

# Appendix C

San Gold Corporation

## Notice of Alteration

- **Best Management Practices Plan for Control of Fugitive Dust (working draft)**

# **SANGOLD CORPORATION**

## **BEST MANAGEMENT PRACTICES PLAN FOR CONTROL OF FUGITIVE DUST**

### **BISSETT GOLD MINE**

Environment Act License 2628 R

January 2011

***SanGold Corporation***

*Bissett Gold Mine*

*Bissett, Manitoba*

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## **1.0 DOCUMENT OVERVIEW**

This Best Management Practices Plan for the Control of Fugitive Dust (“Plan”) is intended to serve as a procedural document that is to be followed for the identification and control of fugitive dust at the SanGold Corporation (“SanGold”) Bissett Gold Mine (“Mine”).

The Plan is intended to meet evolving regulatory requirements and will be updated on an as-needed basis to reflect the modifications to the Mine, personnel and procedures. Table 1-1 below lists the typical requirements related to fugitive dust control and how each requirement is fulfilled in this Plan.

Documents that describe the Mine are summarized in Section 2.0 of this Plan. Sections 3.1 to 3.4 of this Plan list the sources of fugitive dust at the Mine site and describe appropriate control measures (procedural controls and engineering controls). The approach to implementing control measures presented herein is a phased approach whereby proven and reasonable control measures will be implemented as fugitive sources are created and a monitoring program will be followed to determine if additional control measures are warranted to meet the performance targets (Section 4.0). Training and implementation related to the Plan is described in Section 5.0. Monitoring for compliance with performance targets and corrective actions are described in Section 6.0.

**Table 1-1: Summary of Certificate of Approval Requirements**

<b>Certificate of Approval Requirement</b>	<b>Relevant Section(s) of this Plan</b>
Identify main sources of fugitive dust	Section 3.1 to 3.8 list the main sources of fugitive dust
List potential causes of high dust emissions from the sources	Section 3.1 to 3.8 list the potential causes of high dust from the sources
List of preventative or control measures in place or under development to minimize likelihood of high dust emissions from the identified sources, including: (a) a description of the control equipment to be installed; (b) a description of the preventative procedures to be implemented; and/or (c) the frequency of occurrence of periodic preventative activities	Table 3-1 to 3-8 list control measures that are implemented and under development.
Implementation schedule for the Best Management Practices Plan, including training of personnel;	Table 3-1 to 3-8 list implementation schedules for control measures. Section 3.1.1, 3.2.1, 3.3.1 and 3.4.1 further describe implementation schedule. Training and implementation is described in Section 5.0.
Inspection and maintenance procedures and monitoring initiatives to ensure effective implementation of the preventative and control measures.	Section 6.0 describes the monitoring that will be undertaken to ensure effective implementation of the control measures. The effectiveness will be measured relative to the performance targets described in Section 4.0.
Documentation requirements and records retention	Section 7.0.

The Plan has been prepared using the reference documents listed in the bullets below.

- Basel Convention (Basel), 2004. *Draft Technical Guidelines on the Environmentally Sound Recycling/Reclamation of Metals and Metal Compounds (R4)*. Conference of the Parties to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal: Seventh meeting Geneva, 25-29 October 2004.
- British Columbia Ministry of Water, Land and Air Protection, March 2005. *Best Management Practices to Mitigate Road Dust from Winter Traction Materials*.
- Environment Canada, 2001. *Pollution Prevention Planning Handbook*.
- Environment Canada, 2006. *Environmental Code of Practice for Base Metals Smelters and Refineries*.
- Hatch Associates Ltd., 2001. *Environmental Management Plan Guidance Document for the Base Metals Smelting Sector*. Prepared for Environment Canada.
- Ministry of the Environment (MOE), 2004. *Review of Approaches to Manage Industrial Fugitive Dust Sources*. SDB Technical Bulletin.
- Organisation for Economic Co-operation and Development (OECD), 1999. First Workshop on Environmentally Sound Management (ESM) of Wastes Destined for Recovery Operations. 28-29 October 1999, Cancun, Mexico.
- Transportation Association of Canada, 2005. *Syntheses of Best Practices*.
- United States Environmental Protection Agency (USEPA), 1978. *Particulate Control for Fugitive Dust*.
- United States Environmental Protection Agency (USEPA), 1986. *Identification Assessment and Control of Fugitive Particulate Emissions*.

A site location plan is provided in Figure 1. A general arrangement of the Mine site is provided in Figure 2.

### **1.1 Revisions and Document Control**

A complete hard copy of the Plan and the ancillary documents are kept in the office of the Mill Manager. An electronic copy of the Plan is kept on the computer of the Mill Manager.

Revisions to the Plan are made by the Mill Manager on an annual basis during the month of December, as a minimum. More frequent changes will be made, if warranted, based on modifications to the Mine, personnel, procedures as well as management reviews and new legislative and organizational requirements. Out-of-date hard copies are destroyed. Out-of-date electronic copies are archived on the computer of the Mill Manager.

In addition to the technical references listed in Section 1.0, site-specific reference documents generally related to fugitive dust emissions and the Plan are provided in Table 1-2.

**Table 1-2 – Site-Specific Reference Documents**

Year	Author	Title	Location of Report
2009	AECOM (on behalf of SanGold)	Notice of Alteration for Environment Act License 2628R	Office of Mill Manager
2011	Parks Environmental (on behalf of SanGold)	Notice of Alteration for Environment Act License 2628R	

### **1.2 Management of Change**

The VP Operations identifies material changes to the Mine to the Mill Manager to determine permit requirements as well as changes to operations manuals and this Plan. Modifications are made to the Mine are made in accordance with Certificate of Approval 9500-7NGTTC (as may be amended).

The need for modifications to the Plan is identified by the Mill Manager based on observed operating conditions and the monitoring program described in Section 4.0.

The Mill Manager is to coordinate a key personnel management review as part of the annual update to the Plan in order to ensure all components and functions of the Plan are adequate and up to date. The Mill Manager is to coordinate more frequent reviews in response to material changes to the Mine and observed operating conditions.

### **1.3 Roles and Responsibilities**

The roles and responsibilities of key personnel involved with the control of fugitive dust emissions are identified in Table 1-3. Contact numbers for key personnel are provided in Table 1-4.

### **1.4 Compliance Audits**

The Mill Manager will review forms and logs on a quarterly basis, as outlined in Section 4.1. The audit is intended to confirm: 1) that inspections are being conducted at the required frequency; 2) that inspections are sufficient in their level of detail to identify issues and make appropriate recommendations; 3) that recommended control measures are adequate; and 4) that recommendations are being completed in a timely manner.

**Table 1-3 – Roles and Responsibilities**

Position	Functions	Responsibilities
VP Operations	Oversee Mine Operations	<ul style="list-style-type: none"> <li>• Approval of major works and expenditures.</li> <li>• Liaison with management and government.</li> <li>• Ultimate responsibility for the regulatory compliance.</li> </ul>
Mill Manager	Permitting and regulatory issues; inspection, training, monitoring and documentation	<ul style="list-style-type: none"> <li>• Coordinate permitting and engineering for modifications to emissions.</li> <li>• Review inspection reports, manage environmental monitoring.</li> <li>• Coordinate annual updates to Plan with key personnel.</li> </ul>
First Line Supervisors	Equipment operation and material handling	<ul style="list-style-type: none"> <li>• Perform routine monitoring and documentation and implementation of corrective actions.</li> <li>• Follow applicable procedures listed in Section 3 related to fugitive dust control</li> </ul>
Equipment Operators, Personnel	Material Handling, Road Travel & speed limits	<ul style="list-style-type: none"> <li>• Follow applicable procedures listed in Section 3 related to fugitive dust control.</li> </ul>

**Table 1-4 – Key Personnel and Contact Telephone Numbers**

Position	Person	Telephone Numbers
Mine Manager	Eric Setchell	C: 204.612.2466
Mill Manager	John Hutchison	C:204.612.0929
Mill Superintendent	Shawn Healey/ Ed Brylikowski	C:204.612.1411

## 2.0 FACILITY DESCRIPTION

The Mine site is located in Bissett, Manitoba, a relatively remote area in rural Manitoba. The nearest receptors are residences located approximately 500 m to the north and west. Accordingly, there are no receptors in the immediate vicinity of the Mine site and access road.



Generic dust sources are listed below.

- F1: Road Dust
- F2: Material Handling – Dumping and Reclaiming Rock at Shaft Dump Pocket
- F3: Material Handling – Placement / Dumping of Rock at the Mine site
- F4: Material Handling – Outdoor Crusher / Screener Operation
- F5: Material Handling – Conveyor Drop to Undersize Stockpile
- F6: Material Handling – Load rock into haulage trucks
- F7: Stockpiles
- F8: Wind Erosion of Tailings Management Facility (“TMF”)

Return air from the underground workings is not considered a significant source of fugitive dust because the work that is currently in progress underground is a wet process and the material being handled is wet. The potential for return air to be a significant source of fugitive dust will be re-evaluated if there is a material change to the work being carried out underground (*i.e.* crushing, modified blasting practices / improved drying of drillholes prior to blasting). Fugitive dust from underground blasting is short-term in nature and is therefore not deemed to be significant at the present time.

### **3.0 FUGITIVE DUST SOURCES AND CONTROLS**

Common industry practice for best practices plans for the control of fugitive dust require the identification of the main sources of fugitive dust emissions such as:

- (a) on-site traffic; haul routes,
- (b) paved roads/areas;
- (c) unpaved roads/areas;
- (d) material stock piles;
- (e) loading/unloading areas and loading/unloading techniques,
- (f) material spills;
- (g) material conveyance systems;
- (h) exposed openings in process and storage buildings; and
- (i) general work areas.

The identified fugitive dust sources, as well as existing and additional (contingency) potential control measures are described in this Section. Control measures are a combination of engineering controls and procedural measures. Generally, control measures incorporate one or more of the following:

- Reduction / elimination of exposure of the erodible surface / process to wind;
- Reduction / elimination of the dust-generating activity,
- Reduced spillage / material loss due to wind and water runoff;
- Reduction in wind velocity and/or
- Agglomeration of erodible materials to prevent entrainment of particles in wind.

### **3.1 Source F1: Road Dust**

The access road is shown on Figure 2. Current traffic volumes are limited and comprise 1) daily light truck traffic for transportation of personnel, materials, and off-site disposal of waste; 2) fuel deliveries; 3) liquid waste pick-up; 4) non-routine deliveries of aggregate, backfill and supplies; 5) transportation of ore from the Mine to the mill; and 6) transportation of development rock from the Mine to areas where the rock is to be stockpiled or used for construction purposes. Existing and potential contingency measures under development are listed below in Table 3-1.

The main potential causes of high dust emissions include the entrainment of spilled / tracked-out material on the road, excessive vehicle speed, unusually dry road conditions and excessive silt content in road material / winter traction material. These potential causes of high fugitive dust emissions are addressed by the controls listed in Table 3-1.

Table 3-1: Source F1 Road Dust

Fugitive Dust Control Measure	Implemented?		Schedule and Strategy for Implementation
	Yes	Contingency Measure Under Development	
1) Wet down road using a water truck to suppress dust based on a pre-determined schedule, or triggered by traffic volume, weather, visual observations, public complaints, etc.		X	Wetting is short-term solution and will only be used on intermittent basis or for short-duration increased traffic volume. Wetting is a longer-term solution when water is being used to re-activate surface tackifiers / stabilizers.
2) Apply stabilizing agent in accordance with manufacturer recommendations.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
3) Surface road with a material that has a low silt content.		X	A low silt aggregate is not readily available near the Mine site.
4) Provide effective source control where process materials are handled and stored in order to minimize trackout, runoff and wind erosion onto roads		X	This BMP is more relevant to prevention of trackout onto paved surface. Fines from development rock are not known to pose a chemical stability risk or to be highly mineralized, making fines a low risk source of metal-bearing fugitive dust. Surface diamond drill sumps are not allowed to overflow on to road surface, thereby preventing additional fines on road surface.
5) Minimize the re-handling of materials throughout the site in order to reduce traffic volumes.	X		Development rock from shaft dump pocket will be reclaimed with a loading unit and directly shipped to its final destination, with no interim stockpiles.
6) Concentrate truck traffic on designated roads in order to reduce the sources of dust and to reduce the areas of the Mine site requiring regular clean-up and maintenance.	X		Once on the Mine site industrial footprint, truck traffic is directed to the laydown area, and light vehicle traffic is directed to the main office. This effectively directs traffic to one of two areas, thereby minimizing road clean-up and maintenance and also minimizing traffic on road surfaces that are subject to material

			spillage.
7) Establish and maintain ditches alongside road corridors. Crown the road in order to direct runoff away from the road rather than washing fines onto the road surface.	X		This BMP is more relevant to prevention of trackout onto paved surface and subsequent fugitive dust emissions.
8) Limit traffic speeds, post signs and train personnel.	X		The speed limit has been established and communicated, and has been included as a part of site specific orientation.
9) Utilize automated sprinklers to maintain wetted surfaces.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
10) Use clean mobile equipment to move snow and locate snow dumps in an area that is not subject to traffic and where water can be collected and managed.	X		When required, snow is piled where it will drain to the sewage works and not onto the access road, which could rinse fines onto the road surface.
11) Utilize winter road sand with a low silt content to reduce the potential for fugitive dust emissions.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
12) Incorporate winter road sand into the road bed (as is warranted based on observations) in spring prior to applying a stabilizer. Steps are below: <ul style="list-style-type: none"> <li>• Deep scarification (100 mm) to produce a granular mix with uniform characteristics. This incorporates remaining winter traction materials into the road surface.</li> <li>• Apply stabilizer on the loose gravel. Stabilizers generally agglomerate fine particles and assist in the prevention of the release of dust particles from the road surface to the atmosphere.</li> <li>• Re-shape the surface with a minimum 2% cross fall, allowing time for penetration of the stabilizer</li> </ul>		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.

<p>into the road surface. The cross fall promotes the shedding of water from the road surface.</p> <ul style="list-style-type: none"> <li>• Compact with a roller. Compaction helps consolidate the road surface and prevent breakdown due to erosion (wind or water) and traffic.</li> </ul>		
<p>13) Application of brine or other dust suppressant solution during “freeze-dry” conditions if deemed necessary due to observed conditions or complaints.</p>	<p>X</p>	<p>To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.</p>
<p>14) Maintain windbreaks to prevent wind-blown erosion from road surface.</p>	<p>X</p>	<p>The established tree cover will be maintained alongside the road.</p>
<p>15) Implement and follow-up a procedure for spill clean-up to prevent fugitive dust.</p>	<p>X</p>	<p>The need for the timely clean-up of spilled material is communicated as a part of site specific orientation.</p>

**3.2 Source F2: Material Handling – Dumping and Reclaiming Rock at Shaft Dump Pocket / Ramp Portal**

Broken rock from the underground workings is dumped onto the ground near the shaft and also the ramp portal. Broken rock has a high moisture content because it is being excavated below the water table and because it is wetted when working faces are washed down following blasts. This high moisture content effectively minimizes fugitive dust emissions during the dumping of rock onto the shaft dump pocket. A portion of the porewater would also be lost to evaporation and sublimation in wintertime. To help minimize these losses, these temporary stockpile locations will be located in an area that is shaded to the maximum extent practical. The maintenance of porewater within the rock will help to agglomerate fines and minimize fugitive dust emissions from material handling. The rapid removal of rock from the temporary stockpile area will minimize porewater loss. Existing and potential contingency measures under development are listed below in Table 3-2.

The main potential causes of high dust emissions include the entrainment of spilled / tracked-out material, exposure of erosion prone material to high winds, unusually dry material, handling of material in a manner that exposes material to high wind. These potential causes of high fugitive dust emissions are addressed by the controls listed in Table 3-2.

**Table 3-2: Source F2 Material Handling – Dumping and Reclaiming Rock at Shaft Dump Pocket**

Fugitive Dust Control	Implemented?		Schedule and Strategy for Implementation
	Yes	Contingency Measure Under Development	
1) Minimize drop height from loading unit to truck box. The loading unit that will be used is normally a front end loader ("FEL").	X		FEL operator has been instructed to do this.
2) Pre-wet material prior to being handled	X		This is done in the underground workings before it is hoisted to surface.
3) Minimize size of working faces where material is extracted	X		The shaft dump pocket or other temporary stockpile area will have a small width which effectively minimizes size of the working face that would be prone to erosion.
4) Protect activities from exposure to wind.	X		The location of the shaft dump pocket provides shelter due to surrounding buildings and log retaining wall. The truck will be placed as close as practical to the shaft dump pocket so the loading activity is protected from wind as well.
5) Avoid re-handling of rock.	X		Development rock will be reclaimed with a loading unit and directly shipped to its final destination, with no interim stockpiles.
6) Re-wetting of rock pile prior to being reclaimed with loading unit.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
7) Covering of rock pile with an industrial tarp / geotextile to prevent wind-blown dust, and/or raise retaining wall as a windbreak.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.

8) Sloping of site to prevent runoff from rinsing fines onto downslope roads and travel areas.	X		Yard is sloped so that there is no potential for rinsing of fines away from the temporary stockpile area.
9) Installation of trackout prevention measures (e.g. install dry wheel-washer, dedicated loading unit to area and prevent truck tires from entering material handling area; use excavator or telescopic loader to load material because it would not have to travel in and out of pile, etc.)		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
10) Dump rock directly into truck box and avoid going to ground with the rock.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.

**3.3 Source F3: Material Handling – Placement of Rock at the Mine Site**

Rock will be handled before it has had a chance to dry out and lose porewater to the maximum extent practical. The maintenance of porewater within the rock will help to agglomerate fines and minimize fugitive dust emissions from material handling.

Rock placement at the Mine site relates to ore stockpiling, TMF construction, yard construction and placement of rock into long-term stockpiles.

The main potential causes of high dust emissions include the entrainment of spilled / tracked-out material, exposure of erosion prone material to high winds, unusually dry material, handling of material in a manner that exposes material to high wind. These potential causes of high fugitive dust emissions are addressed by the controls listed in Table 3-3. Existing and potential contingency measures under development are listed below in Table 3-3.

**Table 3-3: Source F3: Material Handling – Placement of Rock at the Mine site**

Fugitive Dust Control	Implemented?		Schedule and Strategy for Implementation
	Yes	Contingency Measure Under Development	
1) Unload trucks in areas protected from wind. Where this is not practical, unload trucks in open areas on days when wind speed is minimal (less than approximately 4.5 m/sec or 16 km/hr) or when conditions are wet. On windy, dry days when rock handling is necessary, unload trucks in areas protected from wind.	X		Trucks will not be unloaded in open areas during windy conditions (greater than about 4.5 m/sec or 16 km/hr).
2) Postpone this activity until favourable weather condition.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
3) Wet material before it is loaded into haulage unit.	X		This is being done in underground workings, and may be done as a control measure for Source F2, which would reduce fugitive dust from Source F3 as well.
4) Avoid re-handling of rock.	X		Development rock from shaft dump pocket will be reclaimed with a loading unit and directly shipped to its final destination, with no interim stockpiles.
5) Re-wetting of rock after it is loaded into haulage unit.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
6) Minimize drop height from truck box at dump location. Also, can protect falling material from wind-through use of windbreaks (mudflaps) extending from bottom of truck box to ground level.	X	X	Truck boxes will have minimal drop height. If this is an issue, use of bottom-dump trailers to be evaluated.



7) Cover loads with tarp to prevent exposure to wind.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
8) Avoid overloading trucks to prevent spillage of fines on road.	X		FEL operator has been instructed to do this.
9) Trucks should have functional tailgates to prevent spillage from the truck box.	X		This is part of the operator's shift checks.

**3.4 Source F4: Material Handling – Outdoor Crusher / Screening Operation**

During the life of the Mine, it will be necessary to crush and screen rock (ore and development rock). Planned control measures and potential contingency measures under development are listed below in Table 3-4.

The main potential causes of high dust emissions include the entrainment of spilled / tracked-out material, exposure of erosion prone material to high winds, unusually dry material, handling of material (with loader or conveyor) in a manner that exposes material to high wind. These potential causes of high fugitive dust emissions are addressed by the controls listed in Table 3-4.

**Table 3-4: Source F4: Material Handling – Crusher / Screener Operation**

Fugitive Dust Control	Implemented?		Schedule and Strategy for Implementation
	Yes	Contingency Measure Under Development	
1) Complete crushing / screening in an area protected from wind (layout, windbreak, constructed windbreak such as suspended conveyor belt curtain).	X		Crushing / screening would be completed near the shaft dump pocket, which is sheltered by nearby buildings and topography, as well as the shaft dump pocket retaining walls. Additional windbreak to be evaluated upon receipt of a complaint.
2) Perform this operation on a campaign basis during non freeze-up conditions to allow the use of water for dust suppression.	X		Crushing / screening would be performed during non freeze-up conditions, ideally when the seasonal residences surrounding the Mine area are not occupied.

3) Carry out this activity on days with favourable weather conditions, when wind speed is less than 4.5 m/second (16 km/hr).		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
4) Re-wetting of rock prior to screening.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
5) Maintain water sprays where dust is generated on the screener.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
6) Use screened material as windbreak from prevailing wind for the screening operation.	X		To be used upon start-up.
7) Minimize drop height from loading unit into screener.	X		Operator to be instructed to do this prior to start-up.
<b>Conveyor Transport (as applicable)</b>			
9) Minimize the number of transfer points and shelter transfer points from wind	X		To be completed prior to start-up.
10) Use effective belt scrapers that are in constant contact with belt to prevent carryback.		X	To be evaluated upon start-up.
11) Shelter the top of the belt from the wind (industrial tarp, geotextile, steel culvert) to prevent material being blown off belt.	X		To be completed prior to start-up.
12) Collect belt scrapings and falling material from belt (housekeeping)	X		To be evaluated upon start-up and initiated as appropriate.
13) Maintain water sprays at transfer points to suppress dust and agglomerate fine particles, thereby reducing dust emissions at later transfer points.	X		To be evaluated upon start-up and initiated as appropriate.
14) Minimize drop height from stacker conveyor (if installed).	X		To be evaluated upon start-up and initiated as appropriate.
15) Install tube or telescopic “sock” over drop point to protect falling fines from wind.		X	To be evaluated upon start-up and initiated as appropriate.

### 3.5 Source F5: Conveyor Drops to Stockpile

During the life of the Mine, it may be necessary to convey materials (rock, tailings) to stockpile(s). Planned control measures and potential contingency measures under development are listed below in Table 3-5.

The main potential causes of high dust emissions include the handling of unusually dry material and the handling of material (with loader or conveyor) in a manner that exposes material to high wind. These potential causes of high fugitive dust emissions are addressed by the controls listed in Table 3-5.

**Table 3-5: Source F5: Material Handling – Conveyor Drops to Stockpile**

Fugitive Dust Control	Implemented?		Schedule and Strategy for Implementation
	Yes	Contingency Measure Under Development	
1) Minimize the number of transfer points and shelter transfer points from wind	X		To be completed prior to start-up.
2) Use effective belt scrapers that are in constant contact with belt to prevent carryback.		X	To be evaluated upon start-up.
3) Shelter the top of the belt from the wind (industrial tarp, geotextile, steel culvert) to prevent material being blown off belt.	X		To be completed prior to start-up.
4) Collect belt scrapings and falling material from belt (housekeeping)	X		To be evaluated upon start-up and initiated as appropriate.
5) Maintain water sprays at transfer points to suppress dust and agglomerate fine particles, thereby reducing dust emissions at later transfer points.	X		To be evaluated upon start-up and initiated as appropriate.
6) Minimize drop height from stacker conveyor.	X		To be evaluated upon start-up and initiated as appropriate.
7) Install a “sock” on the headend of the conveyor to shelter the falling material from wind. The sock should extend from the conveyor headend to as close to the stockpile as possible.	X		To be completed prior to start-up.

**3.6 Source F6: Material Handling – Loading Materials into Trucks**

The main potential causes of high dust emissions include the entrainment of spilled / tracked-out material, exposure of erosion prone material to high winds, unusually dry material, handling of material in a manner that exposes material to high wind. These potential causes of high fugitive dust emissions are addressed by the controls listed in Table 3-6. Existing and potential contingency measures under development are listed below in Table 3-6.

**Table 3-6: Source F6 Material Handling – Loading Materials into Trucks**

Fugitive Dust Control	Implemented?		Schedule and Strategy for Implementation
	Yes	Contingency Measure Under Development	
1) Minimize drop height from loading unit to truck box. The loading unit that will be used is normally a front end loader (“FEL”).	X		FEL operator has been instructed to do this.
2) Pre-wet material prior to being handled	X		This is done in the underground workings before it is hoisted to surface.
3) Minimize size of working faces where material is extracted	X		The shaft dump pocket has a small width which effectively minimizes size of the working face that would be prone to erosion.
4) Protect activities from exposure to wind.	X		The location of the shaft dump pocket provides shelter due to surrounding buildings and log retaining wall. The truck will be placed as close as practical to the shaft dump pocket so the loading activity is protected from wind as well.
5) Avoid re-handling of rock / materials.	X		Development rock from shaft dump pocket will be reclaimed with a loading unit and directly shipped to its final destination, with no interim stockpiles.

6) Re-wetting of rock pile prior to being reclaimed with loading unit.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
7) Covering of rock pile with an industrial tarp / geotextile to prevent wind-blown dust, and/or raise retaining wall as a windbreak.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
8) Sloping of site to prevent runoff from rinsing fines onto downslope roads and travel areas.	X		Yard is sloped towards the shaft dump pocket, there is no potential for rinsing of fines away from shaft dump pocket.
9) Installation of trackout prevention measures (e.g. install dry wheel-washer, dedicated loading unit to area and prevent truck tires from entering material handling area; use excavator or telescopic loader to load material because it would not have to travel in and out of pile, etc.)		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
10) Dump rock directly into truck box and avoid going to ground with the rock.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.

**3.7 Source F7: Material Handling – Stockpiles**

During the life of the Mine, it may be necessary to place materials in temporary stockpiles. Planned control measures and potential contingency measures under development are listed below in Table 3-7.

The main potential causes of high dust emissions include the entrainment of spilled / tracked-out material, exposure of erosion prone material to high winds, unusually dry material, handling of material (with loader or conveyor) in a manner that exposes material to high wind. These potential causes of high fugitive dust emissions are addressed by the controls listed in Table 3-7.

**Table 3-7: Source F7: Material Handling – Stockpiles**

Fugitive Dust Control	Implemented?		Schedule and Strategy for Implementation
	Yes	Contingency Measure Under Development	
1) Locate stockpile in an area protected from wind (site layout, use nearby building as windbreak, constructed windbreak such as suspended conveyor belt curtain).	X		To be in place upon start of stockpile. Additional windbreak to be evaluated upon receipt of a complaint.
2) Periodic re-wetting of stockpile (manual sprays or automated sprinklers).		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
3) Minimize size and duration of stockpile	X	X	To be in practiced at all times.
4) Locate stockpile such that runoff is controlled and trackout is minimized.	X		To be used upon start-up.
5) Prevent contact with precipitation to maximum extent practical to minimize trackout.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.

**3.8 Source F8: Wind Erosion of TMF Surface**

The TMF surface will be primarily characterized by fine particles that are coarser (i.e. silt size) near the outer perimeter of the TMF and finer (i.e. clay size) more internal to the TMF. The coarser particles near the perimeter will tend to dry out, while the finer particles that are more internal to the TMF will tend to remain wetted. Any areas of the TMF surface that become dried will be prone to erosion if the wind speed is sufficient. Planned control measures and potential contingency measures under development are listed below in Table 3-8.

The main potential causes of high dust emissions include the desiccation of tailings particles through evaporation or sublimation processes and subsequent exposure to high wind velocities. These potential causes of high fugitive dust emissions are addressed by the controls listed in Table 3-8.

**Table 3-8: Source F8: Wind Erosion of TMF Surface**

Fugitive Dust Control	Implemented?		Schedule and Strategy for Implementation
	Yes	Contingency Measure Under Development	
1) Frequently move the tailings discharge location in order to maintain a wetted tailings surface.	X		To be in place upon start up.
2) Mix tackifier with settled solids in the mill plant sumps so that it will suppress dust when this mixture is discharged over the tailings surface. Due the nature of the material, the mixture will disperse and cover a large area, thereby providing effective dust suppression over a large area.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
3) Spigot discharge tailings instead of practicing end-of-pipe discharge, to maximize the wetted surface.	X		To be in practiced to the maximum extent practical. This may not be possible during freeze-up conditions.
4) Crimp straw into areas of tailings surface that are susceptible to erosion. This will reduce wind speed at the tailings surface and retain moisture, thereby helping to agglomerate solids together.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
5) Frequently move any pipe discharge points that direct water / settled sludge to the TMF in order to maintain a wetted tailings surface.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
6) Deployment of snow fence and/or other windbreaks to reduce wind speed at tailings surface. This may also be employed to create a protective snow cover over an erosion prone area.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.

7) Add tackifier and/or binder to discharged tailings to bind together the tailings solids and prevent entrainment by wind.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.
8) Periodic manual or automated sprinkling of the relevant areas of the TMF surface.		X	To be evaluated and implemented as appropriate pending findings of monitoring program and receipt of complaints.



#### **4.0 PERFORMANCE TARGETS**

The established targets related to fugitive dust are:

- No significant visible fugitive dust from the identified fugitive dust sources during worst-case conditions (refer to Section 6.0). For the purpose of this Plan, “significant” is defined as visible dust that is observed to move, or is likely to move, off the Mine site.
- Zero public complaints related to fugitive dust.
- Zero complaints from personnel related to fugitive dust.

#### **5.0 IMPLEMENTATION AND TRAINING**

The controls listed in Section 3.4 (Table 3-1 to 3-8) are listed as either “implemented” or as a “contingency measure under development.”

- Engineering controls listed as “implemented” in Section 3.4 are in place. Routine monitoring (Section 6.0) identifies the continuing effectiveness of the installed engineering controls.
- Procedural controls listed as “implemented” in Section 3.4 have been communicated to the involved personnel and are documented in the [Fugitive Dust Control Logsheet](#). Procedural controls are also communicated to personnel during the site-specific orientation and documented as part of the Safety Program. Routine monitoring (Section 6.0) identifies the continuing effectiveness of the established procedural controls.
- The “contingency measures under development” will be further evaluated and implemented based on the findings from the routine inspections (Section 6.0) and based on any complaints to achieve the performance targets in Section 4.0.

## 6.0 IMPLEMENTATION AND TRAINING

The controls listed in Section 3.4 (Table 3-1 to 3-8) are listed as either “implemented” or as a “contingency measure under development.”

- Engineering controls listed as “implemented” in Section 3.4 are in place. Routine monitoring (Section 6.0) identifies the continuing effectiveness of the installed engineering controls.
- Procedural controls listed as “implemented” in Section 3.4 have been communicated to the involved personnel and are documented in the [Fugitive Dust Control Logsheet](#). Procedural controls are also communicated to personnel during the site-specific orientation and documented as part of the Safety Program. Routine monitoring (Section 6.0) identifies the continuing effectiveness of the established procedural controls.
- The “contingency measures under development” will be further evaluated and implemented based on the findings from the routine inspections (Section 6.0) and based on any complaints to achieve the performance targets in Section 4.0.

## 7.0 MONITORING AND CORRECTIVE ACTIONS

Formal inspections of the installed controls (Table 3-1 to 3-8) and the fugitive dust sources (F1 to F8) are conducted by the Mill Manager once per month under the following worst-case conditions:

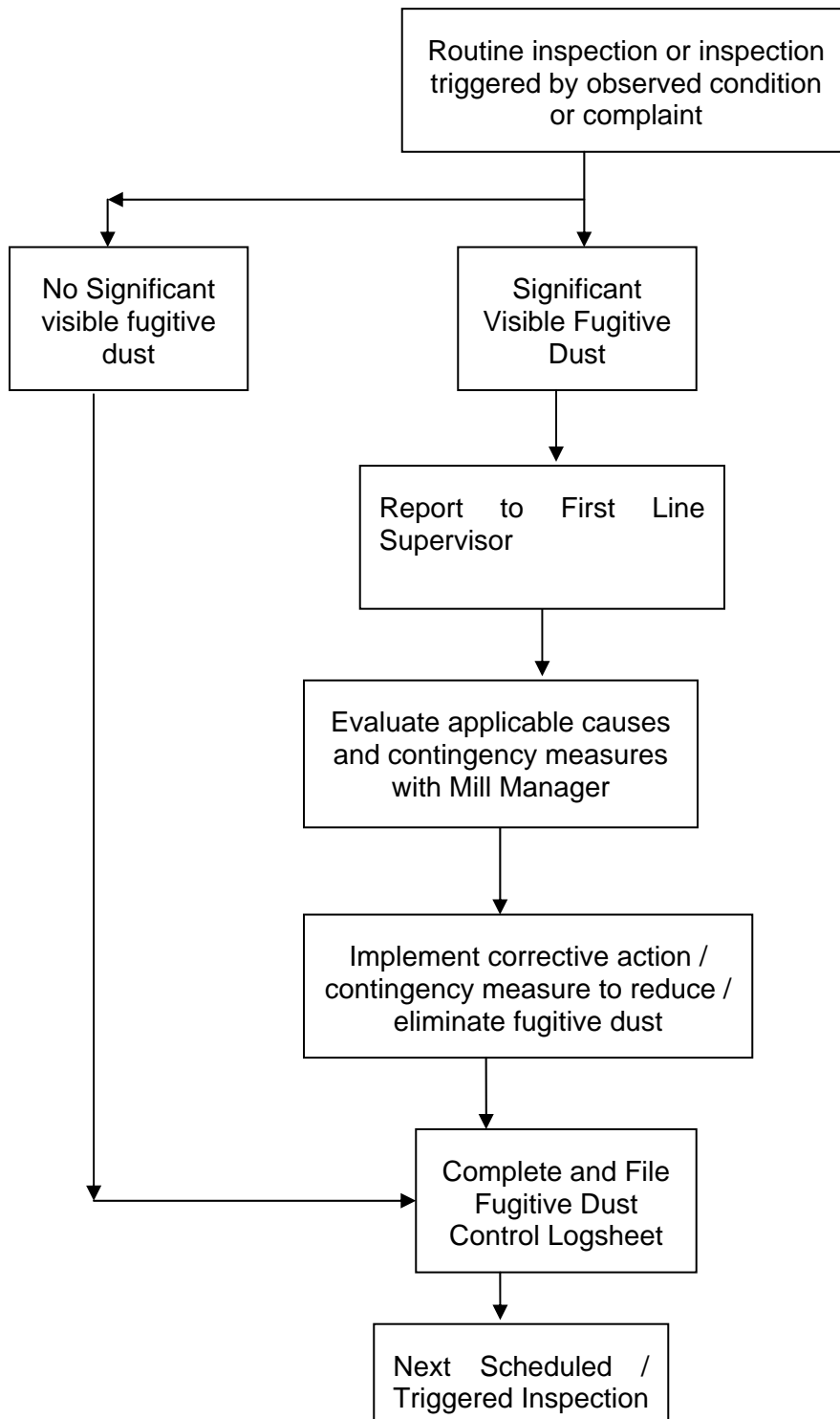
- When weather conditions are dry (no precipitation for a minimum of two days).
- When fugitive dust sources are at their maximum (e.g. maximum material handling rates; maximum traffic volume).

Inspection findings are documented in the [Fugitive Dust Control Logsheet](#). Completed [Fugitive Dust Control Logsheets](#) are provided in Appendix B.

In addition to formal, monthly inspections, the Mill Manager and management will identify any sources of significant visible fugitive dust. If significant visible fugitive dust is observed, a formal inspection will be triggered.

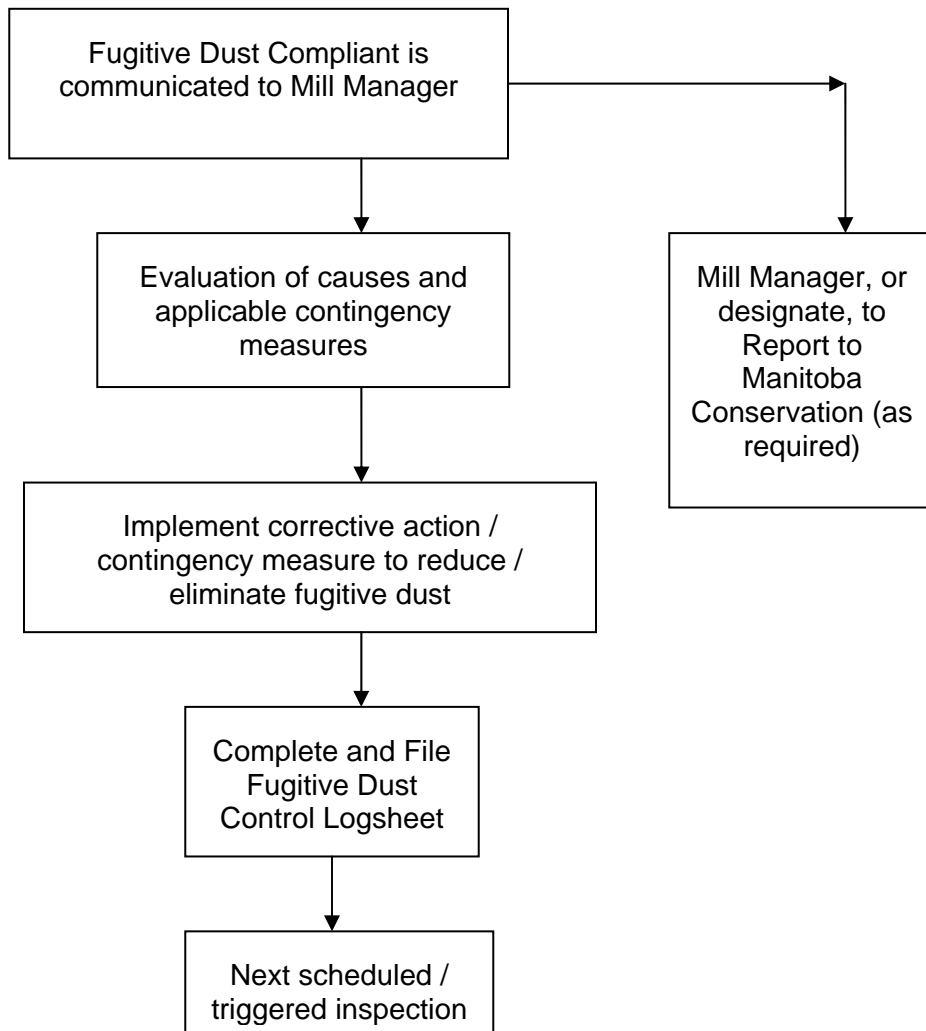
If significant visible fugitive dust is observed during an inspection, corrective action will be implemented as outlined in Flowchart 6-1 below.

**Flowchart 6-1: Inspections and Corrective Action**



Complaints (from public and/or personnel) are handled in accordance with [Standard Task Procedure 001: Environmental Operating Procedures](#) (procedure is provided in Appendix C). If complaints are received related to fugitive dust, corrective action will be implemented as outlined in Flowchart 6-2 below.

**Flowchart 6-2: Complaints and Corrective Action**



## **8.0 DOCUMENTATION REQUIREMENTS**

Training will be recorded in the [Fugitive Dust Control Logsheet](#) and also in the site-specific orientation training reports that are on file in the training records file for each individual.

Inspections and corrective actions will be recorded in the [Fugitive Dust Control Logsheet](#).

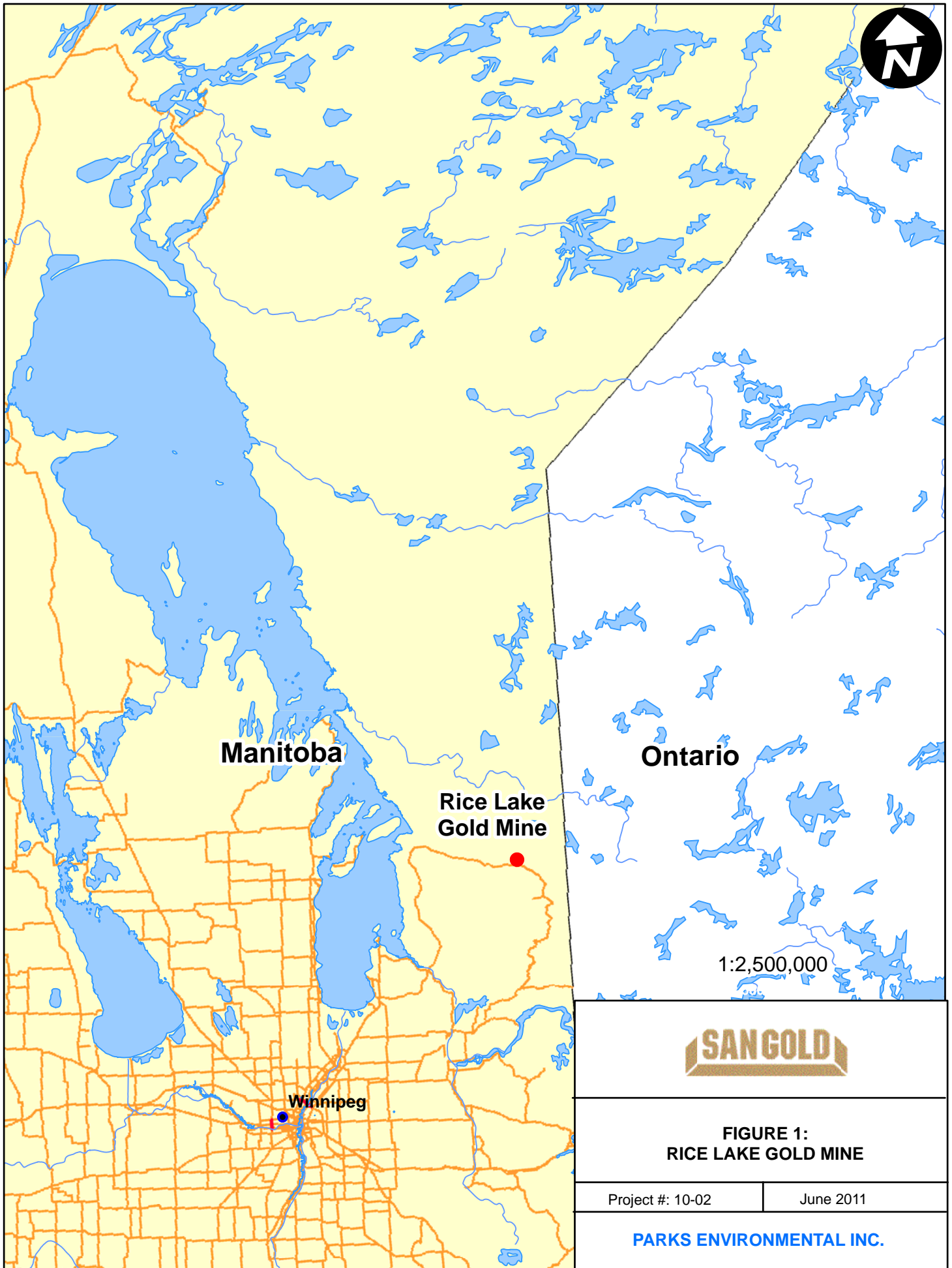
Completed [Fugitive Dust Control Logsheets](#) will be maintained in the office of the Mill Manager in Appendix B of the Plan. These completed logsheets serve as the logbook. Logsheets will be maintained for a minimum of five (5) years.

# Appendix A

San Gold Corporation

## Best Management Practices for Control of Fugitive Dust

- Figures







**FIGURE 2 - Rice Lake Mill**  
SITE LAYOUT



PARKS  
ENVIRONMENTAL  
INC.



# Appendix B

San Gold Corporation

## Best Management Practices for Control of Fugitive Dust

- Fugitive Dust Control Logsheets (Template)
- Completed Fugitive Dust Control Logsheets (Mine to date)

**SanGold Corporation**  
**Bissett Gold Mine**  
***Fugitive Dust Control Logsheet - Revision 0: Jan 2011***

Inspector: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Inspector's signature: \_\_\_\_\_

Reviewer / Auditor (print and sign): \_\_\_\_\_

Attachments to this document? Yes / No (if yes, describe)

Control measures listed in Section 3 of most version of BMP Plan Implemented? Yes / No (if no, state why)

**Description of applied dust control measure(s)**

**Source F1: Road Dust**


**Source F2: Material Handling - Dumping and Reclaiming Rock at Shaft Dump Pocket**


**Source F3: Material Handling - Placement of Rock at Project Site**


**Source F4: Material Handling - Crusher / Screener Operation**


*The purpose of this page is to document the fugitive dust control measures that are applied to the sources of fugitive dust at the Project site.*

**SanGold Corporation**  
**Bissett Gold Mine**  
***Fugitive Dust Control Logsheet - Revision 0: Jan 2011***

Inspector: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Inspector's signature: \_\_\_\_\_

Reviewer / Auditor (print and sign): \_\_\_\_\_

Attachments to this document? Yes / No (if yes, describe)

Control measures listed in Section 3 of most version of BMP Plan Implemented? Yes / No (if no, state why)

**Description of applied dust control measure(s)**

**Source F5: Conveyor Drops to Stockpile**


**Source F6: Material Handling - Loading Materials into Trucks**


**Source F7: Material Handling - Stockpiles**


**Source F8: Wind Erosion of TMF Surface**


*The purpose of this page is to document the fugitive dust control measures that are applied to the sources of fugitive dust at the Project site.*

**Weather Conditions:** Sunny / Partly Cloudy / Cloudy / Precipitation \_\_\_\_\_

Temperature:	Wind speed and Direction:	Ground Conditions (wet/dry):
--------------	---------------------------	------------------------------

**Dust Conditions** (indicate any unsatisfactory conditions in the boxes below)

<b>Fugitive Dust Source and Location</b>	<b>Significant visible fugitive dust from fugitive dust source?</b>	<b>Trackout present / poor housekeeping / spillage</b>	<b>Accumulations of dust (e.g. from surface runoff, wind erosion)</b>	<b>Other unsatisfactory condition (include description)</b>
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**Source F1: Road Dust**


**Source F2: Material Handling - Dumping and Reclaiming Rock at Shaft Dump Pocket**


**Source F3: Material Handling - Placement of Rock at Project Site**


**Source F4: Material Handling - Crusher / Screener Operation**


*The purpose of this page is to assist the Inspector determine which fugitive dust sources require additional control measures. Corrective action and follow-up at the time of the next scheduled inspection are required if any unsatisfactory conditions are identified.*

**Summary of Findings from Previous Inspection:**


**Description of Corrective Action and Follow-up (if required):**


**Weather Conditions:** Sunny / Partly Cloudy / Cloudy / Precipitation \_\_\_\_\_

Temperature:	Wind speed and Direction:	Ground Conditions (wet/dry):
--------------	---------------------------	------------------------------

**Dust Conditions** (indicate any unsatisfactory conditions in the boxes below)

Fugitive Dust Source and Location	Significant visible fugitive dust from fugitive dust source?	Trackout present / poor housekeeping / spillage	Accumulations of dust (e.g. from surface runoff, wind erosion)	Other unsatisfactory condition (include description)
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**Source F5: Conveyor Drops to Stockpile**


**Source F6: Material Handling - Loading Materials into Trucks**


**Source F7: Material Handling - Stockpiles**


**Source F8: Wind Erosion of TMF Surface**


*The purpose of this page is to assist the Inspector determine which fugitive dust sources require additional control measures. Corrective action and follow-up at the time of the next scheduled inspection are required if any unsatisfactory conditions are i*

**Summary of Findings from Previous Inspection:**


**Description of Corrective Action and Follow-up (if required):**




# Appendix C

San Gold Corporation

## Best Management Practices for Control of Fugitive Dust

- Standard Task Procedure ENV-001:  
Environmental Operating Procedures

# **STANDARD TASK PROCEDURE**

## **ENV-001: ENVIRONMENTAL OPERATING PROCEDURES**

Issue Date: 1 February 2011

Date of Latest Revision: 1 February 2011

Revision Number: 1

Relevant legislation: *Environment Act*

Objective:.... To comply with applicable environmental legislation, site-specific approvals, conform to best practices, practice due diligence and minimize environmental liability.

---

### **TASK.....SPILL REPORTING PROCEDURE**

#### **1.....SPILL DEFINITION**

A spill is the uncontrolled or unintentional release of any liquid (e.g. petroleum product, paint), solid (e.g. mineralized rock fines) or gas (e.g. smoke from a fire) into the natural environment (e.g on surface, outside of a contained area) in an amount that might cause harm to the environment.

#### **2.....SPILL RESPONSE**

Stop the flow of product, if it is safe to do so.

Eliminate fire / explosion hazards.

Control hazard situation and notify the Front Line Supervisor. The Front Line Supervisor will notify the Mill Manager as required.

#### **3.....SPILL REPORTING**

Report spills and potential spills immediately to the Front Line Supervisor.

When notified of a potential spill, the Front Line Supervisor must take immediate response measures as is appropriate, gather relevant information and contact the Mill Manager for assistance if required.



---

## **TASK.....WASTE MANAGEMENT**

**1.....SOLID, NON-HAZARDOUS WASTE** (e.g. non-recyclable packaging, food waste, etc.)

Place waste into the solid waste trailer. The trailer is to be emptied at the municipal landfill on an as-needed basis.

**2.....RECYCLABLES** (scrap metal)

Place scrap metal into the scrap metal bin. Scrap metal may include empty paint cans, punctured aerosol cans, pipe, pop cans and empty drums with labels removed. The scrap metal bin will be removed from site by the contractor that supplied it. The Front Line Supervisor is to arrange for replacement of the bin as it becomes full with an empty one.

**3.....USED OIL FILTERS**

These are to be placed in the designated tote/drum within the liquid waste storage enclosure.

**4.....20 L PETROLEUM PRODUCT PAILS**

These are to be stacked inside one another prior to being returned to suppliers on backhauls. Pails should be stored in the liquid waste storage enclosure or placed on their side to keep out rainwater. Lids may be discarded with solid, non-hazardous waste.

**5.....PETROLEUM PRODUCT-CONTAMINATED WASTES**

Discharges of small volumes of petroleum product such as fuels or oil associated with vehicle maintenance which are cleaned up during routine house keeping are not classified as spills. Clean up materials (e.g. FLOORCO) associated with such housekeeping should be stored inside the liquid waste enclosure to prevent migration of the products by precipitation. These drums must be kept at the liquid waste storage shed for disposal with the licensed hauler and receiver. Alternatively, Spill Green HS is to be applied, in accordance with manufacturer recommendations to encapsulate the hydrocarbons and render them into amorphous silica.

**6.....LIQUID WASTES** (i.e. waste oil, fuel, antifreeze, varsol, greases etc.)

Waste must be segregated in separate containers, labelled accordingly and disposed of with a licensed receiver. Liquid wastes are to be stored in the liquid waste storage enclosure until shipped off-site to prevent migration due to contact with precipitation.

---

## **TASK.....WATER MANAGEMENT**

### **1.....EQUIPMENT WASHING**

Heavy equipment must be washed underground or in an area where washwater is collected (i.e. mill building floor, shaft dump pocket sump, settling pond). Washwater may contain sulphides and petroleum products that can cause contamination.

### **2.....STORM WATER AND SNOW MANAGEMENT**

Runoff and snowmelt from the yard should be directed to the containment cell.

Runoff collecting in the sump of the shaft dump pocket is to be pumped to the effluent treatment system.

### **3.....WATER WITHDRAWALS**

Freshwater withdrawals must be in accordance with regulatory requirements.

Water in the underground workings that is pumped to surface must report to the tailings management facility for treatment.

---

## **TASK.....ROCK HANDLING**

- 1) Barren development rock that is brought to surface may be used for construction purposes throughout the site.
  - 2) Rock that is brought to surface and is interpreted to pose a risk of metal leaching and/or acid rock drainage is placed in a designated location.
- 

## **TASK.....FUGITIVE DUST ABATEMENT**

On-site aggregate roads are to be wetted with an approved dust suppressant on an as-needed basis to prevent visible fugitive dust.

Where practical, roads are to be surfaced with a low-silt material (e.g. crushed stone rather than glaciofluvial till or aggregate).

There is a speed limit of 20 km/hr on-site.

As appropriate, exhausts of mobile equipment are to not be directed down at the ground because the exhaust can create fugitive dust.

Passive trackout control devices are to be established at strategic locations and traffic should be controlled to use these locations.

---

## **TASK.....RESPONDING TO PUBLIC COMPLAINTS**

### **1.....RESPONSE**

Public complaints are to be addressed by the Mill Manager. Upon receipt of a complaint from the public, staff are to notify the Mill Manager, or designate. If contact cannot be made, staff must call the VP Operations.

### **2.....ACTIONS**

The Mill Manager is to gain an understanding of the complaint and obtain all the “facts /opinions /arguments” that are offered by the stakeholder making the complaint. The Mill Manager is to record:

- 1) the dates of any public complaints,
  - 2) who made the complaint, description of the origin or nature of the complaint,
  - 3) Time, date and location of complaint
  - 4) Wind direction and other weather information at the time of the incident.  
Name of company personnel involved.
- (3) the follow-up actions to rectify the situation and to prevent a recurrence, as well as the minutes of any meetings that result from the complaint.

### **3.....REPORTING**

Public complaints are to be documented. Documentation is to be kept in a dedicated “Public Complaints” folder in the office of the office of the Mill Manager. The public complaint report is submitted to the VP Operations in writing at the earliest convenience.

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**TASK.....COMMUNICATION OF PROCEDURES**

The Front Line Supervisor / SanGold trainer is to communicate these procedures to relevant personnel during the site-specific orientation. Individuals who complete the site-specific orientation are to acknowledge completion and understanding of the environmental procedures in writing, with these acknowledgment forms kept in a dedicated folder in the office of the H&S Training Supervisor.

**TASK.....HANDLING OF BLASTING PRODUCTS**

Un-used blasting products are to be removed from the underground workings and returned to the approved storage facility to reduce ammonia in mine water. Un-used products are to be re-used at a later date or returned to the supplier.