt saturator line. Both of these processes may contribute to potential facility odors. However, at this time, the odor reduction plan for the asphalt saturator line will be no operation of this process equipment. Pursuant to Condition 11.B. of Consent Order

No. 34-2001, IKO must submit a revised PM/MA/OR Plan that will include methods to address potential odors from the asphalt saturator line in addition to the paper production line, and receive MDEQ approval of the revised plan prior to re-starting the asphalt saturator line.

Preventative Maintenance, Malfunction Abatement Plans (PM/MA Plans) have been developed and included as Appendices of this version of the PM/MA/OR Plan for process equipment related to the paper production process only. The following is a description of the paper production process. An overall process flow diagram for the paper production process is shown in Figure 1.

2.1 Raw Materials Storage

Wood chips from used pallets and other used wood sources, as well as raw wood, are delivered on site and are stored outdoors on a concrete surface. The concrete surface is sloped such that excess water drains off the concrete, and this helps to avoid excessive pooling of stagnant water and minimize potential odors. To the extent that is possible, the recycled paper products are stored indoors to keep the materials dry and minimize odors. When necessary, paper products may also be stored outdoors, but this practice will be minimized.

2.2 Wood Chip Washing Operation

The wood chips are brought to the wood chip washing area inside the plant via closed conveyor. In the past, the chips were washed using hot process water, which contained dissolved organics and/or resulted in lignin degradation, resulting in VOC emissions from this operation. In order to reduce the potential for odors, the facility is proposing to use fresh (i.e. river or city) water at ambient temperature, which is not expected to generate any emissions from the wood chip washing operation.

Following the chip washing operation, the wood chips travel on a vibrating conveyor (to remove debris and oversized wood chips which are then sent offsite as waste or for reprocessing on a daily basis 5 days per week) to a wet chips feed hopper, which feeds the facility's thermomechanical pulping process. The wet chips feed hopper is located inside the facility buildings.

Figure 1 here

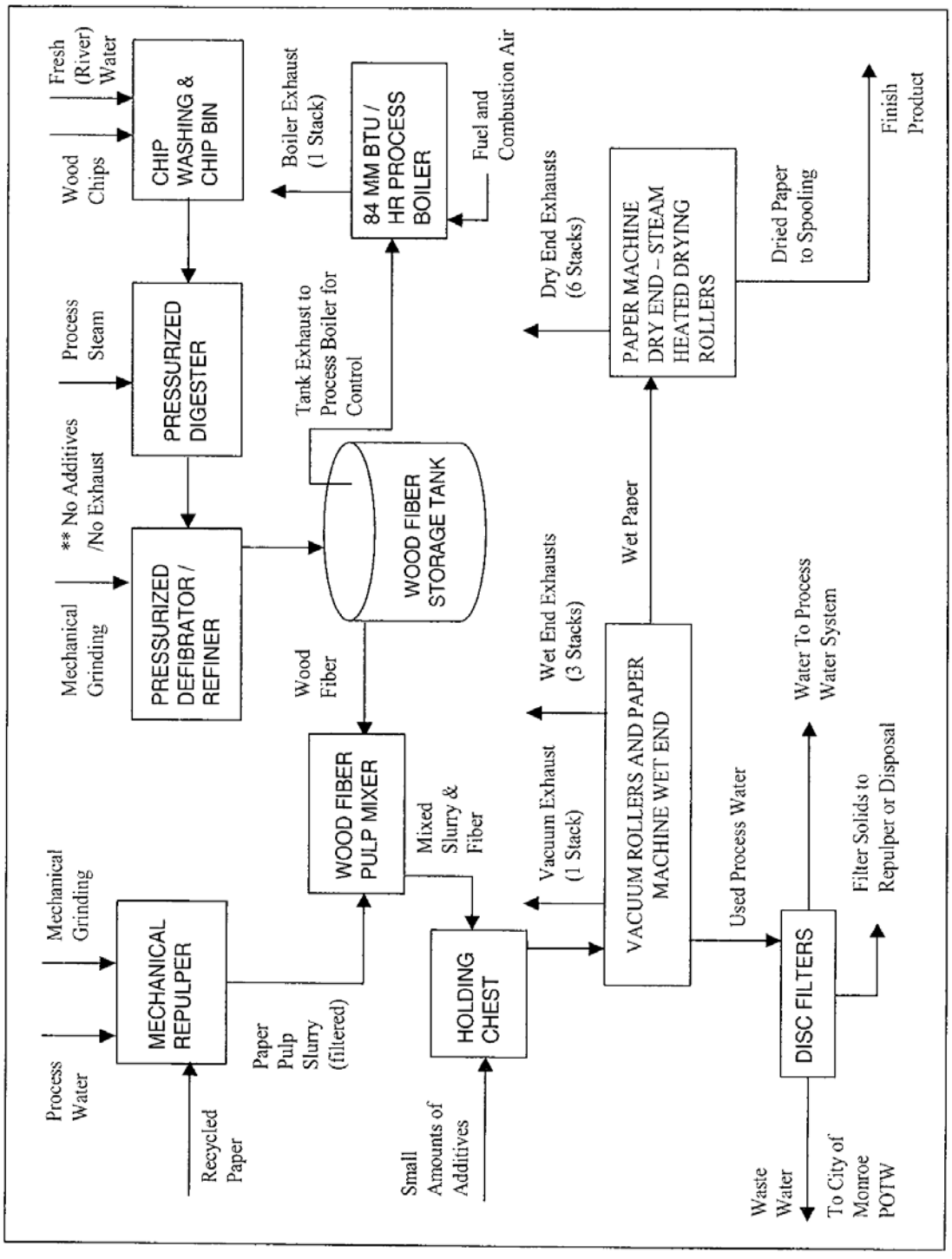

Figure 1. Process Flow Diagram for the IKO Monroe Paper Production Process

2.3 Thermomechanical Pulping (TMP) Process

IKO Monroe uses a thermomechanical pulping (TMP) process to recover wood fiber from the wood chips. No chemicals are added to the TMP process to promote defibration of the wood chips. Rather, defibration is accomplished through the use of steam and mechanical grinding. The TMP equipment consists of: 1) a pressurized steaming vessel (digester) where the chips are softened, and 2) a pressurized defibrator/refiner containing revolving disks that mechanically pulp the softened wood chips to recover the wood fibers. The TMP process used at IKO Monroe does not include any heat recovery operations (which would cause additional emissions).

The steam pressure in the defibrator is used to convey the wood pulp to a storage tank, where the pulp remains until it is mixed with recycle pulp and then used in the paper machine. Because the TMP process system is maintained under positive steam pressure, it is a closed system and there are no appreciable fugitive emissions. Historically, the pulp storage tank was equipped with a vent to relieve pressure and discharge steam (and potential VOC emissions) directly to the ambient air. However, in an effort to reduce emissions and potential odors, IKO Monroe has committed to combusting these exhaust gases in the facility's 84 MM Btu/hr process boiler and discharging the controlled emissions through the boiler exhaust stack. The exhaust gases from the TMP process storage tank are expected to be at a flow rate of 400 actual cubic feet per minute and a temperature of 150°F.

2.4 Recycled Paper Pulping Process

The recycled paper/paperboard products are received in large bundles and stored indoors to the greatest extent possible, or outdoors on a concrete pad. The recycled paper consists of mainly old corrugated containers, with some mixed office paper. Emissions may be generated at the repulper due to the use of the process water, which may contain some dissolved organics. There are no powered exhaust fans near the repulper, and any emissions from the repulper are expected to be emitted from the exhaust stacks serving the nearby paper machine wet end.

After being transported to the repulper, the recycled paper is mixed with process water and mechanically ground up into pulp. The pulp slurry is sent through screens and cleaners to remove metals, glass, plastics, and other impurities and is then pumped to an intermediate storage chest.

The recycle paper pulp is then sent to the wood fiber pulp mixer (mixing vault), where it is mixed with the pulp produced from wood chips.

From the mixing vault, the combined pulp is transferred to a final holding chest and is then subsequently used in the paper machine. Unlike the mechanical repulping operation, the recycle paper pulp intermediate storage chest, the pulp mixing vault, and the final holding chest are located in the facility's basement and they all remain covered while in operation/use (with the momentary exception of removing the covers for material sampling purposes). Therefore, they are not sources of emissions.

Small amounts of additives are introduced into the pulp while it is stored in the final holding chest before being used in the paper machine. These additives consist of biocides and related chemicals intended to prevent the degradation of the wood fiber and aid in the paper production process.

2.5 Papermaking Operations

Prior to the paper machine, the wood fibers are added to the paper pulp in a carefully controlled manner. The mixture is then pumped to a cylinder paperboard machine, which produces approximately 220 air-dried tons/day of roofing felt. The final product (i.e. roofing felt) contains about 6% moisture. Generally, the TMP wood fiber represents about 40% of the pulp stock and the remaining 60% of the pulp stock is recycled paper pulp.

The pulp slurry is first spread over a felt screen. Water is removed from the slurry in two ways; first by vacuum as the screen passes over vacuum drum rollers, and second, by pressing the screen between rollers (i.e. the paper machine wet end). The process water is recycled or sent to the disc filter, where solids are removed from the discharge water. A portion of the process water from the disc filer is recycled back into the process, and the remainder is sent to the City of Monroe Publicly Owned Treatment Works (POTW). The vacuum system is equipped with one exhaust stack. While there are no hoods or enclosures located directly above the wet end of the paper machine, there are three (3) powered exhausts in the roof above the wet end. Any emissions from the wet end are assumed to be discharged through these three stacks.

After the vacuum and press rollers, the paper has sufficient solids (40 to 50%) to be self-supporting, and it is sent to the drying section. In the drying section, the paper is rolled over large drum rollers that are heated by steam. All but a few percent (approximately 6%) of the water is removed from the paper by this heating/drying process. At the exit end of the paper machine, the paper is rolled onto large spools. Similar to the wet end of the paper machine, there are no hoods or enclosures located above the dry end of the paper machine. However, there are six (6) powered exhausts in the roof above the dry end and any associated emissions are assumed to be discharged through these six stacks.

2.6 Wastewater Handling Operations

The existing paper mill was purchased by IKO Monroe from Jefferson Smurfit Corporation in June of 1997. Prior to operating under IKO Monroe, the paper mill had been operated by Jefferson Smurfit Corporation and was used to produce corrugated paper products. Changes that were introduced by IKO Monroe at the paper mill include the addition of the thermomechanical pulping line to accommodate wood chip pulp production, changes to the wastewater handling and recycling procedures, and the addition of a felt saturation line.

Pulp and paper production is a very water intensive process. Based upon the US EPA's publication "Profile of the Pulp and Paper Industry" [EPA 310-R-95-015], typical pulp mills use between 16,000 and 17,000 gallons of water per ton of pulp produced. At the high end of this range, a pulp production rate of 220 tons per day equates to a water usage of more than 3.5 million gallons per day. Due to the high water usage rates, pulp mills almost always re-use a portion of their process water, which is referred to as white water. This used process water will contain varying degrees of dissolved solids and organics, depending upon a wide range of factors including the pulp production process, whether bleaching is being conducted, the types of paper additives being used, water treatment processes being used, et cetera. (Note that the IKO process does not include any bleaching, and that very few additives are used.)

Historically, Jefferson Smurfit Corporation did not achieve a high degree of process water recycling and had approximate sewer discharges in the range of 1.0 to 1.5 MM gallons per day. As part of a general corporate policy regarding water conservation, IKO Monroe initiated changes

to the wastewater handling and treatment that eventually led to sewer discharges that averaged 100,000 gallons per day, with a low of only 30,000 gallons per day.

The initial water treatment equipment used by IKO Monroe consisted of clarifiers, which are essentially tanks equipped with plows or rakes that are used to recover water from a dilute suspension of solids by gravity sedimentation (sometimes aided by flocculating agents). Based upon investigations following odor complaints, IKO Monroe believes that operational problems with the clarifiers (i.e. a broken rake) and subsequent remedial actions were a significant part of past odor problems.

As part of the overall odor reduction plan, IKO Monroe installed a disc filter before the plant was temporarily idled. The original intent of the disc filter was to remove a significant portion of the solids from the process water that is eventually recycled back into the pulp and paper production processes, thus taking some of the solids removal demand off the clarifiers.

While the initial intent of the disk filter was to aid the continued use of the clarifiers in the overall water treatment process, IKO Monroe has decided to abandon the use of the water clarifiers and focus on the disc filter use and water recycling rates. Based upon preliminary investigations, the expected process water recycling rates will be lower than those that existed before the facility was idled and higher than those achieved by Jefferson Smurfit Corporation (i.e. generation of wastewater is expected to be approximately 250,000 gallons per day, with variations in discharge volume depending upon operational and odor considerations).

Before the idling of the IKO Monroe facility, the municipal wastewater treatment plant had expressed concerns over the facility's wastewater discharges. These concerns were related to the loading of dissolved solids and biochemical oxygen demand (BOD) in the facility's wastewater. IKO Monroe believes that these issues were the result of the intensive water reuse program (i.e. repeatedly recycling most of the facility process water) that was in place prior to the facility being idled.

IKO Monroe's decision to recycle less water and increase daily water discharges is therefore expected to address these concerns. IKO believes that this operational improvement will

essentially eliminate potential odors from the wastewater operations and will reduce potential odors from all of the process operations using white water. In addition, the IKO Monroe facility will be required to obtain a new discharge permit from the POTW that is expected to restrict the amount of BOD in the discharge water. By maintaining a discharge water BOD level that is acceptable under the POTW discharge permit and monitoring the facility water in accordance with the Water Monitoring Plan, IKO will reduce the potential for odorous emissions from process water.

The water clarification operations were carried out in both enclosed and non-enclosed outdoor water treatment tanks. There is only one exhaust point from the enclosed tank, and this exhaust point is equipped with a carbon filter to help eliminate any potential odors. In the future, the enclosed tank may be used to store process water on an as needed basis during process upsets and other emergency situations. In addition, the carbon filter will be replaced periodically to ensure proper operation of the control device.

The additional outdoor water storage tanks that are not currently covered will not be used by IKO Monroe until such time as adequate cover(s) have been properly constructed. The newly constructed cover(s) for these additional tanks will included a discharge point that is also equipped with a carbon filter or other method acceptable to MDEQ,to help eliminate odors. .

The hours of outdoor water storage will be tracked on a daily basis and a cumulative total of hours between carbon filter change-outs will be maintained via the Facility Inspection logs.

3.0 ODOR SOURCE DISCUSSION

This section discusses the potential odor sources at the IKO Monroe facility and the steps that are necessary to help reduce the potential odors from these sources. Section 3.1 discusses Michigan Rule 901 and Section 3.2 and Table 3-1 discuss and summarize potential areas of odors and how they will be addressed.

3.1 Compliance with Michigan Rule 901

Michigan Rule 901 is designed to ensure that processes meeting the applicable Part 55 requirements of Act 451 do not result in undesirable impacts not specifically addressed by the Part 55 regulations. These impacts include a loss of economic value, injury to human health, animal life or plant life of significant value, or interference with the comfortable enjoyment of life and property. The regulatory text is as follows:

R 336.1901 Air contaminant or water vapor, when prohibited. (1/18/80)

Rule 901. Notwithstanding the provisions of any other commission rule, a person shall not cause or permit the emission of an air contaminant or water vapor in quantities that cause, alone or in reaction with other air contaminants, either of the following:

(a) Injurious effects to human health or safety, animal life, plant life of significant economic value, or property.

(b) Unreasonable interference with the comfortable enjoyment of life and property.

Rule 901 has primarily been used to ensure that processes do not result in odors that are of a magnitude such that they interfere with human comfort. As detailed in the Consent Judgment Staff Activity Report, IKO Monroe voluntarily suspended manufacturing operations at the plant on December 17, 2000. From April 1999 through the voluntary idling of the plant, citizens complained of odors emanating from the plant.

This document addresses the potential odor problems from the thermomechanical pulping (TMP) and recycled paper pulping processes, the wood fiber storage tank, and the paper machine operations. In addition, possible odors emanating from raw material storage (wood chips and recycled paper) and process and discharge water will be addressed. As previously mentioned, this Plan will have to be updated to address potential odors from the asphalt saturation line prior to start up of the asphalt saturation line. Per Condition 11.B. of the Consent Order, the updated PM/MA/OR Plan must be approved by the AQD before the asphalt saturation line can resume operation.

In an effort to address potential odor issues associated with the thermomechanical pulping (TMP) and recycled paper pulping processes, the wood fiber storage tank, and the paper machine

operations, IKO Monroe conducted computer dispersion modeling to predict the maximum odor concentrations resulting from these operations. The modeling demonstration was submitted in support of the October 2004 permit application for the restart of the paper line and the results are included in Appendix A of this document. Pursuant to Michigan AQD guidance, the odor concentrations were determined by doubling the 1-hour ambient concentrations obtained through modeled impacts to represent 10-minute averaging periods. Emission rates of compounds emitted from the various paper production line sources were determined in a very conservative manner based upon a thorough investigation of National Committee for Air and Stream Improvement (NCASI) documents provided by the MDEQ.

The results of the odor modeling exercise for the paper process (also included in Appendix A) indicate that none of the expected emissions from the IKO Monroe paper production line operations will result in perceptible odors.

3.2 Summary of Past Odor Concerns and Improvements

Table 3-1 presents a summary of past odor concerns related to the IKO Monroe operations and the steps that will be implemented in order to improve (i.e. reduce) the odors from the facility once the paper production line is re-started.

Table 3-1. SUMMARY OF PAST ODOR CONCERNS AND IMPROVEMENTS TO ADDRESS CONCERNS

Past Concern	Future Improvements
1) Wood chips are composting, creating odors	Odor abatement measures contained in this preventative maintenance and odor reduction plan will prevent odors from the composting of wood chips. This will be accomplished through the implementation of a Wood Chip and Outdoor Paper Storage Plan and using fresh water to wash wood chips before processing the chips.
2) Process water septic odors are coming from sewer, clarifiers (outdoor storage tanks), paper line vents, and other sources.	IKO is proposing to markedly increase the amount of fresh water entering the paper production process and reduce the amount of water that is recycled back into the process. In doing so, more water will be discharged from the facility and the process water that is recycled will contain reduced amounts of potentially odorous volatile compounds. The process water will be treated using a disc filter to ensure that the water discharged from the facility will not violate any water discharge limitations, which will also correlate to less odor in the discharge. IKO has already replaced portions of the sewer system to avoid low flow, low velocity areas where the water could become stagnant. In addition, the metering pit has been sealed. One of the outdoor water tanks is currently covered withitsexhaust passing through a carbon filter. The other outdoor water tanks will not be used unless covers are added to them and they are vented in a manner that is approved by the MDEQ-AQD. The covered tank(s) will only be used if there is a process upset or an emergency situation that requires temporary water storage; this should not occur on a regular basis. IKO will not store any water in uncovered outdoor water tanks. The increase in fresh water use will result in a reduced amount of odorous organics remaining in the process water, thus reducing odors from the overall paper production process. In addition, fresh water (instead of process water) will be used to wash the wood chips, so odorous emissions from the chip washing area will be eliminated. Lastly, the vacuum stack will be raised and a water monitoring plan will be followed.
3) Steam defibrator – odor from short vent on wood fiber storage tank.	Some of the stronger wood odors may have come from the wood chip pulp storage tank In the past, the wood chips were washed with process water that likely contained high amounts of process organics (potential odors) and was at elevated temperatures. In addition, the vent from the wood chip pulp storage tank was very low and resulted in poor dispersion (i.e. high ambient concentrations). As an improvement to this, the water used to wash the chips will be fresh water at ambient temperatures, and the tank vent will be routed to the combustion chamber of the facility boiler. So, not only will there be less odorous emissions generated during the chip defibrating process, but the emissions will be controlled by the boiler and then released from the boiler stack (which has much better dispersion than the tank vent). The net result of these efforts will be impacts that are less than 1% of the impacts that were produced before these changes were implemented.
4) Asphalt saturator odors, from the saturator itself and the scrubber stack.	This equipment will remain idled until IKO has submitted a revised version of the PM/MA/OR Plan and the plan has been approved by the MDEQ.

4.0 ODOR REDUCTION PLANS AND STRATEGIES

This section discusses the production operations at the IKO Monroe facility that are believed to have been past sources of odors, and provides details on how IKO Monroe will operate to reduce or eliminate these odors. The operations of past concern are as follows:

- Wood chips and wood chip storage area
- Process water system
- Wood chip pulp storage tank

The following subsections will discuss each of these operations and reference preventative maintenance/measures, malfunction abatement plans, and odor reduction strategies that have been developed to help reduce or eliminate odors from these and other areas. The proposed preventative maintenance and odor reduction plans are included in the Appendices of this document.

4.1 Wood Chip and Outdoor Paper Storage Plan

The intent of the wood chip management and outdoor paper storage plan is to ensure that wood/chips and paper are not: (A) accepted when in an odorous state; and (B) stored outside long enough to deteriorate to the point that they may produce nuisance odors. The basic operational consideration for this plan (also referred to as the Chip Management Plan or CMP) is that wood/chip piles shall be rotated as much as possible and at no time should any wood/chips have been in IKO Monroe's storage longer than 1 week. These chips will be kept in three or more piles and stored towards the eastern side of the concrete pad, as far away from the residents along the western side of the concrete pad as feasible. (these paragraphs are now combined)Wood chip inventories shall be managed with a residence time for chip piles of 1 week, based on a 7 day rolling average of 1200 tons or less. There will be no exceptions; even when fall and spring conditions prevent normal wood harvesting.

The measures IKO Monroe will implement to minimize odors from wood chip handling and outdoor paper storage are listed below:

- The wood/chip storage area will contain multiple piles of wood chips and each pile will be numbered. The pile that has been stored the longest will be the first sent to the mill, and the pile completely used before depletion of the next pile. This will be recorded on the Daily CMP Inspection & Shipment Log.

- Each load of wood chips will be physically inspected by the wood yard operator to determine the acceptability (based on deterioration and odor) of incoming loads. Wood types (certain cherry wood in particular) that may be particularly odorous will ***not*** be accepted, and the wood chips will be required to have a certain degree of structural integrity to be viable as a raw material. In addition, every reasonable effort will be made to ensure that chips do not arrive in a decomposed state and that decomposition does not occur before such chips are used by IKO.

- Any load that may have debris or wood chips that has deteriorated to the point that it has an odor will not be accepted. If trends are observed over the course of time relating a specific type of wood chips to unacceptable odor, actions will be taken to prevent acceptance of these types of chips from suppliers. For example, certain types of cherry wood chips have been noted to cause a stronger than average odor and will not be accepted.

- A sample of each load will be bagged and labeled with the supplier name, date and time received, daily shipment #, and pile # to be stored in, and then sent to the Plant Lab for further inspection, including quality analysis and moisture content.

- Each load received will be logged on the Daily CMP Inspection & Shipment Log by the wood yard operator. The operator will record the supplier name, date and time received, daily shipment #, and the pile # where the chips are stored.

- If unacceptable odors are noticed coming from the wood chip piles, action will be taken to determine where these chips are and to use these chips next in the process or remove them from the facility. Staff will be trained to report such odors and supervisors will conduct inspections to meet the goal of addressing noticeable odors before they can affect neighboring property owners.

- At a minimum of once per month (such as on a plant shut down day) the wood chips in the area of the ramp to the stocker will be replaced with fresh wood chips and the wood chips taken from the ramp will be used next in the process, in order to prevent these chips from developing unacceptable odors.

- In addition to the wood/chip storage inspection procedures, outside paper storage will be monitored and bales will be rotated inside as soon as possible so that outdoor storage time is limited to no more than two months.

- Senior Management will inspect the Daily CMP Inspection & Shipment Log, once per week, to ensure that all procedures have been followed. In addition, a physical walk through of the wood chip and paper storage yard will be conducted looking for any signs of standing water, wood odor, or any other issue that may be a source of odor, and action will be taken to address any notable situations.

A detailed description of the Wood Chip and Outdoor Paper Storage Plan (aka. Chip Management Plan or CMP) is included in Appendix B of this document, along with an example Daily CMP Inspection & Shipment Log and Weekly/Monthly Inspection Log.

It should be noted that the fresh wood chips – which are generally the chips that will have a perceptible smell versus the chips from recycled pallets/wood – are usually received with a water content of 40-50%. This percentage of water indicates that these chips are already nearly saturated with water, and therefore, will not absorb much moisture from precipitation. Drier chip stock, such as chipped pallets, could absorb some moisture. However, these chips do not usually produce odors or decompose easily. Therefore, attempting to keep chips dry will not provide any substantial reduction in potential odors.

4.2 Process Water and WasteWater Management System Odor Control Plans

The potential for odor to originate from the process water (whitewater) and wastewater management system depends on whether the process water is allowed to stagnate and become anaerobic (decomposition or breakdown by microorganisms in the absence of air). IKO will be obtaining an Industrial Pre-Treatment Program (IPP) permit and will follow stringent discharge requirements. Compliance with the IPP plan will significantly reduce (if not eliminate) the possibility of the process and/or wastewater becoming anaerobic because, to meet discharge concentration limits, a significant increase in daily discharge must occur (which means considerably more fresh water will be added to the water system).

The IPP compliance program will include daily monitoring, including sampling for Chemical Oxygen Demand (COD), which will help maintain the recycle rate such that the permitted discharge levels in the water are being met, which will, in turn, prevent odors.

The increased use of fresh water and water monitoring will not only have a direct effect of preventing odors from the water processing and discharge system, there will also be a significant indirect benefit of reducing fugitive emissions from the operations that use process water. Most notably, these include the paper production line vacuum exhaust and the building vents that exhaust above the paper machine. In addition, much of this fresh water will be introduced to the process in the chip washing area of the operation, which will be restricted to using only fresh water. In the past, heated process water (that contained potentially odorous compounds) was used for chip washing, so this process improvement of using fresh water for chip washing will definitely reduce odorous emissions.

Appendix E contains a detailed description of the Water Monitoring Plan that IKO Monroe will utilize to detect and help prevent potential odorous emissions from facility water sources. In addition, the Water Monitoring Plan will include monitoring of any water storage in the external water storage tanks for possible odors and taking action to avoid or alleviate odors or odor potential, if they are present at levels that may be problematic.

4.3 Wood Chip Pulp Storage Tank Vent Pipe

As the washed wood chips are processed in the TMP process, steam (from fresh or potable water) is used to break down the wood chips. This system is under vacuum pressure, which allows no emissions or odors to escape (note: steam has been seen in the past in the area near this process equipment; this is from the steam feed line and not from process "backup"). The defibrated wood chip pulp is then sent via steam pressure to a large outdoor storage tank that is equipped with a vent. In the past, this short vent exhausted directly to the ambient air. As a result of discussions with members of the MDEQ-AQD permit section, IKO has committed to route the storage tank vent to the existing facility boiler to be controlled. The emissions from the tank will be sent to the boiler combustion chamber where they will be reduced by approximately 98-100%, with the remaining emissions released from the boiler stack. Taking into account the improved dispersion offered by the boiler stack release characteristics versus the previous tank vent release, the overall ambient impacts from the storage tank emissions will be reduced to less than 1% of the historical impacts.

A preventative maintenance and malfunction abatement program has been developed for the process boiler in order to ensure that it operates on a continuous basis. This plan is included in Appendix D and covers daily action items and an annual inspection.

In addition, it should be mentioned that in the event that the boiler experiences even a temporary shutdown, the paper production line and the thermomechanical processes will cease to operate. Steam generated by the boiler is used throughout the paper production line process equipment, and without it, the line cannot operate. Operation of the line will only resume when the boiler is re-started.

Subsequently, almost no uncontrolled emissions from the wood fiber storage tank will be discharged when the boiler is not operating because the process will not operate is absence of the boiler (and will only displace an insignificant amount of tank air). Due to this fact, no formal malfunction abatement plan is necessary for the boiler (i.e. the boiler will always be fixed as quickly as possible so that the process can start up again). However, a brief procedure is described and included in Appendix D.

4.4 Daily and Weekly Facility Inspections for Odor Sources

IKO Monroe will conduct both daily and weekly inspections of the facility in order to further reduce potential odors from the paper production line and associated operations. Included in the daily inspections will be items such as checking that all raw material storage/holding tanks are properly covered, making sure that the paper machine vent exhaust fans are operating properly, and making note of the number of hours of any outdoor, enclosed water storage tank use during each day. Note that the covers on the raw material storage chests and vaults used for temporary storage of raw materials that are fed to the paper machine may be removed periodically for material testing purposes and then immediately replaced.

The weekly facility inspection items will ensure that all plans are being conducted properly and will provide an inspection for unusual visible emissions from the various facility stacks (i.e. emissions that look dark or unlike steam). Additionally, the weekly inspection logs will be used to track the cumulative hours of water storage in the enclosed outdoor water storage tank(s).

If any concerns arise as a result of the Daily and Weekly Facility Inspections, actions will be taken to rectify these concerns and those actions will be recorded.

Appendix C provides a checklist of items that will be inspected under the Daily and Weekly Facility Inspections.

APPENDIX A

PAPER PRODUCTION PROCESS AMBIENT IMPACT ANALYSIS

(As Excerpted From IKO Monroe Permit Application Submitted October 12, 2004)

5.0 AMBIENT IMPACT ANALYSIS (excerpted)

A computer dispersion modeling analysis has been conducted in order to determine the maximum ambient impacts, or ground level concentrations (GLCs), resulting from the emissions of toxic air contaminants (TACs) from the nine (9) stacks associated with the paper machine wet and dry ends, the one (1) vacuum exhaust stack associated with the paper machine, and the emissions from the thermomechanical pulping process that are being controlled through combustion in the process boiler (i.e. controlled emissions released from the boiler stack). The emissions from the facility's recycled paper pulping process are included in the emissions from the wet end of the paper machine. This section of the report discusses the modeling methodology, provides a source description, and presents the results of the dispersion modeling analysis for both toxic air contaminants and odors.

The predicted ground level concentrations of the TACs have been compared with the applicable initial threshold screening levels (ITSLs) and initial risk screening levels (IRSLs) in order to determine whether or not the emissions from pulping processes and paper machine comply with Michigan's Rules 225 through 232. The formaldehyde emissions from the facility have also been modeled for comparison with the secondary risk screening level (SRSL). Aside from determining ambient impacts for purposes of Michigan Rule 225, the modeling analysis has also been used to predict maximum 10-minute concentrations that have been used to evaluate the potential odors produced by the paper production operations.

Based upon the screening results of the modeling analysis and a more refined analysis for formaldehyde, it has been determined that the TAC emissions from the recycled paper repulping process, controlled thermomechanical pulping process and the paper machine comply with the applicable screening levels. Based upon the available odor threshold/perception data and the predicted 10-minute concentrations, the emissions from these paper production operations, following the proposed improvements (controlling TMP emissions and raising vacuum stack, etc.), are not expected to cause nuisance odors. In fact, the odor concentrations produced by the paper production line are expected to be below the lowest odor concentrations associated with either the odor threshold or odor perception concentration data.

5.1 Modeling Methodology

As discussed in Section 2.0 of this report, the IKO Monroe paper production line contains both pulping processes and a paper machine. The emissions from these processes consist of volatile organic compounds (VOCs), all of which are also classified as toxic air contaminants pursuant to Michigan Rule 120(f). Controlled emissions from the thermomechanical pulping process will be discharged from the process boiler stack, while the emissions from the recycled paper repulping process and paper machine are expected to be emitted from the nine ventilation stacks located above the paper machine line, and from the vacuum exhaust stack.

In Section 3.0, the maximum potential emission rate of TACs from the recycled paper repulping process, thermomechanical pulping process (uncontrolled and controlled) and the paper machine are presented. Rather than model the individual TAC emission rates from the boiler and vacuum system exhaust stacks and each of the nine paper machine exhaust stacks, the modeling analysis has been conducted by determining modeled impacts for the process boiler and vacuum system exhaust stacks, and combined modeled impacts for each of the paper machine wet and dry ends.

The overall facility impacts were then determined by summing the maximum impacts produced by the controlled TMP process emissions from the process boiler, the paper machine vacuum stack emissions, the paper machine wet end emissions and the paper machine dry end emissions, per averaging period, for each of the TACs associated with the overall paper production process.

The toxic air contaminant emission rates have been calculated based upon the maximum daily recycled paper pulp, wood chip pulp, and roofing felt paper production rates, using emission factors developed from NCASI emission studies as discussed in Section 3.0 of this technical support document. For modeling purposes, the short term emission rates have been calculated by assuming that the daily emission rates occur over a 24-hour period. The facility normally operates the pulping and papermaking process 24 hours per day, and this approach is expected to accurately estimate the hourly emissions from the processes. The maximum GLCs have been calculated by assuming that the emissions from the pulping processes and paper machine operation occur continuously (i.e. 8,760 hours/year) at the maximum hourly emission rates.

Section 5.3 presents a more detailed discussion of the procedures employed in determining the GLCs for the TACs emitted from the pulping processes and paper machine, including example calculations. Table 5-4 presents the maximum GLCs for the TAC emissions resulting from the paper production emissions. These impacts are shown in comparison with the corresponding screening levels and, with the exception of formaldehyde, demonstrate that every TAC complies with the health based screening levels of Michigan Rule 225. In the case of formaldehyde, an additional site-wide modeling analysis has been conducted, and the results of this additional analysis demonstrate compliance with Michigan Rule 225.

As discussed in relation to Rule 901, IKO Monroe has evaluated the potential odor concentrations that will be produced by the emissions from the paper production process. The results of the odor evaluation are presented in Section 5.5 and indicate that the potential odors produced by the paper production line are below established odor concentration thresholds and perception values (hereafter odor "values"). The predicted 10-minute odor concentrations are summarized and compared to the applicable odor values in Table 5-9.

(Sections 5.2 through 5.4 present the modeling background information and describe the results of the TAC modeling analysis versus the Rule 225 screening levels. These sections are not necessary in support of this document, because they do not provide much information related to the odor analysis. The PTI document contains the unabridged version of the modeling analysis.)

5.5 Odor Modeling Analysis Results

The modeling analysis methodology discussed in Section 5.3 has also been used to determine the potential odor concentrations produced by the recycled paper repulping process, thermo-mechanical pulping process, and the paper machine. Based upon this methodology, modeled impacts have been used to determine per TAC odor impacts for the thermomechanical pulping process (controlled emissions from process boiler stack), the paper machine vacuum system, the paper machine wet end (including emission from the mechanical repulping process), and the paper machine dry end. These individual TAC odor impacts were then summed to derive a total odor impacts for the paper production line.

Odor Values Used For Rule 901 Compliance Demonstration

The Michigan AQD discusses various permitting issues in a publication referred to as *Michigan Air Use Permit Technical Manual* (henceforth referred to as "AQD manual"). The Air Quality Dispersion Modeling section of the AQD manual discusses one specific technique for assessing odors. This technique suggests that the one hour concentrations obtained through appropriate computer dispersion modeling be multiplied by a factor of 2.0 to determine an approximate 10-minute concentration.

The calculated 10-minute "odor" concentrations can then be compared to specific threshold odor concentrations/perception odor concentrations, which are contained in Appendix D of the Air Quality Dispersion Modeling section of the AQD manual[1] for many of the TACs emitted from the IKO Monroe paper production line. The odor data of Appendix D of the AQD manual contains the following data: odor quality, threshold of odor concentration, odor perception concentration, and odor index. The following is a brief summary of the threshold odor concentration and odor perception concentration terms as they are defined in the AQD manual (the odor quality and odor index data is not being presented).

Threshold Odor Concentration

The threshold odor concentrations presented in the AQD manual are based upon 50% of concentrations that are referred to as recognition thresholds. A recognition threshold is the concentration at which an odor can be defined as being representative of the chemical being studied (i.e. rotten eggs for hydrogen sulfide).

Odors thresholds are normally established through the use of odor panels. For example, the chemical hydrogen sulfide has a reported odor threshold of 0.2-7 parts per billion (ppb) in the AQD manual. From this information, it can be inferred that the 50% recognition threshold for the hydrogen sulfide was reported as 0.2-7 ppb. This concentration reflects the level at which half of the people in an odor panel were able to identify a "rotten egg" smell at a hydrogen sulfide concentrations of between 0.2 and 7 ppb.

[1] The odor data of Appendix D of the AQD manual is consistent with the data contained in Appendix F of the Michigan AQD April 2003 publication *"PERMIT TO INSTALL WORKBOOK – A Practical Guide to Completing an Air Permit Application"*.

Odor Perception Concentration

This odor quality represents the concentration at which a person is barely certain that an odor is detected. The data from which these concentrations were obtained does not specify whether the concentrations are for the worst individual responses or 50% population (i.e. odor panel) perception responses. These concentrations are typically more conservative than the threshold odor concentrations.

It should be noted that odor data for each of the individual TACs that may be emitted from the paper production line was not always available within the AQD manual. In these cases, alternate sources of odor data have been used. The primary alternate source of odor data is the U.S. EPA's March 1992 publication No. EPA/600/R-92/047 – *"Reference Guide to Odor Thresholds for Hazardous Air Pollutants Listed in the Clean Air Act Amendments of 1990"*. Additional alternate sources of odor data include the following:

- "Sources of Formaldehyde, Other Aldehydes and Terpenes in a New Manufactured House", A. T. Hodgson and D. Beal, October 28, 2002. Please note that the odor threshold data is actually from a secondary reference of Devos, et al, 1990.
- The U.S. EPA's Technology Transfer Network, Air Toxics Website (refer to http://www.epa.gov/ttn/atw/hlthef).
- "Odor Thresholds and Irritation Level of Several Chemical Substances: A Review", Jon A. Ruth, March 1986.

With the pertinent terms and sources of odor data having been discussed, Table 5-7 presents a summary of the odor data obtained for the individual TACs that may be emitted from the IKO Monroe paper production line. All of the referenced odor data sources (or pertinent excerpts from the sources) are contained in Appendix E.

For purposes of the Rule 901 odor impact analysis, the numerical values labeled as odor "values" in Table 5-7 have been used to assess the acceptability of the odor impacts produced by the IKO Monroe paper production line. The following is a brief discussion of which odor data has been used to establish the odor "values".

As noted previously, odor perception concentrations are typically lower, or more conservative, than threshold odor concentrations. The final $\mu g/m^3$ odor "values" listed in Table 5-7, which have been used in conducting the odor modeling analysis, have primarily been based upon the lowest odor concentrations associated with either the odor threshold or odor perception concentrations for each of the TACs.

For all odor data obtained from the AQD manual, the concentrations are explicitly identified as representing threshold odor concentrations or odor perception concentrations. In the case of the odor data obtained from the U.S. EPA's Reference Guide to Odor Thresholds for Hazardous Air Pollutants Listed in the Clean Air Act Amendments of 1990, all odor data with the exception of that for bromoform represent odor perception concentrations. The bromoform odor value data presented in Table 5-9 represents a threshold odor concentration rather than an odor perception concentration and was selected based upon data quality. For all other sources of odor data, it is not known whether the odor data represents threshold odor concentrations or odor perception concentrations.

It should be noted that all final odor values in Table 5-7 are presented in units of microgram per cubic meter ($\mu g/m^3$). All odor data has been converted into these units in order to facilitate comparisons with the odor impacts determined through the use of the ISCPRIME dispersion model, which expresses concentrations in units of $\mu g/m^3$. An example unit conversion is presented following Table 5-7.

Table 5-7. IKO Monroe Paper Production Line Individual Toxic Air Contaminants and Associated Odor Data

Toxic Air Contaminant	CAS Registry Number	Molecular Weight (g/g-mole)	MI AQD Threshold Odor Conc. [1] (ppm)	MI AQD Odor Perception Conc. [1] (ppm)	EPA Odor Data [2] (mg/m^3)	Notes for the EPA Odor Data [3]	Alternate (non-AQD or EPA) Odor Data [4]	Units and Source of Alternate Odor Data [4]	Final Odor Value [5] (ug/m^3)
Acetaldehyde	75-07-0	44.05	0.03-0.1	0.007					12.8
Biphenyl	92-52-4	154.21			0.06	B2			60.0
3-Carene	13466-78-9	136.23	No Data	No Data	No Data	-----	No Data	-----	2,465 [6]
Chloroform	67-66-3	119.40	200-300						988,970
Cumene	98-82-8	120.20			0.04	A (lowest value)			40.0
P-cymene	99-87-6	134.22	No Data	No Data	No Data	-----	No Data	-----	40.0 [7]
1,2-dimethoxyethane	110-71-4	90.12	No Data	No Data	No Data	-----	No Data	-----	No Data
Limonene	5989-27-5	136.23					0.44	ppm, Devos	2,465
Methanol	67-56-1	32.04	2,000	4					5,308
Methyl Ethyl Ketone	78-93-3	72.10	4-10	2					5,972
Methylene Chloride	75-09-2	84.94			500.00	A (lowest value)			500,000
Naphthalene	91-20-3	128.20			0.20	A			200
Phenol	108-95-2	94.11	0.05-0.6						195
Alpha-pinene	80-56-8	136.23					0.69	ppm, Devos	3,904
Beta-pinene	127-91-3	136.23	No Data	No Data	No Data	-----	No Data	-----	2,465 [6]
Propionaldehyde	123-38-6	58.08	0.400	0.009					21.6
Toluene	108-88-3	92.13	2	0.200					763
Formaldehyde	50-00-0	30.03	1	0.050					62.2
Acetone	67-64-1	58.08	20-50	0.500					1,203

[1] Odor data was obtained from Appendix F of the Michigan AQD publication "Permit To Install Workbook - A Practical Guide to Completing an Air Permit Application", April 2003.

[2] Odor data was obtained from the US EPA's "Reference Guide to Odor Thresholds for Hazardous Air Pollutants Listed In the Clean Air Act Amendments of 1990", EPA/600/R-92/047, March 1992.

[3] The following is a summary of the EPA codes regarding odor data: A = accepted value based on critique, B = rejected value based on criteria, B1 = rejected value - water threshold, B2 = rejected value - minimum perceptible value, B3 = rejected value - water threshold/air conversion, B4 = rejected value - intensity, B5 = rejected value - insufficient methodology, C1 = rejected source based on review - secondary source, C2 = rejected source - incidental reference, C3 = rejected source - passive exposure/workplace, C4 = rejected source - passive exposure/experiment, D1 = omitted source - unpublished data, D2 = omitted source - personal communication, D3 = omitted source - anonymous reference, D4 = omitted source - omitted in Gemert, D5 = omitted source - pre-1900 reference, E1 = source located but not reviewed, E2 = source not located.

[4] In the event that neither the Michigan AQD nor EPA sources of data contained odor data, alternate sources of data were evaluated. These sources include various papers provided by Mr. Telesz of the Michigan AQD and general web-based searches. The ultimate source of the alternate odor data is noted by author.

[5] These odor "values" will be used in the odor modeling analysis. Please note that when both Michigan AQD Odor Threshold and Perception data were available, the lowest value was used. In addition, the lowest value (whenever ranges of values were present) has been used to establish the odor value used for modeling purposes.

[6] Odor threshold data for 3-carene and beta-pinene was not located. However, both these compounds are similar to the compounds limonene and alpha-pinene in that they all share the same molecular formula ($C_{10}H_{16}$). Although the structures of the four compounds differ, the lowest odor threshold associated with limonene and alpha-pinene (i.e. 2,433 $\mu g/m^3$ for limonene) has been used as an odor value for 3-carene and beta-pinene.

[7] No odor threshold data was located for p-cymene. However, p-cymene is structurally similar to cumene (both have an aromatic ring structure with an attached propyl group), and the odor threshold concentration for cumene (40 $\mu g/m^3$) has also been used as an odor value for p-cymene.

Table 5-7. (Continued) IKO Monroe Paper Production Line Individual Toxic Air Contaminants and Associated Odor Data

Toxic Air Contaminant	CAS Registry Number	Molecular Weight (g/g-mole)	MI AQD Threshold Odor Conc. [1] (ppm)	MI AQD Odor Perception Conc. [1] (ppm)	EPA Odor Data [2] (mg/m^3)	Notes for the EPA Odor Data [3]	Alternate (non-AQD or EPA) Odor Data [4]	Units and Source of Alternate Odor Data [4]	Final Odor Value [5] (ug/m^3)
Bromodichloromethane	75-27-4	163.83	No Data	No Data	No Data	-----	No Data	-----	2,200 [8]
Bromoform	75-25-2	252.75			2.2-2.5	E1			2,200
Bromomethane	74-83-9	94.94					80.00	mg/m^3, EPA Air Toxics Website	80,000
n-Butane	106-97-8	58.12		5000					12,034,958
1-Butanol	71-36-3	74.12	1-50	0.300					921
1-Butene	106-98-9	56.11	60-70	0.070					163
Chloromethane	74-87-3	163.83					10.00	ppm, EPA Air Toxics Website	67,849
Dibromochloromethane	124-48-1	208.28	No Data	No Data	No Data	-----	No Data	-----	2,200 [8]
Ethanol	64-17-5	46.07	1-50						1,908
Ether	60-29-7	74.12	0.300						921
Isobutane	75-28-5	58.12	1.200						2,888
Isopentane	78-78-4	72.15	No Data	No Data	No Data	-----	No Data	-----	5,976 [9]
Pentane	109-66-0	72.15	990	2					5,976
Propylene	115-07-1	42.08					39.56-116.272	mg/m^3, John Ruth	39,560
1,1,1-trichloroethane	71-55-6	133.40	400	100					552,465
Alpha-methyl-styrene	98-83-9	118.18					0.2496-960	mg/m^3, John Ruth	250
Trichloroethene	79-01-6	131.39	20						108,828
Vinyl Acetate	108-05-4	86.09			0.40	A (lowest value)			400
m,p-xylene	1330-20-7	108.20	0.3-4	0.100					448

[1] Odor data was obtained from Appendix F of the Michigan AQD publication "Permit To Install Workbook - A Practical Guide to Completing an Air Permit Application", April 2003.

[2] Odor data was obtained from the US EPA's "Reference Guide to Odor Thresholds for Hazardous Air Pollutants Listed In the Clean Air Act Amendments of 1990", EPA/600/R-92/047, March 1992.

[3] The following is a summary of the EPA codes regarding odor data: A = accepted value based on critique, B = rejected value based on criteria, B1 = rejected value - water threshold, B2 = rejected value - minimum perceptible value, B3 = rejected value - water threshold/air conversion, B4 = rejected value - intensity, B5 = rejected value - insufficient methodology, C1 = rejected source based on review - secondary source, C2 = rejected source - incidental reference, C3 = rejected source - passive exposure/workplace, C4 = rejected source - passive exposure/experiment, D1 = omitted source - unpublished data, D2 = omitted source - personal communication, D3 = omitted source - anonymous reference, D4 = omitted source - omitted in Gemert, D5 = omitted source - pre-1900 reference, E1 = source located but not reviewed, E2 = source not located.

[4] In the event that neither the Michigan AQD or EPA sources of data contained odor data, alternate sources of data were evaluated. These sources include various papers provided by Mr. Telesz of the Michigan AQD and general web-based searches. The ultimate source of the alternate odor data is noted by author.

[5] These odor “values” will be used in the odor modeling analysis. Please note that when both Michigan AQD Odor Threshold and Perception data were available, the lowest value was used. In addition, the lowest value (whenever ranges of values were present) has been used to establish the odor value used for modeling purposes.

[8] Odor threshold data for bromodichloromethane and dibromochloromethane was not located. For purposes of assigning an approximate odor value to these compounds, the lowest value of any of the remaining halogenated compounds within Table 5-5 has been used. This lowest value is equal to 2,200 $\mu g/m^3$ and is for the compound bromoform. The odor thresholds for the other halogenated compounds in Table 5-5 range between 66,964 $\mu g/m^3$ and 976,071 $\mu g/m^3$, so the use of the odor value for bromoform is believed to be conservative.

[9] Odor threshold data for isopentane was not located. However, isopentane is similar to pentane in that they all share the same molecular formula (C_5H_{12}). Although the structures of these compounds differ, the odor threshold for pentane is being used as the representative odor value for isopentane.

The following calculation demonstrates the conversion of a ppmv concentration to units of μg/m^3 for acetaldehyde (conversion taken from Appendix C of the Air Quality Dispersion Modeling section of the AQD manual). The parts per million by volume (ppmv) to μg/m^3 micrograms per cubic meter conversion for all other TACs have been calculated in a similar manner using the appropriate molecular weights of Table 5-7.

Acetaldehyde (CH_3CHO) ppmv to μg/m^3 Conversion

Acetaldehyde Concentration = 0.007 ppmv (lowest available odor concentration)

Acetaldehyde Molecular Weight (MW) = 44.05 g/g-mole

Molar Volume (760 mm Hg, 70°F) = 24.146 L/g-mole

$$Acetaldehyde\ Concentration, \frac{\mu g}{m^3} = \frac{0.007\ L\ CH_2O}{10^6\ L} \times \frac{g-mole\ CH_2O}{24.146\ L\ CH_2O} \times \frac{44.05\ g\ CH_2O}{g-mole\ CH_2O} \times \frac{10^6\ \mu g}{g} \times \frac{1{,}000\ L}{m^3} = \frac{12.77\ \mu g}{m^3}$$

As shown in the preceding calculation, a concentration of 0.007 ppmv acetaldehyde is equivalent to 12.8 μg/m^3 of acetaldehyde at standard conditions (760 mm Hg and 70°F based upon the AQD manual, Air Quality Dispersion Modeling Section, Appendix C). For any odor data that was expressed in units of mg/m^3, the values have been converted into units of μg/m^3 by simply multiplying the mg/m^3 values by a factor of 1,000 μg/mg.

Odor Analysis Results

The 1-hour modeled impacts of Table 5-3 have been used to determine 10-minute modeled impacts by directly scaling the 1-hour impacts by a factor of 2.0 (as suggested in the AQD manual), and the results of this procedure are shown in Table 5-8. The 10-minute impacts for each of the TACs emitted from the pulping processes and the paper machine were then calculated in a manner identical to the calculation methodology discussed in Section 5.3.

Table 5-8. One Gram Per Second Modeled Impacts For the Modeled Exhaust Stacks

Modeled Exhaust Stack(s)	Gram Per Second Modeled Impact [1] ($\mu g/m^3$)/(g/sec)	
	1-Hour	10-Minute [2]
Process Boiler Exhaust Stack	167.98	335.97
Paper Machine Vacuum System Stack	257.50	515.01
Paper Machine Wet End Stacks (3)	382.07	764.14
Paper Machine Dry End Stacks (6)	279.89	559.77

[1] The gram per second modeled impacts represent an emission rate of 1.0 g/sec distributed evenly amongst the number of stacks associated with the release.

[2] Per AQD guidelines, the 10-minute modeled impacts have been calculated by multiplying the 1-hour impacts by a factor of 2.0.

Although the locations of the 10-minute modeled impacts are not presented within Table 5-8, the locations these modeled impacts are consistent with those presented for the 1-hour averaging periods within Table 5-3. For example, based upon Table 5-3, the location of the 10-minute modeled impact for the process boiler exhaust stack is as follows: X (east/west) = 47.43 meters, Y (north/south) = 98.37 meters.

As discussed in Section 5.3 in relation to the TAC modeling analysis, the 10-minute gram per second modeled impacts have been applied to the individual TAC emission rates from each release (i.e. process boiler stack, vacuum system stack, wet end stacks, and dry end stacks). The resulting 10-minute impacts have then been summed to derive a total 10-minute odor impact for each toxic air contaminant emitted from the paper production line. The following calculation demonstrates this procedure for the acetaldehyde odor impact for the paper production line. The odor impacts for all other toxic air contaminants have been calculated in a similar fashion.

Paper Production Line Acetaldehyde (CH_3CHO) Odor Impact

Boiler Stack (TMP Process) CH_3CHO Emission Rate = 2.649 E-04 g/sec

Paper Machine Vacuum Stack CH_3CHO Emission Rate = 1.162 E-03 g/sec

Paper Machine Wet End CH_3CHO Emission Rate = 4.031 E-03 g/sec

Paper Machine Dry End CH_3CHO Emission Rate = 7.664 E-03 g/sec

Boiler Stack 10-Min. Modeled Impact = 335.97 $\mu g/m^3$ per gram/sec

Paper Machine Vacuum Stack 10-Min. Modeled Impact = 515.01 $\mu g/m^3$ per gram/sec

Paper Machine Wet End (Combined) 10-Min. Modeled Impact = 764.14 $\mu g/m^3$ per gram/sec

Paper Machine Dry End (Combined) 10-Min. Modeled Impact = 559.77 $\mu g/m^3$ per gram/sec

$$CH_3CHO\ 10-Min.GLC_{Boiler\_Stk} = \frac{2.649\ E-04\ g\ CH_3CHO}{second} \times \frac{335.97\ \mu g/m^3}{1\ gram/\text{sec}ond} = \frac{0.089\ \mu g\ CH_3CHO}{m^3}$$

$$CH_3CHO\ 10-Min.GLC_{Vacuum\_Stk} = \frac{1.162\ E-03\ g\ CH_3CHO}{second} \times \frac{515.01\ \mu g/m^3}{1\ gram/\text{sec}ond} = \frac{0.598\ \mu g\ CH_3CHO}{m^3}$$

$$CH_3CHO\ 10-Min.GLC_{Wet\_End\_Stks} = \frac{4.031\ E-03\ g\ CH_3CHO}{second} \times \frac{764.14\ \mu g/m^3}{1\ gram/\text{sec}ond} = \frac{3.080\ \mu g\ CH_3CHO}{m^3}$$

$$CH_3CHO\ 10-Min.GLC_{Dry\_End\_Stks} = \frac{7.664\ E-03\ g\ CH_3CHO}{second} \times \frac{559.77\ \mu g/m^3}{1\ gram/\text{sec}ond} = \frac{4.290\ \mu g\ CH_3CHO}{m^3}$$

$$CH_3CHO\ 10-Min.GLC_{Total} = \frac{(0.089+0.598+3.080+4.290)\ \mu g\ CH_3CHO}{m^3} = \frac{8.058\ \mu g\ CH_3CHO}{m^3}$$

Therefore, the maximum 10-minute acetaldehyde concentration (i.e. odor) is predicted to be 8.06 $\mu g/m^3$, which is significantly less than the calculated odor value of 12.8 $\mu g/m^3$. The results of applying the proceeding procedure to the rest of the toxic air contaminants emitted from the IKO Monroe paper production line are presented in Table 5-9.

Table 5-9. IKO Monroe Facility Paper Production Line Odor Analysis Results

Toxic Air Contaminant	CAS No.	Modeled Emission Rates (g/sec)				10-Minute Odor Concentrations (µg/m^3)					Odor Value (µg/m^3)	Impact As % of Odor Value
		Boiler Stack (TMP Process)	Paper Machine Vacuum stack	Paper Machine Wet End [1]	Paper Machine Dry End	Boiler Stack (TMP Process)	Paper Machine Vacuum stack	Paper Machine Wet End [1]	Paper Machine Dry End	TOTALS		
Acetaldehyde	75-07-0	2.649E-04	1.162E-03	4.031E-03	7.664E-03	0.09	0.60	3.08	4.29	8.06	12.8	63.1%
Biphenyl	92-52-4	1.184E-04	1.138E-03	6.901E-03	1.725E-02	0.04	0.59	5.27	9.66	15.56	60.0	25.9%
3-Carene	13466-78-9	2.867E-03	-----	-----	-----	0.96	-----	-----	-----	0.96	2,465	< 0.1%
Chloroform	67-66-3	-----	6.468E-05	1.756E-03	-----	-----	0.03	1.34	-----	1.37	988,970	< 0.1%
Cumene	98-82-8	7.897E-05	-----	-----	-----	2.65E-02	-----	-----	-----	2.65E-02	40.0	< 0.1%
P-cymene	99-87-6	8.083E-05	-----	-----	-----	2.72E-02	-----	-----	-----	2.72E-02	40.0	< 0.1%
1,2-dimethoxyethane	110-71-4	-----	2.772E-05	1.455E-03	-----	-----	0.01	1.11	-----	1.13	-----	-----
Limonene	5989-27-5	2.288E-04	1.258E-03	2.828E-03	-----	0.08	0.65	2.16	-----	2.89	2,465	0.1%
Methanol	67-56-1	1.425E-03	2.164E-03	1.986E-02	1.187E-02	0.48	1.11	15.18	6.64	23.41	5,308	0.4%
Methyl Ethyl Ketone	78-93-3	4.525E-05	5.283E-04	2.192E-03	-----	0.02	0.27	1.68	-----	1.96	5,972	< 0.1%
Methylene Chloride	75-09-2	-----	7.778E-04	2.567E-03	1.866E-03	-----	0.40	1.96	1.04	3.41	500,000	< 0.1%
Naphthalene	91-20-3	-----	1.419E-03	3.229E-03	-----	-----	0.73	2.47	-----	3.20	200	1.6%
Phenol	108-95-2	1.499E-04	3.073E-03	5.204E-03	1.696E-02	0.05	1.58	3.98	9.49	15.10	195	7.7%
Alpha-pinene	80-56-8	4.552E-03	1.016E-03	1.562E-02	6.699E-03	1.53	0.52	11.93	3.75	17.74	3,904	0.5%
Beta-pinene	127-91-3	9.091E-04	4.620E-04	6.015E-03	3.945E-03	0.31	0.24	4.60	2.21	7.35	2,465	0.3%
Propionaldehyde	123-38-6	1.693E-05	2.132E-04	1.985E-03	4.357E-03	0.01	0.11	1.52	2.44	4.07	21.6	18.8%
Toluene	108-88-3	-----	1.756E-05	1.305E-03	-----	-----	0.01	1.00	-----	1.01	763	0.1%
Formaldehyde	50-00-0	1.521E-04	1.814E-04	3.750E-04	7.102E-03	0.05	0.09	0.29	3.98	4.41	62.2	7.1%
Acetone	67-64-1	6.862E-05	1.072E-03	7.669E-04	1.331E-03	0.02	0.55	0.59	0.74	1.91	1,203	0.2%
Bromodichloromethane	75-27-4	-----	6.930E-05	-----	-----	-----	3.57E-02	-----	-----	3.57E-02	2,200	< 0.1%
Bromoform	75-25-2	-----	7.623E-04	3.118E-04	1.386E-04	-----	0.39	0.24	0.08	0.71	2,200	< 0.1%
Bromomethane	74-83-9	-----	-----	1.317E-04	-----	-----	-----	0.10	-----	0.10	80,000	< 0.1%
n-Butane	106-97-8	-----	1.201E-05	3.349E-05	-----	-----	6.19E-03	2.56E-02	-----	3.18E-02	12,034,958	< 0.1%
1-Butanol	71-36-3	-----	9.702E-04	1.261E-03	7.854E-04	-----	0.50	0.96	0.44	1.90	921	0.2%
1-Butene	106-98-9	2.692E-06	-----	1.871E-05	6.214E-05	9.05E-04	-----	1.43E-02	3.48E-02	5.00E-02	163	< 0.1%
Chloromethane	74-87-3	1.303E-05	9.009E-05	6.306E-05	1.178E-04	0.00	0.05	0.05	0.07	0.16	67,849	< 0.1%
Dibromochloromethane	124-48-1	-----	2.148E-04	-----	-----	-----	0.11	-----	-----	0.11	2,200	< 0.1%
Ethanol	64-17-5	2.606E-04	1.007E-03	1.284E-03	2.356E-03	0.09	0.52	0.98	1.32	2.91	1,908	0.2%
Ether	60-29-7	1.042E-04	4.643E-04	-----	1.039E-03	0.04	0.24	-----	0.58	0.86	921	< 0.1%
Isobutane	75-28-5	1.303E-05	1.548E-04	9.933E-05	3.289E-04	0.00	0.08	0.08	0.18	0.34	2,888	< 0.1%
Isopentane	78-78-4	6.254E-06	7.854E-05	1.063E-04	1.455E-04	0.00	0.04	0.08	0.08	0.21	5,976	< 0.1%
Pentane	109-66-0	9.554E-06	5.082E-06	5.082E-06	-----	3.21E-03	2.62E-03	3.88E-03	-----	9.71E-03	5,976	< 0.1%
Propylene	115-07-1	4.951E-06	-----	-----	-----	1.66E-03	-----	-----	-----	1.66E-03	39,560	< 0.1%
1,1,1-trichloroethane	71-55-6	-----	-----	4.990E-05	-----	-----	-----	3.81E-02	-----	3.81E-02	552,465	< 0.1%
Alpha-methyl-styrene	98-83-9	-----	8.316E-06	8.316E-06	-----	-----	4.28E-03	6.35E-03	-----	1.06E-02	250	< 0.1%
Trichloroethene	79-01-6	-----	-----	-----	1.016E-04	-----	-----	-----	5.69E-02	5.69E-02	108,828	< 0.1%
Vinyl Acetate	108-05-4	-----	3.465E-03	3.188E-03	4.089E-03	-----	1.78	2.44	2.29	6.51	400	1.6%
m,p-xylene	1330-20-7	-----	9.702E-06	5.059E-05	-----	-----	5.00E-03	3.87E-02	-----	4.37E-02	448	< 0.1%

[1] The emission rates (and associated odor concentrations) presented for the paper machine wet end include both the emissions from the recycled paper repulper and the wet end of the paper machine.

The odor modeling analysis results presented in Table 5-9 indicate that the toxic air contaminant emissions from the IKO Monroe paper production line will not result in odor concentrations that are above the associated odor values. Therefore, the emissions from the paper production line are not expected to cause a violation of Michigan Rule 901.

In relation to the odor value criteria presented in Table 5-9, the five TACs resulting the highest odor impacts are acetaldehyde, biphenyl, propionaldehyde, phenol and formaldehyde. These five TACs will be discussed in more detail in the following section. Of the remaining 33 toxic air contaminants that have been evaluated to determine 10-minute odor impacts, the resulting odor impacts range between 1.6% and less than 0.1% of the odor value data presented in Table 5-9.

While reviewing Table 5-9, it should be noted that most of the odor values presented in the table are based upon odor perception concentrations rather than threshold odor concentrations. Therefore, the odor value criteria of Table 5-9 used to evaluate the acceptability of the odor concentrations produced by the IKO Monroe paper production line is conservative.

Using acetaldehyde as an example, the available AQD data indicates an acetaldehyde odor threshold concentration of between 0.03 and 0.1 ppmv, and an odor perception concentration of 0.007 ppmv. The acetaldehyde odor value of Table 5-9 is based upon the odor perception concentration 0.007 ppmv. Had the lowest of the available threshold odor concentrations been used, the calculated odor value would be 54.7 $\mu g/m^3$. If the threshold odor concentration had been used, the corresponding acetaldehyde odor impact as a percentage of the calculated odor value would be 14.6% (instead of 63.1% based upon use of the odor perception concentration).

Another aspect of the modeling analysis that must be considered in conjunction with the predicted odor concentrations is the modeled emission rates. All emission rates have been based upon the operation of each discrete pulping process and the paper machine at rated capacity. Furthermore, the odor modeling analysis assumes that both of the pulping processes and the paper machine operate concurrently with each other. In a practical manner, the actual odor concentrations are expected to be lower than the values presented in Table 5-9 because not all of the paper production operations are expected to be operating at the same time and at rated capacity.

5.6 Evaluation of Five TACs Versus Odor Data

In addition to including individual pollutant runs for the five TACs that were found to generate the highest impacts in relation to their respective screening level(s), the MDEQ also requested that similar information be provided for the five TACs that were found to generate the highest impacts in relation to their respective odor "value". As presented in the Table 5-9, the following compounds were found to consume the highest percentage of their odor value using the simplified methodology discussed in Section 5.3: acetaldehyde, biphenyl, propionaldehyde, phenol and formaldehyde. When expressed as percentages of the odor values being used to evaluate compliance with Michigan Rule 901, the odor concentrations for these five TACs range between 63% and 7.1%. As the predicted 10-minute concentrations of these compounds are lower than the conservatively calculated odor values, the compounds are not expected to produce perceptible odors.

The modeling analyses for these five compounds were run using the anticipated emission rates from each stack to determine the combined impacts. In cases where a pollutant was emitted from the wet end or the dry end of the paper machine operations, emissions were distributed evenly amongst the number of stacks (i.e. 3 wet end, 6 dry end). The results for the individual modeling runs are included in Table 5-10.

Table 5-10. Combined Impacts for Top Five TACs Versus Odor Values

Compound	Odor Threshold/ Perception Value ($\mu g/m^3$)	Combined Impact [1] ($\mu g/m^3$)	Impact as % of Odor Value	X Location (meters)	Y Location (meters)	Previously Calculated Combined Odor Impact ($\mu g/m^3$)
Acetaldehyde	12.8	7.14	55.8%	32.87	82.09	8.06
Biphenyl	60	14.23	23.7%	32.87	82.09	15.56
Formaldehyde	62.2	4.27	6.9%	32.87	82.09	4.41
Phenol	195	13.49	6.9%	32.87	82.09	15.1
Propionaldehyde	21.6	3.73	17.3%	32.87	82.09	4.07

[1] All combined impacts are based on a 10-minute averaging period (i.e. doubled one-hour impact)

As seen in Table 5-10, all five pollutants comply with their respective odor values, and the combined impacts determined by the pollutant specific, individual modeling runs were all less than the impacts determined in Section 5.5. When these impacts are expressed as percentages of their respective odor values, the odor concentrations range between 56% and 6.9%. These results again show that the combined impacts determined by separate, individual modeling runs are lower than or equal to the impacts determined based upon the simplified approach using modeled impacts.

APPENDIX B

CHIP MANAGEMENT AND
OUTDOOR PAPER STORAGE PLAN
(With Example Log Sheets)

Wood Chip and Outdoor Paper Storage Plan
IKO Monroe - PM/MAP/Odor Reduction Plan

Wood Chip Management Plan

Daily Inspections

Parameter	Monitoring Method	Operating Range	Frequency	Responsible Supervisor
Initial Inspections - All Received Shipments	Visual and olfactory inspections	Each load of wood chips will be physically inspected to determine the acceptability (based on deterioration and odor) of incoming loads. **1)** wood types (certain cherry wood in particular) that may be particularly odorous will not be accepted; **2)** the wood chips must have a certain degree of structural integrity to be viable as a raw material; **3)** any load that may have debris or wood chips that has deteriorated to the point that it has an odor will not be accepted. Each load will then be logged according to the supplier name, day and time received, daily shipment number, and pile number to be stored in.	Each Shipment	Wood Yard Operator & Shift Manager
Detailed Lab Inspection - All Received Shipments	Plant Lab	A sample of each load will be bagged and labeled with the name of supplier, date and time received, shipment # for the day, and pile # to be stored in, and sent to the Plant Lab for further inspection.	Each Shipment	Wood Yard Operator & Shift Manager
Shipment Receit and Pile Locations	Daily Log Sheet for the CMP	Piles must be used in the order that they were created. Piles need to be labeled and marked (either on a map or alternative method). Piles being "built" should be distinguished from piles being depleted so that new chips do not get placed on a pile being depleted. Each shipment received must be documented as to how much wood was received (estimated tonnage) which pile the chips are sent to, and must be sent to the proper "building" pile. The wood storage area is expected to contain 3 or more wood chip piles and each pile will be placed as far from Huber Drive on the East side of the concrete pad as feasible. The pile that has been stored the longest will be the first wood sent to the mill, and the pile will be completely used before starting to deplete another pile. The residence time for the chips, in all piles, will be limited to 1 week as measured and recorded by a seven day rolling time period, no more than 1200 tons onsite.	Each Shipment	Wood Yard Operator & Shift Manager
Pile Labels	Inspection Daily Log compared to Chip/Wood Storage	Daily Log must properly indicate the pile(s) being depleted and pile(s) being built up and the dates that these piles were started and finished. Number of days on hand should be determined for each pile that has been completely used. Piles remaining at the end of business Sunday should be transferred to the next week's Log.	Daily	Wood Yard Operator & Shift Manager

Bi-Weekly Inspections

Parameter	Monitoring Method	Operating Range	Frequency	Responsible Supervisor
Periodic Pile Inspections	Visual and olfactory inspections	Physical walkthrough of the wood chip and paper storage yard will be conducted looking for signs of standing water, wood odor, or any other issue that may be a source of odor, and taking necessary action to address any notable situation.	Twice per Week	Senior Management

Wood Chip Management Plan (continued)

Monthly Inspections

Parameter	Monitoring Method	Operating Range	Frequency	Responsible Supervisor
Remove and Replace Chips on Chip Ramp to Stocker	Must be noted on the Monthly Inspection Section of the CMP log sheet	Once per month on a plant shut down day, wood chips on the chip ramp to the stocker will be replaced with fresh wood chips and the wood chips taken from the ramp will be used next in the process.	End of Month	Wood Yard Operator and Shift Manager on Plant Shut down day. Follow up by Senior Management.

Outdoor Paper Storage Plan

Daily Inspections

Parameter	Monitoring Method	Operating Range	Frequency	Responsible Supervisor
Bale Date Labeling/Tracking	Visual inspections	Bales must be dated at the time they are first put outside or numbered and shown on a map in order to ensure that no individual bale stays outside for longer than two months. Bales must be rotated so that oldest bales are brought inside as soon as possible.	Daily	Wood Yard Operator and Shift Manager
Paper Bale Condition Inspections	Visual and olfactory inspections	Paper bales must not show signs of decomposition that are significant enough to cause nuisance odors. Any individual bale of paper may not be stored outside for longer than two months. Any bale showing signs of decomposition should be discarded or used (if possible to use) next in the process.	Daily	Wood Yard Operator and Shift Manager

IKO Monroe - Chip Management and Outdoor Paper Storage Log

Week Start Date
Chip Yard Operator(s)

The following items need to be conducted on a Daily basis:

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
All shipments being logged properly?							
Samples of all shipments going to lab?							
Sample labels properly filled out?							
How many chip piles are there?							
Are the chip piles labeled properly?							
How many shipments were refused during day?							
Are the proper piles being depleted?							
Are new shipments going to correct pile(s), with new piles being made on the concrete pad as far from Huber Drive as feasible?							
Is there any paper stored outside?							
Are the bales of paper labeled with Date placed outside?							

List Each Chip Shipment **(use back of sheet for additional shipments)**

Company Delivering Shipment		Shipment #	Date	Time	Tons	Pile #		Sample to Lab
		1						
		2						
		3						
		4						
		5						
		6						
		7						
		8						
		9						
		10						
		11						
		12						
		13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						
		21						
		22						
		23						
		24						
		25						
		26						
		27						
		28						

Provide List Below of Piles Built and Depleted During Week

(Note: Total Days from start of build to end of depletion cannot exceed 7 days, as measured by having no more than 1200 tons of wood chips per 7 day rolling time period.)

Pile #	Pile Building Start	Pile Building End	Pile Depleting Start	Pile Depleting End	Total Days/tons On Hand
Average days/tons onsite					

IKO Monroe - Wood Chip and Outdoor Paper Storage - Weekly/Monthly Inspection Log

Month

Supervisor

The following items need to be conducted on a Bi - Weekly basis:

	Week #1	Week #2	Week #3	Week #4	Week #5
Tuesday - Any Odors from Chip piles?					
Tuesday - Which Chip piles have odors?					
Tuesday - Describe any odor/decomposition noticed and actions taken to rectify					
Tuesday - Is there any standing water in the chip storage pad area? If yes, describe actions to rectify					
Friday - Any Odors from Chip piles?					
Friday - Which Chip piles have odors?					
Friday - Describe any odor/decomposition noticed and actions taken to rectify					
Friday - Is there any standing water in the chip storage pad area? If yes, describe actions to rectify					
Are the chip piles labeled properly?					
Initials					

NOTE: If unusual, pungent, or strong odors or signs of decomposition of wood chips are noted during the Bi-Weekly Inspections, **notify supervisor immediately**

The following items need to be completed on a Monthly basis:

Wood Chips

Were any 7 day rolling averages greater than 1200 tons of wood chips? _____

months has it been since it was started? ***To be deleted.*** _____

[illegible] days?
If "yes", how many? _____

Has the Chip Ramp to Stocker been cleaned? _____

Paper Storage

Is there any paper stored outside? _____

Are the bales of paper outside being labeled properly and what is the oldest date for any bale? _____

Signature of Supervisor Providing Management Review for Month End _____

APPENDIX C

DAILY and WEEKLY FACILITY
INSPECTION PLAN
LOG SHEETS

IKO Monroe - Daily Facility Inspection Checklist

Week _____

The following inspection items need to be conducted on Daily basis:

(Note: Use ID #s and space at bottom of sheet to describe any issues and corrective actions taken)

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	Are all paper machine fans operating properly?							
2	Are all covers properly in place for covered process tanks/equipment?							
3	Were any enclosed outside storage tank(s) needed for emergency water storage? If yes, for how many hours?							
4	Are there any unusual (non-steam) emissions being released from the boiler, paper machine vents or vacuum stacks? (visually inspect - if yes, describe below)							
5	Is ONLY fresh water being used for the chip washing process?							
	Date & Initials							

Describe any odor issues noted during the month (either internally or by neighbors/officials) and corrective actions taken

ID # and Date of Issue	**Description of Issue And Correction Action Taken (attach additional sheets if necessary)**

IKO Monroe - Weekly Facility Inspection List

Month

Supervisor

The following inspection items need to be conducted on Weekly basis:

(Note: Use ID #s and space at bottom of sheet to describe any issues and corrective actions taken if the NOTES area is not enough room)

		Week #1	Week #2	Week #3	Week #4	Week #5	NOTES:
1	Are there any unusual, pungent, or strong odors notable in areas outside of the chip area, around the plant or along Huber Drive? (walk around inspection - note: chip area inspected under CMP)						
2	Is the Water Monitoring Plan being completed properly?						
3	Is the Chip & Outdoor Paper Management Plan being completed properly (daily, bi-weekly, & monthly)?						
4	Is the Boiler Preventative Maintenance Plan being completed properly (daily, weekly)?						
5	Are the Daily Facility Inspections being completed properly?						
6	Total Hours of **Enclosed** Outdoor Water Storage during week? (note which enclosed tank(s) were used)						Total Cumulative Hours since last carbon filter Changeout: (note: look at previous week sheet)
	Date & Initials						

Describe issues/findings of the Water Monitoring Plan:

Summarize any corrective actions taken under the Water Monitoring Plan:

Describe any odor issues noted during the month (either internally or by neighbors/officials) and corrective actions taken (or refer to Daily Inspection Checklist if action already described)

ID # and Week of Issue **Description of Issue And Correction Action Taken (attach additional sheets if necessary)**

Signature of Supervisor Providing Management Review for Monthly End

IKO Monroe - Boiler Preventative Maintenance Worksheet

DAILY

Week Start Date _____

The following items should be conducted on a Daily basis:

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Blow down the water column, gauge glass, and the cross							
Blow down the mud drum							
Blow down air instrumentation on the water level controllers and the feed water valve							
Meter reading on gas equipment							
Meter reading on water equipment							
Do a visual inspection of tank levels							
Notes for tank levels:							
Check water softeners and test water, and salt levels							
Check all feedwater pumps							
Check level of boiler chemical concentration and adjust as needed							
Fill chemical tanks and batch chemicals as needed							
Monitor flash tank levels							
INITIALS	_____	_____	_____	_____	_____	_____	_____

NOTES:

IKO Monroe - Annual Boiler Preventative Maintenance Worksheet

Date Annual Inspection Started:

The following items need to be conducted on an Annual basis:

	Date Completed	Initials	NOTES (Necessary Work and Date Work Completed - if more space required, use bottom of sheet or attach additional pages):
Inspection of mud drum and steam drum			
Repack main header valves			
Inspect low water cut-off			
Inspect and clean cross fitting			
Inspect burner			
Inspect refractory			
Do a pop test on safety valves			
Check all feedwater pumps			
Check level of boiler chemical concentration and adjust as needed			
Fill chemical tanks and batch chemicals as needed			
Monitor flash tank levels			

APPENDIX D

PREVENTATIVE MAINTENANCE PLAN

AND

STARTUP, SHUTDOWN, MALFUNCTION ABATEMENT

FOR THE FACILITY BOILER

IKO MONROE BOILER STARTUP, SHUTDOWN, MALFUNCTION ABATEMENT

The following procedures will be used during start-up, shutdown and malfunctions of the boiler, to minimize or eliminate odors from the wood fiber storage tank during those periods.

Under this startup, shutdown, malfunction abatement plan (S/S/M plan), IKO shall not install or operate an emergency bypass on the wood chip pulping storage tank line. IKO believes that a bypass valve will not be necessary.

If it is determined that a bypass valve is necessary for the proper operation of this equipment, this S/S/M plan must be updated to include proper measures to reduce emissions during operation of the bypass valve.

Startup

1. During the boiler start-up process, the steam defibrator will not be placed into operation until the boiler is producing steam at full pressure (approximately 125 to 150 PSI). The steam defibrator should not be operated until the boiler is fully operational and able to combust the air stream from the wood chip fiber storage tank in order to prevent the release of uncontrolled odorous compounds to the atmosphere.

2. During boiler start-up, the boiler must be up and running at full steam pressure (approximately 125 - 150 PSI) before steam is sent to the defibrator. Steam is sent to the defibrator at approximately the same time the wood chips are entering the defibrator. At this point, because the boiler combustion zone is operating at the proper temperature, any storage tank air that is displaced by steam entering the storage tank (from the defibrator) will be properly combusted.

Shutdown

1. Prior to a planned shutdown of the boiler, the steam defibrator shall be taken offline. No steam or wood chips shall be sent to the defibrator during any period of the planned boiler shutdown.

2. Startup will follow the steps listed above.

Malfunction Abatement

1. A boiler malfunction could cause one of the following scenarios:

    a. The boiler begins to lose steam pressure. If the pressure drops more than 25 PSI below the operating set point of 150 PSI, the steam defibrator would automatically shut down. (A pressure switch would trip the drive relay to the wood chip feeder screw, thus automatically shutting off the feeder system supplying wood to the

defibrator, and set off an alarm. The steam line is shut off until pressure is resumed and the defibrator is manually restarted.) The exhaust from the wood fiber storage tank would cease at this point (i.e. below 125 PSI), however the boiler will still be in operation and combusting any residual outlet from the storage tank, if there is a small amount.

b. <u>If the boiler trips out and is shutdown immediately</u>. The defibrator would stop operating because it cannot operate without steam from the boiler. Therefore, no steam would be vented out the wood fiber storage tank. Without heated wood fibers and steam/hot water vapor entering the wood fiber storage tank, the tank will cool and water vapor will condense, creating a partial vacuum within the tank. Air will then flow backwards into the tank through the line at the boiler.

APPENDIX E

WATER MONITORING PLAN

Process Water and Wastewater Management System
Odor Control Plans

The potential for odor to originate from the process water (whitewater) and wastewater management system depends on two components: (1) whether odorous constituents are permitted to become concentrated in the process water and possibly airborne during the paper-making process; and (2) whether either the process water or the wastewater is allowed to stagnate and become anaerobic (decomposition or breakdown by microorganisms in the absence of air).

Lower Concentration of Odorous Constituents

As has been reported previously, in order to meet City of Monroe discharge requirements, IKO intends to manage its water recycling rate, which will have a positive impact on both components. Water will be recycled less on average than previously, meaning that less concentration will occur. IKO plans to significantly increase the amount of fresh water used in the chip washing and other processes, which will reduce the concentrations of potential odor causing compounds and increase the water discharge.

The increased use of fresh water will not only have a direct effect of preventing odors from the water processing and discharge system, there will also be a significant indirect benefit of preventing fugitive emissions from the operations that use process water. Most notably, these include the paper production line vacuum exhaust and the building vents that exhaust above the paper machine. In addition, much of this fresh water will be introduced to the process in the chip washing area of the operation, which will be restricted to using only fresh water. In the past, heated process water (that contained potentially odorous compounds) was used for chip washing, so this process improvement of using fresh water for chip washing will definitely reduce odorous emissions.

Monitoring

IKO will be filing an Industrial Pre-Treatment Program (IPP) application with the City and will follow stringent discharge requirements. Compliance with the IPP will significantly reduce (if not eliminate) the possibility that the process and/or wastewater will become anaerobic or otherwise odorous. The IPP compliance program will include daily monitoring of Chemical Oxygen

Demand (COD) to maintain the recycle rate such that discharge levels in the water are being met which will, in turn, control conditions that may generate unacceptable odors. This was described in the paper production line PTI application document. Additionally, this strategy will allow IKO to meet permit limits set by the City of Monroe POTW for water discharges and ensure that the water will continually discharge and not accumulate unnecessarily at the facility. IKO's review of the literature and survey of consultants in this field indicates that there is no conclusive correlation between wastewater content and odor production due to the many variables at work. However, it does appear that COD will be a reasonable predictor of potential odor concerns.

IKO will monitor COD at the site on a daily basis, or more frequently, in the event that plant staff notice any unusual odors. In the event that the plant staff detects any unusual odors, actions will be taken to isolate the source of such odors and to address such odors as necessary. In-plant COD monitoring has not been done previously at this plant. During the start up phase, IKO will endeavor to track any correlation between COD levels and noticeable odors and will adjust the in-plant recycling rate or make other operational adjustments based on such results. IKO will monitor process water for COD after treatment through the disc filter and before recycling into plant operations. It is expected that, at the outset, IKO will target an operating discharge level of COD in the wastewater of 1200 mg/L COD. IKO will record the daily COD results and note any actions taken to address a COD increase.

Prevention of Stagnation

Except for infrequent emergency or urgent situations, very little water will be stored on site as there will be a continuous discharge. As a result of this continuous discharge, there will be little opportunity for water to become stagnant on site. Use of the disc filter and more rigorous management of recycling rates will allow IKO to commit to not use the external storage tank system for either process or wastewater except in unusual circumstances (such as the City requesting a reduction in discharge due to high stormwater discharges to the system from other sources). If water is required to be stored in the external tanks, IKO will consider temporarily adjusting operational parameters in an effort to reduce the volume of such water to the extent reasonable without creating odor concerns. During such operational adjustments, IKO will conduct in-plant evaluations of the process and odor generation potential twice each day. If water

is required to be stored in the external tanks, IKO will use only those .tanks that are properly covered and vented through a control device (such as a carbon filter)

Monitoring

If external storage of water is required, IKO will conduct twice daily monitoring (on separate shifts), using a direct reading instrument, of the air space in the tanks immediately above the water for hydrogen sulfide gas, the most likely leading indicator of anaerobic decomposition. In the event of a confirmed detection of a concentration of hydrogen sulfide gas that indicates an odor potential, IKO will evaluate odor controls in place, add additional controls, or take action to containerize or otherwise remove the water. IKO will record the H_2S results and note any actions taken to address an increase.

In addition, IKO will track the approximate number of hours per day that the enclosed external tank(s) are used for the storage of water. A rolling total of hours that water is stored in the covered external tank will be recorded until such time as it is deemed appropriate to change out the carbon filter in the canister that is used to control odors that could potentially emanate from the water in the enclosed tank. (After the carbon filter is replaced, the cumulative hours will start over beginning at 0 hours). It is estimated that the carbon will be changed out every 1,000 hours of water storage, but this duration may be adjusted as appropriate.

The following table is the Water Monitoring Plan that the facility will utilize to detect and help prevent potential odorous emissions from facility water.

Water Monitoring Plan
IKO Monroe - PM/MAP/Odor Reduction Plan

Water Monitoring Plan

Assumptions: 1) The water BOD is approximately one half (1/2) of the COD
2) For discharge to City POTW: BOD > 600 mg/L will not be accepted (based on 24-hr average) at the City of Monroe

Daily Monitoring				
Moritoring Location	**Monitoring Method**	**Operating Range**	**Frequency**	**Responsible Supervisor**
Post Disc Filter – prior to recycling	Take water sample and log results	The water sample taken should have a COD below 1200 mg/L. Depending on the level of COD, different corrective actions might be followed including, but not limited to reduced recirculation of whitewater. Record results and actions taken, if any.	Daily	Shift Manager
Head End of the Paperline	Evaluate odor conditions (Olfactory)	If unusual odors present, conduct an additional COD sampling event as described above and consider action as described above.	Daily	Shift Manager
Emergency Storage of Water in Enclosed External Water Tanks	Monitor air above water for H_2S	Utilize direct reading equipment. Confirmed detection of H_2S will initiate evaluation of various actions to address odor concerns including contacting the City of Monroe POTW to request discharge be permitted. Actions will be documented.	Twice Daily (on separate shifts) when water is in storage	Shift Manager
Emergency Storage of Water in Enclosed External Water Tanks	Contact MDEQ District to Report Outdoor Water Storage in Enclosed Tank(s)	Permit Condition 6.5 requires that the AQD District (supervisor or designated staff personnel) be notified when water storage in the enclosed external water tank(s) is necessary	Within 24 hours of beginning of Water Storage	Shift Manager or Senior Management
Monthly				
N/A	Review of Monitoring Data	Two to three months after start up of operations evaluate COD data and operational odors and consider modification of 1200 mg/L level.	2-3 Months after re-start of Operation & As Necessary After That	Shift Manager with Outside Consultants, As Needed
N/A	Inspect Records of Water Sampling, Odor Evaluations, and Monitoring of Stored Wastewater	Evaluate overall plan for completeness and effectiveness. Recommend necessary adjustments to staff and MDEQ.	Monthly	Senior Management
N/A	Review of Weekly Facility Inspection Logs for hours of water storage in the enclosed external water storage tank(s)	Total hours of water storage in enclosed external water tank(s) (recorded weekly on facility inspection log) and keep running total up to changeout of carbon in canister control device. Make sure the dates of any carbon changeouts are recorded and that the running total reflects the changeout for each control device.	Monthly	Senior Management