ENVIRONMENT CONTROL

EMISSIONS MANAGEMENT MEASURES

Note: Issued with the approval of the Department Manager Environment Control

RECORD OF REVISION

SECTION NO.	DESCRIPTION/REASON FOR CHANGE	Revision Date	DATE Implemented	APPROVED BY
All	New Procedure			

INDEX

1. DOCUMENT CONTROL - DISTRIBUTION LIST

The pages in this Emissions Management Measures manual shall be document controlled, as described below. The procedure described below applies to the Emissions Management Measures manual only.

- The pages in this manual are document controlled and are not to be photocopied for posting at work sites, except for controlled posting as described below. Procedure changes to a manual should be written up and distributed as soon as possible. Minor editing revisions can be done during the regular review as long as they are initialled and dated.

- This manual, any external references and pages or portions of this manual required for posting at work sites, must be document controlled and listed in the distribution list. This is necessary in order to control postings. The postings must be marked "CONTROLLED POSTING" in red.

- Under certain circumstances it is necessary to print electronic procedures. Since the electronic procedure is the most up to date, is subject to change and is document controlled, the printed copy must be discarded after use and reprinted when needed again.

- This manual is reviewed regularly, at least every two years. This review must be documented even if no revisions are necessary.

1.1 Distribution List

Copy	Location
Master Copy	Electronic ://environment/fugitive dust management/Dust Management Measures/Algoma Steel Inc EMISSIONS MANAGEMENT MEASURES.doc
Printed Copies	All printed copies are uncontrolled

2. PURPOSE

The purpose of this procedure is to provide the information necessary for the management of emissions from operations and storage of materials at the Steelworks. This manual has been prepared to ensure that Algoma complies with the Ministry of Environment, Conservation and Parks (MECP) Best Management Practices for Fugitive Emissions and other legal requirements. The procedures in this manual provide detail regarding the management practices applied by Algoma and may point to other procedure manuals.

3. SCOPE

This manual applies to all departments and personnel within the Steelworks that generate, or have the potential to generate, fugitive emissions through operations, storage of materials or by other means as applicable.

The methods described in this manual are used to comply with the guidelines set out in the MECP Best Management Practices for Fugitive Emissions and with Algoma's Environmental Compliance Approvals (ECAs).

4. RESPONSIBILITY AND TRAINING

(Specify the training requirements for the job function(s) and refer to training records)

5. PROCEDURE

5.1 PAVED AND UNPAVED ROADS

These procedures are to be followed by all departments responsible for unpaved and paved roads to mitigate fugitive emissions stemming from travel in these areas. There a numerous areas throughout the plant with unpaved roadways with heavy vehicle traffic and it is the responsibility of all employees to aid in identifying road dust situations. All areas should practice wet suppression and follow the 30 km/h speed limit to reduce fugitive emissions from road dust.

5.1.1 Transwest – Material Reprocessing

The control of road dust is the accountability of the Transportation Services area. They have various methods of controlling road dust based on location, season and severity to road traffic. These methods are wetting the roads with water, applying commercial dust suppressants and Magnesium or Calcium Chloride. These are applied as preventative measures but are also applied in emergency situations.
The reporting of excessive road dust conditions is the accountability of all employees. When a road dust situation is identified it is reported to the Front Line Supervisor (FLS) or area leader by phone (4681) or over the radio. Upon receiving the report, the FLS/leader records the particulars of the incident, in the Road Dust Incident Report Log, located on the FLS/leader desk at the Material Reprocessing Building Door #1. The FLS/leader is to notify all equipment and vehicles

operators of the dust situation and instructs them to reduce speed through the affected area until further notice.

Once the FLS/leader has the information verified they are to determine the best method of response. The three types of dust control utilized in Transwest are as follows:

1) Water applied by a flusher truck to dampen the surface of the affected roads or clean the surface of the pavement;
2) Petro-Tac and Poly-Trol (or other suppressant) applied by a special applicator truck to the surface of dirt roads to help seat the surface of dirt roads and reduce the dust; and
3) Magnesium Chloride or substitute (i.e. Calcium Chloride) applied by a spray truck to the surface of dirt roads to help keep the surface damp longer then water spray only.

When the incident has been resolved, the FLS/leader records the method of suppression used and the date and time completed in the Road Dust Report Log. The FLS/leader then notifies all equipment and vehicle operators to resume normal operations. The information recorded in the Road Dust Incident Report Log is then utilized in assessing the effectiveness of the Road Dust Reduction Program. (Reporting method – Section 5.3.1 in the Department Environmental Guide)

5.1.2 Transeast – Transportation Services

The control of road dust is the responsibility of the Mobile Equipment area and is identified in the department's Standard Operating Procedures Manual. There are various methods of controlling road dust based on location, season and intensity of traffic. Methods are wetting roads with water, application of commercial dust suppressants such as Petro Tac and Calcium Chloride. These are applied as a preventative measure but are also applied in emergency situations.

The reporting of excessive road dust conditions are the responsibility of all employees and is managed by the Mobile Equipment Area. When a road dust situation is identified, it is reported to the Mobile Dispatcher by phone or over the radio. Upon receiving the report, the Dispatcher records the particulars of the incident in the Road Dust Incident Report Log located at the Transportation Services Building Door #X. The Dispatcher notifies all Mobile's equipment and vehicle operators of the dust situation and to reduce speed through the affected area until further notice. The Dispatcher coordinates resources to respond to the road dust event or potential and applies one of the following dust control methods:

1) Water applied by a flusher truck to dampen the surface of the affected roads or clean the surface of pavement;
2) Petro-Tac applied by a special applicator truck to the surface of dirt roads to help seat the surface and reduce the dust;
3) Magnesium Chloride or substitute (i.e. Calcium Chloride) applied by a spray truck to the surface of dirt roads to help keep the surface damp longer then water spray only.
4) Tech Suppressant for steelworks transition areas; and
5) Dustex (lingo sulphonate) applied to roadways internal to the steelworks.

When the incident has been resolved, the Dispatcher records the method of suppression used, and the date and time completed in the Road Dust Incident Report Log. The Dispatcher then notifies all Mobile Equipment and Vehicle operators to resume normal operations. The information recorded in the Road Dust Incident Report Log is used when assessing the effectiveness of the road dust reduction program.

5.1.3 Cokemaking

There are two types of unpaved roads in Cokemaking: Roads around Surge Piles to Ground Hopper and Roads to Pile Cuts.

5.1.3.1 Roads around Surge Piles to Ground Hopper

The surge piles roads leading up to the ground hopper are required to be graded. Immediately after grading, an appropriate dust suppressant, such as Petro Tac or water, is applied to prevent dust emissions as a result of equipment traffic. The frequency and type of application is dependent on weather and may be adjusted as appropriate. Mobile Equipment operators working in the area confirm if the application has been effective and record the observation in the Mobile shift logs. Weather forecasting of hot, dry and dusty conditions will be considered when scheduling applications of a dust suppressant or levels of activity for equipment operating in the area.

5.1.3.2 Roads to Pile Cuts

A “Pile Cut” is the term used when coal scraper equipment drives into the side of the active coal pile and “cuts off a slice” of coal to be transported to the conveying system which takes it to the batteries. An appropriate dust suppressant, such as Petro Tac or water, is applied to prevent dust emissions as a result of the coal scraper equipment working in this area. Mobile Equipment Operators working in the area confirm the application has been effective and record the observation in the Mobile shift logs.

5.1.4 Ironmaking

Unpaved roads in Ironmaking are treated with dust suppressant by Transportation Services personnel as part of the corporate programme. Paved roads in Ironmaking are flushed with water and swept as required.

5.1.5 Steelmaking

BOSP personnel monitor road conditions around the facility. If road dust conditions are deemed questionable around the facility, Transportation Services are notified to dispatch sweepers, flushers or apply dust suppressants or water to prevent emissions from dust being stirred up by large vehicle movement in and out of the area.

When fill is required to maintain level travel surfaces, gravel is used in place of more readily available process fines. The heavier gravel reduces the potential for dust emissions from vehicle traffic around the BOSP facility.

5.2 STOCKPILES, TRANSFER SYSTEMS AND OPERATING AREAS

5.2.1 Transwest – Material Reprocessing

5.2.1.1 Kish Cleanup Operations

This area is located north of the Separator encompasses two skulling pits, two fines pits, an auxiliary fines pit, a skull stockpile, a mixing (cooling) pit with water sprinklers, and a stockpile mix (sand and separator waste fines.

5.2.1.1.1 Cleaning Kish Fines & Mixing (Cooling) Pits: Winter Operator

The loader slowly spreads kish in the mixing pit by gradually tilting the bucket open while travelling in reverse with the bucket positioned close to the ground. By keeping the bucket close to the ground, dust will remain close to the bucket as the loader moves away from the kish and shortens the distance should any material fall to the ground reducing the chance of it becoming airborne. Mix, consisting of snow, sand or waste fines, is spread over the kish fines to cool the kish and reduce dust in future handling. The kisk from the mixing pit is trucked to the current kish stockpile at Fritz to allow weathering and reduce dust processing material through the separator. Truck and loader operators check for excessive plumes of dust during loading and are to stop operation when dusty or high wind conditions exist.

5.2.1.1.2 Cleaning Kish Fines & Mixing (Cooling) Pits: Summer Operation

The water sprinklers located on the bank above the fines mixing pit are turned on to provide water for mixing with a loader bucket and also water kish piles against the bank. Following the cleaning of the pot hauler kish pit, the loader pushes the water in the mixing pit onto the stocked kish. Although this creates steam very little dust is generated and it greatly reduces dust generation from future handling. The fines mixing pit material is transferred to the kish stocking area at Fritz once the kish bank is extended beyond the sprinkler system's reach.

5.2.1.2 Cleaning Skull Pit and Stockpile – Loader and Truck Operator

Kish is weathered for a minimum of three (3) months to reduce dust before processing through the Separator. The kish stockpiling area contains a weathering stockpile and a current stockpile for new kish from the pit stockpile.

These containment methods and procedures are outlined in Sections 6.1.1.10, 6.1.1.10.1, 6.1.1.10.2 & 6.1.1.11 of the Material Re-processing Loader Procedure Manual.

5.2.2 Cokemaking

There is significant potential for fugitive dust emissions from the open-field coal storage pile area located on the west side of the Algoma Boat Slip. A coal pile wind berm provides interference to prevent winds from directly striking the surface of the coal piles and reducing the opportunity for wind to blow fine coal particulate from the pile surface.

5.2.2.1 Sides of Coal Storage Piles

The inactive or uncut sides of the storage piles are treated with a dust suppressant such as Petro-Tac or water. The application is made in 10 foot elevation intervals and reapplied for every 10 feet of elevation change. Application of a dust suppressant causes a crust to form on the surface of the pile making it less susceptible to the effects of the wind striking the surface. The department also retains the services of a dedicated water truck that can supplement the Petro-Tac on an as needed basis, such as extreme weather conditions.

5.2.2.2 Top of Coal Storage Piles

The coal storage pies are built up dependent on coal delivery and vessel off-loading. The coal delivery spec calls for coal to be delivered at approximately 7% moisture which limits potential for dust from off-loading. Coal that has been off-loaded from the vessel is transported by large coal scraper equipment to a specific coal storage pile area, dependent on specific grade and type of

coal. Weather conditions are closely monitored for potential fugitive dust emissions during this activity and, if warranted, a dust suppressant is applied directly to the tops of the piles. The dedicated water truck has been fitted with a water cannon that is also capable of applying water to the top of the piles. Any application in this area is recorded in the Mobile Operator's shift log including their effectiveness.

5.2.2.3 Dust from Belt Systems

The Cokemaking process uses a conveyor belt system to feed various parts of the facility with coal and coke material inputs. A rigorous program is followed to routinely clean accumulations from in and under these beltways to reduce the potential for fugitive dust emissions. The coal conveyors are also enclosed to mitigate dust from the transfer process.

5.2.2.4 COB Operations

Particulate (dust) emissions from operational sources such as pushing and charging are controlled by approved emission control equipment. Examples include the PEC on No. 8 and 9 Coke Batteries, the PEC on No. 7 Coke Battery and the respective battery charging equipment for the coal Larry Car.

5.2.3 Ironmaking

There are a number of potential sources for fugitive dust emissions from ironmaking including pellet and limestone stockpiles, pellet and limestone loading unloading, the conveyor systems and exposed openings in process and storage buildings.

5.2.3.1 Stockpiles of Pellets and Limestone

Both pellets and limestone are stored on the Ironmaking Ore Dock and typically contain moisture. The moisture, along with the high product density, mass and coarseness, limits the potential to generate fugitive emissions.

5.2.3.2 Pellet and Limestone Unloading from Lake Freighters

Pellet and limestone offloading conveyors on Lake Freighters are covered to reduce the potential for fugitive emissions. The conveyor discharges also have rubber shrouding to limit potential for emissions.

5.2.3.3 Conveyor Systems

Ironmaking conveyor systems are enclosed or covered to contain any fugitive emissions.

5.2.3.4 Torpedo Car Dekishing

Operating procedures are in place to rotate the cars 180 degrees apart while removing Kish. A containment system with hoods and portable baghouses is installed on the east and west Dekishing stations.

5.2.3.5 #6 and #7 Casthouses

Casthouses at both #6 and #7 Blast Furnace have fugitive dust potential. Installation of a permanent baghouse at #7 Blast Furnace is complete and the system is operating. Design of the permanent baghouse for #6 Blast Furnace is completed, fabrication of the modules is complete

and civil work has commenced. The new baghouse must be operational 10 months after start-up of #6 Blast Furnace.

5.2.3.6 Beaching Surplus Iron

Surplus hot metal resulting from disruptions downstream of ironmaking is poured on inclined sand pig beds that are prepared by Material Reprocessing personnel. Fugitive emissions are minimized by controlled the rate of flow onto the bed and proper bed preparation.

5.2.3.7 Granulated Slag, Pellet Fines and Flue Dust Spillage

Granulated slag spillage is minimized by use of a truck level control system that allows Material Reprocessing personnel to fill each truck to the optimum level. Any spillage is removed from the roadway by Transportation personnel. Pellet fines are deposited in storage areas at #6 Blast Furnace and trucked to fines storage by Transportation personnel. Elevated moisture of pellet fines, along with high product density, minimizes the potential for fugitive dust emissions. Flue dust that is removed from the #6 Blast Furnace passes through a pug mill that wets the product to avoid fugitive dust emissions. #7 Blast Furnace utilizes a different technology whereby small quantities of flue dust are removed from the process periodically through a lock hopper system. This dust is collected in an enclosed area with doors and is removed to storage by Transportation personnel.

5.2.4 Steelmaking

5.2.4.1 Dust from Belt Systems

The BOSP Steelmaking process uses a stock conveyor belt system to feed various parts of the facility with raw material inputs. A rigorous program is followed to routinely clean the accumulations from under these beltways and reduce the potential for fugitive dust emissions.

5.2.4.2 Charge and Melt

5.2.4.2.1 Fill out Emissions

The vessel is not filled until the light indicates that there is sufficient draw from the SEC to process all the fumes coming off iron and scrap when the vessel is filled out. When emissions occur, the responsible area checks into the scrap inputs and inspects it. If the scrap is deemed unacceptable it is sent back to Trans West Material Reprocessing with notification about any cleanliness issues by dirt entrainment. In addition, vendor audits are conducted periodically to ensure supplied scrap meets Algoma specifications and in cases where the vendor does not satisfy these, the material is returned to the supplier.
Another cause of a fill out emission is when there is excess water in the scrap charge. These occur mainly in the winter time when snow and ice get mixed into the scrap when it is processed. The procedure is to flip the scrap charge over onto the tap belly of the vessel to allow the ice to melt and the water to drain out the tap hole. The crane then slowly gives the vessel a small amount to avoid explosions. Furnace crews do not flip the vessel over for iron fill out until the amount of water flowing out the tap hole stops. This can take up to ten minutes in the winter if there is a lot of water to drain.

5.2.4.2.2 In-blow Emissions

These are caused when the oxidation process going on during the blow causes the molten bath to overflow the top of the vessel. Shift manager's make out a report of any such incident and investigate the possible causes while at the same time initiating appropriate actions.
The furnace operator will generally reduce the oxygen flow rate, add lime and if need be, will abort the blow to stop the emission. These heats are reviewed by department technical personnel to determine if special action needs to be taken to change the blow inputs to the heat.
Algoma has initiated a program to reline the BOSP vessels more often. The major benefit from this is that there is more volume inside the vessel and therefore less chance of the blow slopping over and causing emissions. The frequency of emission rate from this type of event has been greatly reduced since this program was implemented.

5.2.4.2.3 Alloy Addition Emissions

There is some potential for an emission from this activity as a result of alloys and slag trimming material starting to burn off on the top of the ladle. The main cause of this is from high north winds blowing into the shop and blowing the dust into "B" aisle.
To assist in preventing these emissions Algoma tries to maintain the BOSP Shop north wall door systems as well as following the practice of keeping the ladle under the floor until the alloys are completely stirred in. The approved SEC emission control system on the south side of the vessel is designed to capture these emissions.
Plans for a new Ladle Metallurgy Furnace (No.2 LMF) also include a new bag house that will handle the emissions from the new LMF and is intended to be state-of-the-art best available technology for efficiency of capture.

5.2.4.2.4 Hot Metal Transfer (Iron Reladle) Emissions

There is potential for emissions when the iron delivered to the BOSP steelmaking shop is poured out of the torpedo into the charge ladle.
BOSP maintenance personnel follow a rigorous maintenance PM program. Algoma has completed the process of upgrading the compartments of the bag house in order to increase their effectiveness. Maintenance personnel check the draw on the hot metal kish a minimum of once per shift, ensuring the kish that can be generated from this transfer is going into the kish box.

5.2.4.2.5 Pit Cleaning Dust Emissions

There is potential for an emission to occur during this activity when the pay-loader cleans out under the vessels. The Steelmaking slag material is scooped up and dumped into large slag pots used for this purpose.
Algoma is investigating other opportunities to limit the potential for dust from this necessary process activity.

5.2.4.2.6 Pigging Pit – Pouring and Removal Issues

When the shop receives returned metal from the casters it is sometimes pigged in "C" aisle.
In order to reduce the potential for dust emissions from this activity, the molten metal is poured into prepared, clean sand "coffins". BOSP personnel also follow the practice of keeping the "coffins" (pig beds) small to ensure removal and recovery is easier with a small loader that has less potential of creating dust during the activity. The area is water sprayed when Trans West removes them from the south side of the building.

5.3 OPERATING/FACILITY MANAGEMENT

5.3.1 Cokemaking

5.3.1.1 Individual Oven Pressure Control (IOPC)

Individual oven pressure control is considered the best available technology for reducing coke oven battery emissions for vertical slot oven batteries. The technology was only available from two vendors in the world and Algoma worked very closely with the vendors to evaluate the technology's applicability at the existing coke ovens. This technology has the capability to significant reduce battery emissions. Algoma completed the installation of this technology on the current No. 9 Coke Battery, and it became operational October 31, 2011.

In the longer term, Algoma will evaluate the effectiveness of the No. 9 battery installation for consideration of installation onto its existing No. 8 Coke Batter. Any future consideration of a new coke battery will include this technology in the design.

5.3.1.2 Automated Door & Jamb Cleaning No. 7 Coke Battery

While the business case analysis continues to be conducted to assess the ability to finance and construct a replacement new coke battery for the existing older No.7 battery, Algoma has procured Door & Jamb cleaning equipment for the existing No.7 battery from a former U.S. facility that was shut down. The equipment has been refurbished to make it suitable for use on the Algoma #7 battery.
Automated door & jamb cleaning provides a consistent sealing surface between the oven door and the oven jamb face that is difficult to achieve by manual, hand-operated equipment. A clean, consistent surface seals effectively and repeatability.
In 2012 Algoma installed and began operating door & jamb cleaners on the No.7 battery.

5.3.1.3 Expand Benzene Emission Controls

Algoma commissioned and has completed a Technology Benchmarking assessment relative to reducing benzene emissions from Cokemaking. Algoma currently meets or exceeds the CSPA/Environment Canada Code of Practices guideline for benzene release reduction and future targets with our existing Benzene Emission Control (BEC) system utilizing a nitrogen inert sweep-gas and collection system.
Algoma completed the Technology Benchmarking assessment in 2009 and with the anticipated tightening of benzene release standards, plans to expand the current BEC to capture additional sources not within the current system.

5.3.2 Ironmaking

5.3.2.1 Permanent Baghouse on No. 6 Blast Furnace

The No.6 blast furnace was idled in late 2008 following the global market collapse and has not operated since then.
As required by the current Certificate of Approval (Air) for the No.6 furnace, upon restart a new baghouse will be utilized.

While a date for restarting the blast furnace cannot be predicted at this time, Algoma will install and operate a new, state-of-the-art, best technology permanent baghouse for the No.6 Blast Furnace within 10-months of restarting. The new baghouse will incorporate baghouse compartmental broken-bag detection and is expected to result in an overall net reduction of particulate release.

5.3.2.2 Improved Capture System on Dekishing Operation

Algoma completed a portable baghouse trial on a portion of the dekish operation in 2009 and in the dekish emission reduction report submitted December 21, 2009, identified the long-term emissions reduction plan for this activity would be to expand the use of the current portable baghouse technology to include both dekishing stations, including separate capture hoods for each station and separate baghouse for each.
In 2012 the existing east station was upgraded to improve capture efficiency. In 2014, an identical system was installed on the west dekish station.

5.3.3 Steelmaking

5.3.3.1 No. 2 Ladle Metallurgy New Baghouse

It is the intention of Algoma to grow its market share and improve the quality of its steel product range to meet ever-increasing customer quality requirements. In support of this aim, Algoma plans to construct and install a second, efficient Ladle Metallurgy treatment Facility (LMF) at the BOSP Steelmaking operation.
Algoma submitted a completed application for Certificate of Approval (Air) for the baghouse for the proposed new No.2 LMF in March 2010. The baghouse proposed for the new LMF facility will be fully dedicated, state-of-the -art technology and incorporating the latest technology in baghouse design and broken bag leak detection. The approval was received in 2010; however, component procurement and construction restart remains on hold due to still stressed global market conditions.

5.3.4 Lime Plant

The lime plant operates a positive pressure baghouse. A thorough inspection and repair program was conducted in 2015 which included significant upgrades to the baghouse, sealing and patching duct work and replacement of all bags in the baghouse and installing chutes to minimize emissions from falling material. Additionally, in 2015 all lime plant personnel were trained in revised standard operating procedures to control emissions from the process.

6.3 ENVIRONMENTAL/HEALTH AND SAFETY PROCEDURES

(A detailed, step by step, description of the Environmental/Health and Safety procedures performed within the area)

6.4 NONCONFORMANCE PROCEDURES

(The procedure should deal with:

1. IDENTIFYING the nonconformance.

2. ISOLATING the problem and product.

3. FIXING the nonconformance and problem or notify necessary persons.

There should be a record of such activities/actions noted above i.e. On work manifest of shift report, hold report, hold tag etc.

The employee must inform the person responsible to put the defective (suspect) material on hold, so it will not go to the next customer whether internal of external)

5.5 Calibration/Verification Procedures

(A detailed description, including schedules, of the calibration procedures for equipment within the area. These procedures may be referenced.)

5.6 Measurement System Evaluation Procedures

(A description, including schedules, of measurement evaluation procedures within the area. These procedures may be referenced.)

6. REFERENCES