

Mining Environmental Management

CODES OF PRACTICE

Contingency and Response Plan

Guyana Geology and Mines Commission
Brickdam, Georgetown, Guyana

August 2010

Rev – 0

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1.0 Introduction

This Code of Practice for **Contingency and Response Plans** in small and medium-scale gold and diamond mines is intended to provide environmental management guidance and promote the application of related best management practices. It is not a design manual¹.

1.1 Regulatory Authority/Mandate

The Mining (Amendment) Regulations 2005² were promulgated in 2004. Regulation 248 of the Mining (Amendment) Regulations 2005 stipulated that the Guyana Geology and Mines Commission (GGMC) prepare Codes of Practice for Mining Environmental Management prior to their incorporation into the Regulations.

The Codes of Practice were intended to provide critical environmental guidance to the Mining Industry, particularly small and medium-scale gold mines. The importance of the codes was even more enhanced by the development of the Low Carbon Development Strategy.

The following ten (10) provisions of the Codes of Practice for Environmental Management were identified:

- Use of Mercury
- Tailings Management
- Contingency and Emergency Response Plans
- Mine Effluents
- Mine Reclamation and Closure Plans
- Mine Waste Management and Disposal
- Environmental Effects Monitoring Program
- Quarrying
- Sand and Loam Mining
- Use of Small Dams for the Control of Water/Tailings

1.2 Justification for the Contingency and Response Code of Practice

The Mining (Amendment) Regulations (2005), Regulation 248, states that the GGMC shall prepare a Code of Practice to provide further guidance for Contingency and Response Plans and that this Code shall form part of the Regulations.

The potential for major tailings spill or other accidents (cyanide spill, explosion, etc., see table 4-1) are major environmental, financial and social considerations. These considerations and the Regulatory dictates are the primary justification for development of this Code of Practice.

¹ This document is **NOT** a design manual. Users of this document shall assume full responsibility for the design of facilities and for any action taken as a result of the information contained in this document.

² The Mining Regulations, made under the Mining Act (1989), was amended by the Mining (Amendment) Regulations 2005: Collectively they address all the important aspects of mining environmental management.

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Worldwide, over the last the 30-years period, there have been some 33 major mining accidents resulting in releases to the environment. Some of these accidents have caused fatalities in neighboring communities while others resulted in physical damage to property and farmland. Where chemicals have been released, fish and other species have been killed and human health and livelihoods threatened. These accidents had a severe financial impact on companies and damaged seriously the already negative image of the industry. One of these was the 1995 Omai tailings spill in Guyana.

The continued progressive development of the mining industry in Guyana requires that the various stakeholders take a greater role in its (the industry's) management and regulation. With respect to the issues of safety, emergencies and community notification, the small and medium-scale gold and diamond mining industry in Guyana must do more to meet public and regulatory expectations. Mining operations with facilities that pose significant risks to nearby communities or sensitive environments should plan for emergencies. People likely to be affected by an accident need to know what they, as individuals, should know. While in small and medium-scale mining, the consequences of a mining accident may not be, at first glance, as dramatic as in a large-scale operation, this does not preclude sound emergency and response planning.

It is likely that below a certain size of operation a formal APELL (Awareness and Preparedness for Emergencies at the Local Level) process would be difficult to implement. Small scale mining may lack organization and resources required to implement a formal APELL. Industry associations such as GGDMA must therefore take the lead with outreach and assistance programs for small scale and artisanal miners regarding emergency preparedness.

1.3 Administration of Codes and Responsibilities of Owners and Workers

A useful strategy for sustainable environmental management in the small and medium-scale gold and diamond mining is co-regulation by the various stakeholders including the GGMC, and the Miners, and Mining Industry.

GGMC's mandate or role as defined by the Mining Act 1989 and the Mining (Amendment) Regulations 2005 is to develop, administer and enforce the mining regulations. Specific responsibilities include:

- Development and upgrading of the codes of practice
- Consultations with the stakeholders in the mining industry including mining organizations and miners on the development, and utility of the Codes Of Practice.
- Public education, orientation and training
- Enforcement of, and monitoring compliance with, the Mining (Amendment) Regulations 2005

The prime responsibility for the implementation of, and compliance with, the Mining (Amendment) Regulations 2005, and the application of sound environmental management practices rests with the Mine Owners and operators. Specifically, with the respect to Contingency and Response Planning, the Mine Owners and operators must:

- Manage their operations in compliance with the Mining (Amendment) Regulations 2005, and the related Codes of Practice and Guidelines

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- Provide their employees with required training and orientation on their Contingency and Response Plan, and the related the regulations, codes and guidelines

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2.0 Glossary of terms

Acid Rock Drainage (ARD)	Drainage of acid water containing dissolved metals as a result of the natural oxidation of sulphides found in waste rock, ore and tailings exposed to wind, air, and water.
APELL	Awareness and Preparedness for Emergencies at Local Level
Best practice	The best way of doing things. The objective of best practices is to prevent or (when that is not possible) minimize risks to human health, as well as adverse environmental, social and economic impacts.
Buffer zones (areas)	Means land on either bank of rivers or watercourses from the low watermark of the bank to 20 meters (20 m) inland, and extending from the mouth of the river or navigable watercourse to its source; or any area within 30 meters (30 m) of a public road; or 100 meters (100 m) of approved residences, commercial/industrial developments; or 1 kilometer (1 km) of an approved nature reserve or park.
Co-Regulation	The mechanism whereby a <i>Community legislative act</i> entrusts the attainment of the objectives defined by <i>the legislative authority</i> to parties which are recognized in the field (such as economic operators, the social partners, non-governmental organizations, or related industry associations).
Code of Practice	Means the Environmental Code of Practice for the operation of mines that is published by the Commission and which shall be read as part of the Mining (Amendment) Regulations 2005. (A collection of rules and ethical principles related to a specific field of activity, describing the procedures and setting forth standards considered to be Best Practice in said field of activity. The Code may be either voluntary or mandatory).
Community	For the purpose of an emergency response plan, the sum of all affected communities plus the immediate community, whether it is affected or not.
Cut-off trench	Channel or ditch usually excavated around a (mining) structure in order to collect groundwater.

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Effluent	Means any fluid including airborne particles of matter and other substances in suspension or solution in the fluid and includes mine de-watering discharges , site runoff , discharges from a tailings basin or settling pond, discharges from a processing plant or dredging operation which is released to the surface or ground water and other substances such as colloids , in solution or suspension.
.Guidelines	A non-binding document, usually designed to provide users with information, explanations, guidance and help with respect to a specific topic. Guidelines are a tool frequently used to enforce new regulations. Users can be either the Regulator itself or the industry.
HSE	Stands for H ealth, S afety and E nvironment.
Medium-scale mine	A mine for which a mining permit has been issued and from which a volume in excess of 200m ³ , but less than 1000m ³ of material, inclusive of any overburden, is excavated or processed as an aggregate in any continuous period of twenty-four hours. .
Mine	Includes any excavation, processing facility and/or related facilities for the recovery of metal, mineral or quarriable material and excludes any excavation, processing facility or related facilities that excavate or process less than 20 m ³ in any continuous period of twenty-four hours
Mine closure	A whole of mine life process which typically culminates in tenement relinquishment. Closure includes decommissioning and rehabilitation. This term is often used interchangeably with Mine decommissioning.
Mine decommissioning	The process that begins near, or at, the cessation of mineral production. This term is often used interchangeably with Mine Closure.
NGO	Stands for N on- G overnment O rganization.
Overburden	Loose soil, sand, gravel, etc., that lies above the bedrock or above a deposit of useful materials, ores, or coal. Also called burden, capping, cover, drift, mantle, and surface, it may or may not include topsoil.
Reclamation (rehabilitation)	The return of the disturbed land to a stable, productive and self-sustaining condition, taking into account beneficial uses of the site and surrounding land.

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Regulations	<p>A type of “delegated legislation” enacted by a state, or local government agency given authority to do so by the appropriate legislature</p> <p>Regulations are generally very specific and are also referred to as rules, or simply administrative law. Regulations are official rules and must be followed.</p>
Risk analysis	<p>The systematic use of available information to identify hazards and to estimate quantitatively or qualitatively, the likelihood and consequences of those hazards being realized.</p>
Risk assessment	<p>The process of evaluating what might go wrong with a facility and its associated plans and procedures in addition to the consequences of failure. Risk assessments are the basis for developing a risk management strategy that includes communications, contingencies, mitigation measures and emergency response plans.</p>
Small-scale mine	<p>A mine for which a claim license has been issued and from which a volume in excess of 20m³, but less than 200m³, of material, inclusive of any overburden, is excavated or processed as an aggregate in any continuous twenty-four hour period.</p>
Stakeholders	<p>The sum of all representative institutions of the community as well as the relevant sectorial Regulatory bodies.</p>
Sustainable Development (SD)	<p>Development that meets the needs of the present (SD) without compromising the ability of future generations to meet their needs</p>
Tailings	<p>The gangue and other waste material resulting from the washing, concentration or treatment of ore. Also those portions of washed ore regarded as too poor for further treatment.</p>
Tailings dam	<p>Impoundment to which tailings are transported, the solids settling while the liquid may be withdrawn.</p>

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3.0 Mission and Objectives

3.1 Mission Statement

The Contingency and Response Code of Practice's (the Code) mission is to:

Prevent loss of life or damage to health and social well-being, avoid property damage, and ensure environmental safety in a local community

3.2 Objectives

- 1) Provide information to the concerned members of a community on the hazards involved in mining operations in their neighborhood, and on the measures taken to reduce risk.
- 2) Increase local industry involvement in community awareness and emergency response planning.
- 3) Review, update, or establish emergency response plans in the local area.
- 4) Integrate industry emergency plans and local emergency response plans into one overall plan for the community to handle all types of emergencies.
- 5) Involve members of the local community in the development, testing and implementation of the overall emergency response plan.
- 6) Implementation of the overall emergency response plan.

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4.0 Scope

This Code of Practice is a mandatory code that applies to gold and diamond mining operations ranging in size from small-scale to medium-scale. It addresses all the steps leading to the development of an effective contingency and response plan.

This Code is subordinate to the Mining (Amendment) Regulations 2005 and is intended to complement regulatory requirements, not to replace them. Compliance with the rules, regulations and laws is therefore necessary.

No guarantee is made in connection with the application of the Code to prevent hazards, accidents, incidents, or injury to workers and/or members of the public at any specific site where mine reclamation is carried out. Guidelines for the emergency and response planning for artisanal and small-scale mining have been prepared.

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Table 4-1 Potential Accidents Associated with Mine Sites and their Effects

(Modified from UNEP 2001)

Type of Incident	Typical Causes	Potential Effects
Tailings dam failure	Poor water management, overtopping, foundation failure, drainage failure, piping, erosion, and earthquake.	Loss of life, contamination of water supplies, destruction of aquatic habitat and loss of crops and contamination of farm land ,threat to protected habitat and biodiversity and loss of livelihood
Failure of waste rock dump	Instability often related to presence of water (springs, poor dump drainage).	Loss of life, injuries, destruction of property, damage to ecosystems and farm land.
Spills during the transport of chemicals to/from site	Inadequate transport procedures and equipment, unsafe packaging, high-risk transportation routes.	Contamination of soil, water, effects on water users, aquatic ecosystem damage, threat to human health.
Spills of chemicals at site	Poor maintenance, inadequate containment.	Contamination of soil and water. Air pollution could have health effects.
Fire	Poor design, unsafe practices in relation to flammable materials	Property damage.
Explosion (plant)	Inadequate design, failure to follow procedures, inadequate maintenance.	Community concern, loss of life, destruction of property
Atmospheric releases	Inadequate design, failure to follow procedures, inadequate maintenance.	Community concern, possible health effect
Blasting and explosives accidents and handling.	Poor practice, unsafe storage	Property damage, risk to life.

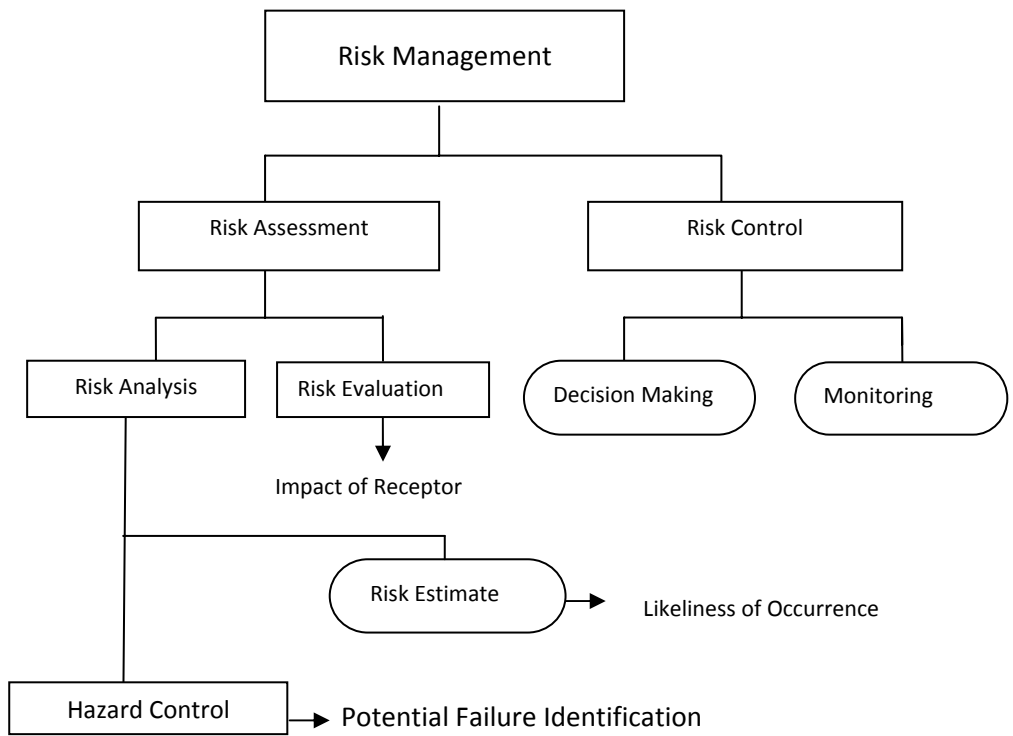


Figure 1.0 Risk Management
(Modified after CSA, 1991)

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5.0 Principles and Standards of Practice

The development of the APELL could be seen as a communal exercise in which several miners with similar operations could participate. (For further details on how the following principles may be implemented, the readers should refer to *Section 6 Code Implementation*).

5.1 Defining the Local Community

Principle: Identify which communities are vulnerable to a mine accident.

Standards of practice

- 5.1.1 The “community”, for the purpose of the APELL, will be the sum of all affected communities plus the immediate community, whether it is affected or not.
- 5.1.2 Carry out a risk analysis to identify hazards and to estimate their likelihood of being realized.
- 5.1.3 On the basis of the conclusions obtained by the risk analysis, identify which communities are at risk of being affected by a mine accident.

5.2 Raising Awareness

Principle: Increase awareness of the community about the mining operation and its risk through an appropriate communication and education program.

Standards of practice

- 5.2.1 Select appropriate methods of communication with stakeholders.
- 5.2.2 Develop communication and education materials and organize meetings or workshops with the stakeholders to:
 - Inform stakeholders on the nature of the mining operation and associated hazards;
 - Explain the APELL process;
 - Identify individuals that will be part of the Coordinating Group (see 5.3 below);
 - Obtain suggestions and ideas;
- 5.2.3 Gather information on existing emergency services and community response plans.

5.3 Forming a Coordinating Group

Principle: Build and maintain motivation, communication, commitment, cooperation and momentum by the creation of a Coordinating Group.

Standards of practice

- 5.3.1 Mine managers, emergency response providers, EPA officers, local GGMC representatives and community leaders from the core of the Coordinating Group.

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- 5.3.2 The Coordinating Group should include representatives of those parties who are responsible for minimizing and for responding to emergencies, or who have a legitimate interest in the choices among planning alternatives.
- 5.3.3 Identify people with a wide range of relevant expertise and local knowledge.
- 5.3.4 Consider cultural and political diversity and gender equity when setting up the Coordinating Group (the composition of the local population may differ from formal governance structures).
- 5.3.5 Designate a leader for the Coordinating Group.

5.4 Developing the APELL

Principle: Ensure that members of the Coordinating Group are assigned tasks and responsibilities, that necessary resources are available, tasks and resources matched and all emergency response plans integrated.

Standards of practice

- 5.4.1 Identify emergency response participants and establish their roles, resources and concerns.
- 5.4.2 Have participating organizations review their individual emergency plan, including communications, for adequacy relative to coordinated response.
- 5.4.3 Review the results of the separate evaluations to determine overall strengths and weaknesses of the current status of a coordinated emergency response.
- 5.4.4 Identify the required response tasks not covered by existing plans.
- 5.4.5 Match tasks to resources available from the identified participants in the Coordinating Group.
- 5.4.6 Integrate individual plan into overall plan and reach agreement.
- 5.4.7 Draft final APELL and obtain written endorsement from participants.

5.5 Communication, Training and Testing

Principle: Ensure that the different participating groups are properly trained and that the plan is well tested.

Standards of practice

- 5.5.1 Communicate final version of integrated response plan to participating groups.
- 5.5.2 Prepare procedure manuals.
- 5.5.3 Complete field exercises for hands-on training in monitoring, use of communication, traffic control, etc.
- 5.5.4 Complete workshops on key issues related to the plan, focusing on education and communication.
- 5.5.5 Establish schedules and procedures for periodic testing, review and updating the plan.
- 5.5.6 Communicate the integrated plan to the general community.

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6.0 Code Implementation

6.1 Defining the Local Community

- 6.1.1 In defining what is the community potentially affected by an eventual mine accident, one must answer the following questions:
- What areas downstream of the mine site and its facilities such as tailings dams may be affected by a catastrophic spill? More than one catchment may be affected and people living many miles from the site could be affected. What is the dilution factor and the flow rate?
 - What is the prevailing wind direction and what communities lie downwind?
 - What are the chances of less frequent wind directions affecting other populations who should also be included?
 - What about deliveries of hazardous materials to the site?
 - Are the transporters (truck drivers) of the hazardous materials in contact with communities along the route?
- 6.1.2 The following may be considered in defining the community:
- Geographic or administrative boundaries
 - Catchment boundaries (airshed and watershed)
 - Governing bodies affecting the operations
 - Traditional landowners
 - Influential organizations such as civic, religious, educational, etc.
 - Concerns of local residents
 - Major communication media.

6.2 Raising Awareness

- 6.2.1 Define the local community concerned (see Defining the Local Community above).
- 6.2.2 List existing local community contacts
- 6.2.3 Identify other mines or industrial facilities to be involved (e.g. forestry operation)
- 6.2.4 Gather information on existing emergency services and community response plans
- 6.2.5 Prepare presentation materials on the mining operation, its hazards and existing emergency response plans
- 6.2.6 Develop an introductory presentation on APELL, its benefits and requirements.
- 6.2.7 Form an informal Coordinating Group to plan the initial consultation processes, including possibly a community meeting, a seminar, etc.

6.3 Forming a Coordinating Group

- 6.3.1 For the sake of efficiency, the Coordinating Group cannot include everybody and should not be allowed to expand too much.
- 6.3.2 Select people that will be committed to the process and who can cooperate with one another during development of the plan and after it has been developed to ensure that there is no loss of preparedness when changes occur.

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6.3.3 Individuals for the Coordinating Group could come from a wide range of organizations:

- Mine managers, HSE, communications staff,;
- Local GGMC representatives;
- EPA officers;
- Chemical suppliers;
- Pesticides and Toxics Chemicals Board
- Transport operators
- Members of NGOs (e.g. WWF)
- GGDMA representatives
- Member of local planning authority (e.g. Regional Democratic Council)
- Representatives of agencies with responsibility for fire, health, water quality, air quality
- Emergency response planning (e.g. Civil Defense Commission)
- Local hospital/medical representatives
- Representatives of private sector
- Representatives from local community
- Representatives of labour organizations
- Translators (if more than one language is involved)
- etc.

6.4 Developing the APELL

6.4.1 Before assigning a specific task to a participant, determine his/her willingness to undertake it and his/her resources and experience.

Integration of individual plans

6.4.2 Prepare a draft integrated response plan.

6.4.3 Ensure that the newly developed plan is consistent with any regional disaster plans and with legislation.

6.4.4 Check that the plan is robust in relation to all previously identified risks and emergency scenarios and in relation to response tasks.

6.4.5 Conduct a role-playing exercise to test the plan with key participants.

6.4.6 As much as possible, keep the plan simple. Plans that fill thick files are unwieldy and likely to be ignored.

6.4.7 Include post-accident clean-up in the plan. However, details about cleanup operations should of course be prepared after the accident.

Endorsement

6.4.8 Use a small group to write the plan in its final format.

6.4.9 Prepare a standard presentation to be given to the community.

6.4.10 Prepare notices, instructions, posters, etc. for use at the site and by other organizations and individuals.

6.4.11 Make presentations, hold meetings and review sessions and obtain endorsement of community leaders and relevant officials

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6.5 Communication, Training and Testing

Training

- 6.5.1 Once the plan has been endorsed, the details of it need to be communicated to the members of the emergency provider groups so that they are aware of the format of the plan, of their collective and individual responsibilities and of any training they might require.
- 6.5.2 Identify those who must be trained; develop and carry out training sessions and periodic refresher training where necessary.
- 6.5.3 Training should include such issues as:
- Roles and responsibilities of responders;
 - How to use the resources available for a mine related emergency;
 - Procedures for contacting relevant people for information or assistance;
 - Emergency cards and response guides;
 - Contact with the media (if necessary) and with other key audiences.

Testing

- 6.5.4 Initial testing of the plan should take place without involving the public, to uncover deficiencies in coordination among groups and in the training that has taken place so far
- 6.5.5 Prepare a test drill scenario that identifies the objectives of the drill, components of the plan to be tested and simulated hazards levels.
- 6.5.6 Designate a group of non-participating observers to evaluate the test drill using prepared evaluation checklists.
- 6.5.7 After the test, evaluate the results and revise the plan accordingly in order to correct deficiencies.
- 6.5.8 Organize periodic testing and revision of the plan and its different components.

7.0 Monitoring and Surveillance

There is no specific monitoring associated with the implementation of this Code of Practice. GGMC Mines and Environmental Officers check for and review Contingency and Response Plans as part of their site audits and environmental reviews.

8.0 Emergency Measures

There are no additional emergency measures or considerations related to the implementation of this code of practice

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Web site

<http://xmlwords.infomine.com/xmlwords.htm> (on-line dictionary of mining terms).