

# **Asbestos Health and Safety Plan For Vipro DOOEL**

## **PART I: GENERAL PROVISIONS OF THE HEALTH AND SAFETY PLAN**

### **1.0 INTRODUCTION**

This Plan provides recommendations for asbestos abatement. Abatement activities shall ensure against release of asbestos fibers. These activities include removal, encapsulation, enclosure, repair, and other activities concerning treatment, storage, and disposal of asbestos.

### **1.1 TYPES AND DANGERS OF ASBESTOS**

#### **Types of asbestos:**

Three of the six types of asbestos are common components of various products. Chrysotile, Crocidolite, and Amosite asbestoses have been used in thermal insulation, fire protection, floor tiles, roofing tiles and materials, insulation, and a variety of building materials. The amount of asbestos in products varies from 1% to 100%. It is important in the workplace to reduce or minimize worker exposure to asbestos materials.

#### **Dangers of exposure to asbestos:**

Asbestos usually enters the body through breathing asbestos fibers. Asbestos that is “friable” is most dangerous. Friable asbestos crumbles easily and releases fibers into the air. “Non-friable” asbestos does not usually crumble or release fibers easily. However, if the material containing non-friable asbestos, such as roofing materials, floor tiles, or concrete is broken, drilled, cut, sawed, deteriorated, or damaged, it can release fibers, also.

Asbestos fibers are very small. They can remain floating in air for hours or days. One of the benefits of asbestos is that the fibers are very difficult to destroy. However, this also means heat and chemicals do not easily affect them. The fibers do not dissolve in water and do not breakdown to non-hazardous materials. Once the fibers have been released, they can easily be inhaled. This can cause serious fatal diseases.

1) Mesothelioma is a cancer of the lung or the abdominal cavity. The only known cause of mesothelioma is exposure to asbestos, and it can occur even after very low levels of asbestos exposure. There is no known cure for mesothelioma.

2) Lung cancers. Several types of lung cancer are associated with exposure to asbestos. There is no known cure.

3) Asbestosis is an irreversible, progressive lung condition that results from breathing in asbestos fibers over an extended period. There is no treatment for asbestosis. Reducing the risk of breathing in fibers is the best way to avoid the disease.

## Smokers

Those who smoke are more at risk of contracting diseases after they are breathe in asbestos fibers.

## 1.2 LEGAL BASIS FOR THE ASBESTOS HEALTH & SAFETY PLAN

This Asbestos Health and Safety (AH&S) Plan was developed in accordance with:

- ▶ Macedonian Law on Safety and Health at Work , Official Gazette of the Republic of Macedonia, No. 92/07
- ▶ Macedonian Law on Waste Management Official Gazette of the Republic of Macedonia No. 6/2004
- ▶ Macedonian Regulation On The Methods Of Asbestos Waste Treatment And Asbestos Containing Products Waste Treatment, Ministry Of Environment And Spatial Planning – 1402.
- ▶ Macedonian Labor Relations Act, Official Gazette of the Republic of Macedonia No.80/93-2007, Articles 55, 56, 57
- ▶ Waste Management Strategy of the Republic of Macedonia (208-2020)
- ▶ National Waste Management Plan (2008 – 2014) of the Republic of Macedonia – DRAFT (Received from Ministry of Environment and Physical Planning Sept. 26, 2008)
- ▶ European Union (EU) Directives, 2003/18/EC (27 March 2003) amending EU Directive 83/477/EEC on the protection of workers from the risks related to exposure to asbestos at work,<sup>1</sup>
- ▶ European Union (EU) Directive 2004/37/EC (29 April 2004) on the protection of workers from the risks related to exposure to carcinogens or mutagens at work,
- ▶ *Best Practices Guide To Prevent Or Minimise Asbestos Risks In Work That Involves (Or May Involve) Asbestos*, developed by the Senior Labour Inspectors Committee (SLIC) of the European Commission.<sup>2</sup> and
- ▶ U.S. Occupational Health and Safety Agency asbestos regulations, 29 CFR §1926.1101 covering construction work, including alteration, repair, renovation and demolition of structures containing asbestos. 29 CFR §1910.1001 concerning asbestos exposure in general industry.

## 1.3 RELATIONSHIP BETWEEN MACEDONIAN LAWS, EU DIRECTIVES, AND BEST PRACTICES

Macedonian law places a burden for worker and employee health and safety on the employer. This approach is consistent with EU Directives and Best Practices. Both Macedonian law and EU Directives require an Employer to identify the potential for

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<sup>1</sup> Council Directive 83/477/EEC of 19 September 1983 on the protection of workers from the risks related to exposure to asbestos at work (second individual Directive within the meaning of Article 8 of Directive 80/1107/EEC) (OJ L 263, 24.9.1983, p. 25). Directive as last Amended by Directive 2003/18/EC of the European Parliament and of the Council (OJ L 97, 15.4.2003, p. 48).

The European Asbestos Worker Protection Directive 83/477/EEC as last amended by Directive 2003/18/EC is implemented within the Member States by national regulations that may differ in practical details.

<sup>2</sup> This Best Practices Guide is available in several languages at:  
[http://ec.europa.eu/employment\\_social/health\\_safety/slic\\_en.htm](http://ec.europa.eu/employment_social/health_safety/slic_en.htm)

asbestos exposure, notification of safety risks, employee awareness and training, recordkeeping, safe management of renovations and maintenance operations, health evaluations and ensuring personal and workplace safety.

This Plan relies on Macedonian Laws and Regulations to the extent that they have been passed or promulgated. At the time this AH&S Plan was developed, Macedonia has not finalized regulations concerning management and removal of asbestos. The recommendations in this plan rely on EU Directives and Best Practices for specific actions of employers. It is anticipated that because Macedonia seeks accession to the EU, Macedonian regulations will be consistent with the EU Directives to member states and Best Practice recommendations. US regulations are referenced to provide options and approaches to help minimize the risks associated with removal and disposal of asbestos. It will be necessary, once Macedonian regulations are finalized, to review, revise, and update this AH&S Plan to ensure compliance with specific Macedonian regulations concerning management, removal, and disposal of asbestos.

#### **1.4 PROCESS FOR DEVELOPING THE AH&S PLAN**

In general, the AH&S Plan development process consisted of:

- ▶ A review of the facility March 2008 EDD/PPA that identified the presence of asbestos and the need to manage removal to protect worker health and safety and to protect the environment
- ▶ A review of Macedonian Laws and regulations concerning management of hazardous wastes, treatment, storage, and disposal of asbestos and worker safety.
- ▶ A review of EU Directives and Best Practices to minimize the risks in work that involves the removal, storage, and disposal of asbestos
- ▶ A review of U.S. regulations concerning worker safety to minimize risks associated with removal and disposal of asbestos
- ▶ Discussions with US AID consultants that developed and wrote the EDD/PPAs identifying the presence and risks of asbestos in the plants seeking grants for the US AID AgBiz program.
- ▶ Meeting and discussion with Mr. Valerij Penev, Macedonian Ministry of Environment and Physical Planning.

#### **1.5 ORGANIZATION OF AH&S PLAN**

This AH&S plan is divided into two parts. Part I provides general provisions of the plan; Part II is the Operations and Maintenance Program. This plan relies on the conclusions of the March 2008 EDD/PPA performed at Vipro DOOEL facility. Pertinent sections of the March 2008 EDD/PPA are included in Appendix H

#### **2.0 PURPOSE AND POLICY**

The objective of this AH&S Plan is to allow the continuation of normal building activities

while limiting the potential exposure of building occupants, maintenance workers, and outside service personnel to airborne asbestos fibers. The Plan's policies and work procedures are designed to meet the needs of the company, the employees and workers, and the community at-large, while recognizing that Macedonia is currently developing worker safety regulations/programs, and waste management/disposal regulations for asbestos.

This AH&S Plan is guided by four (4) specific policy statements:

- 1) Asbestos-containing materials identified at the company's facilities are to be maintained under an Operations and Maintenance program to be instituted by the designated Safety Expert. Employees, contractors and other persons working with or near ACMs at the company are expected to comply with this AH&S Plan.
- 2) Under this AH&S Plan, to the extent that the objective of the AH&S Plan is not compromised, intact ACM will not be removed until a condition arises pursuant to Policy Statement three (3) below.
- 3) Removal of some portion of the ACM in the workplace is required:
  - When it is determined that ACM will be disturbed by repair, renovation or demolition activity; or
  - Where a response to damaged ACM is necessary and it is determined that removal is either the only acceptable response or the most cost effective response relative to all factors considered.
- 4) If damaged, ACM that is not removed must be repaired.

Locations of all identified ACM are detailed in the customer specific EDD/PPAs and any further risk assessments.

Appendix A includes pictures of the asbestos present based on the March 2008 EDD/PPA.

### **3.0 DEFINITIONS**

“Asbestos” includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that has been chemically treated and/or altered. For purposes of this standard, “asbestos” includes presumed asbestos containing material.

“ACM” means Asbestos-Containing Material.

“AH&S Plan” refers to this Asbestos Health & Safety Plan

“Representative” is the “workers’ representative on matters related to safety and health at work”, as defined in the S&HW Law;

“HEPA filter” means High Efficiency Particulate Air filter. These filters are at least 99.97% efficient in removing monodisperse particles of 0.3 micrometers in diameter. (International specification and 29 CFR §1910.134(b))

“O & M Program” means Operations and Maintenance Program as developed in Part II of this AH&S Plan.

“Permissible Exposure Limit” or “PEL” is the measurement of the legal limit of asbestos that a person may contact while performing daily routines on the job. EU and US PELs are the same: Employee exposure to asbestos must not exceed 0.1 fiber per cubic centimeter (f/cc) of air, averaged over an 8-hour work shift. An employer cannot rotate employees to comply with PEL. (Based on EU Directive, 2003/18/EC (8))

“S&HW Law” means the Macedonian Law on Safety & Health at Work, Official Gazette of the republic of Macedonia, No. 92/07.

“Safety Expert” is the “safety at work expert” defined in the S&HW Law, Article 3.

The following terms shall have the same meaning as in the Macedonian Law on Safety and Health at Work, Article 3:

“Certified health centre”;

“Employee”;

“Employer”;

“Preventive measures”

“Workplace”;

“Working environment”;

“Means of work”;

“Work equipment”;

“Risk”.

## **4.0 GENERAL SCOPE**

### **4.1 MANAGEMENT STRUCTURE**

#### **4.1.1 PROGRAM MANAGEMENT**

The Employer or designated Safety Expert is responsible for implementing the AH&S

Plan. The Employer or Safety Expert shall delegate, as necessary, oversight, and review of the Plan to appropriate personnel and competent persons who are experienced in removing or containing ACMs, in accordance with the S&HW Law, Articles 6 and 12.

#### **4.1.2 COMPETENT PERSON**

Employer shall ensure that persons trained and experienced in the management and removal of asbestos are responsible for all aspects of the Operation and Management Program detailed in Part II of this AH&S Plan, as provided in the S&HW Law, Articles 12, 17 and 18.

#### **4.1.3 NOTIFICATION**

##### **A. Administrative Authority**

Employer must notify the Macedonian Administrative Authority for labor inspection prior to beginning operation and prior to construction work, as provided in the S&HW Law, Article 23. Employer shall notify the Macedonian Administrative Authority for labor inspection of workplace dangers and threats, as provided in the S&HW Law, Article 36

It is recommended that such notification include at least a brief description of:

- (i) the location of the work site;
  - (ii) the type and quantities of asbestos used or handled;
  - (iii) the activities and processes involved;
  - (iv) the number of workers involved;
  - (v) the starting date and duration of the work;
  - (vi) measures taken to limit the exposure of workers to asbestos.
- (Recommendation based on EU Directive 2003/18/EC, Article 4)

##### **B. Employees, Employee Representatives, and Contracted Labor**

The Employer shall make notifications of the plan provided in the S&HW Law, Articles 23, 25, 26, and 27. The Employer will provide notification to Employees, their representatives and anyone other the Employees that conducts custodial or maintenance type activities in the workplace (such as outside contractors, telephone workers, etc.). Notification to the workers may be in the form of reading of this AH&S Plan , or by other written information that as a minimum includes the type and/or location of ACM in the building, and any special precautions required.

A person designated by the Employer or designated Safety Expert shall be notified of their presence in the building and their intended activities.

#### **4.1.4 EMERGENCY SITUATIONS**

In the event that emergency responses are required, the designated Safety Expert or other person designated must be contacted and direct responses. Written documentation of the emergency and response must be completed and sent to the Employer or designated Safety Expert. Responses must be in accord with the plan developed by the Employer, in accordance with the S&HW Law, Article 17, 24.

#### **4.2 OCCUPANT AWARENESS**

As required by the S&HW Law, Articles 9, 11, 12, and 33, the AH&S Plan will be available from the Employer or designated Safety Expert. Employees shall receive information and instruction on the presence and location of ACM. The Employer will

reinspect and assess the Workplace as required by the S&HW Law to review the condition of ACM being maintained in-place and to address changed conditions or new dangers.

Employer will demarcate the area where there is ongoing asbestos removal or abatement activities. Methods to demarcate an area include any manner, for example warning tape and signs, which minimizes the number of persons in the area and protects persons outside the area from exposure to airborne asbestos. (Recommendation based on 29 CFR §1926.1101(e))

#### **4.3 WARNING SIGNS OF ACM**

The S&HW Law, Articles 14 and 26, requires warning signs of danger and instructions related to safety and health in the workplace. The location of asbestos or ACMs in routine maintenance areas (such as boiler rooms) and wherever located in a facility shall be marked with warning signs affixed immediately adjacent to, or directly upon, the asbestos or ACM.

Recommended wording for signs and other notices is provided in Appendix B.

#### **4.4 MONITORING and TESTING**

Employer must ensure monitoring and measurements of air concentrations of asbestos are done by a competent person or organization, in compliance with the S&HW Law, Article 12, 17 and 18.

Recommended monitoring and testing are described in EU Directive 2003/18/EC and detailed in the EU Best Practices Guidance, Chapter 16.

## **PART II: OPERATIONS & MAINTENANCE PROGRAM**

### **1.0 GENERAL SCOPE**

The following procedures will be used in the O&M Program to manage containment, abatement, removal, storage and disposal of asbestos or ACM by employees or contract workers.

### **1.1 PROGRAM MANAGEMENT**

The Employer or designated Safety Expert is responsible for implementation of the activities involving asbestos or ACM, oversight, and review of work locations and procedures being performed.

### **1.2 SCOPE**

This AH&S Plan shall apply to all spaces and building elements containing asbestos or ACMs and shall not apply to areas where asbestos or ACMs is not present.

### **1.3 DEFINITIONS**

Words, terms, and abbreviations used in the O&M Program shall have the meanings described in the Definitions section of this AH&S Plan .

## **1.4 RISK ASSESSMENT / PLAN OF WORK**

### **A. Risk Assessment**

The Company's EDD/PPA visual survey confirmed the presence of materials containing asbestos (ACMs). Employer shall comply with the S&HW Law, Article 9, 11, 34, and 35 to assess risks and develop a work plan for managing the identified asbestos. Employer must ensure person conducting risk assessment, and preparing and implementing the Work Plan, are trained to provide these services in accordance with the S&HW Law, Articles 6, 9, 12, 17, 18, 19, 24, 31 and 34.

An outline for a Risk Assessment is included in Appendix C.

### **B. Work Plan**

Based on the Risk Assessment, Employer must develop a Work Plan. The Work Plan must be sufficiently detailed and relate to the particular site and activities. The Work Plan should:

- include any preparatory work (e.g. prior to setting up an enclosure);
- include a clear site diagram in the plan, showing the location of the equipment (e.g. enclosure, airlocks, decontamination unit, negative pressure units, transit route for waste, and the secure waste container);
- ensure consultation with the workers who have the practical knowledge to ensure that the risk assessment and plan of work are realistic;
- ensure that copies of the risk assessment and plan of work are available on site and for those involved in doing the work;
- that the risk assessment and plan of work are explained to the workforce and to anyone else affected by the work;

In the absence of a Risk Assessment documenting the type and quantity of asbestos or ACMs, it is recommended that Employer use a precautionary approach. The precautionary approach dictates, based on the visual inspection as documented in the EDD/PPA, that the Employer presumes the ACMs are present in a quantity that exceeds the PELs. If this presumption is made, this must be documented, and a detailed work plan developed to address removal or containment of the presumed ACMs.

Checklist for the Work Plan is included in Appendix D

## **2.0 REMOVAL, CLEANING AND MAINTENANCE PROCEDURES**

### **2.1 GENERAL WORK PRACTICES**

General work practices shall be in accordance with the S&HW Law, Articles 9, 17, 24, 31, and 33.

Recommendations below apply to all types of asbestos work. These recommendations are based on EU Best Practices Guidance and US Worker Health and Safety Regulations. They will need to be modified after Macedonia finalizes its Asbestos Regulations. The Specific Instructions and Work Practices sections of this AH&S Plan detail recommendations for different types of activities involving ACMs.



### **Recommended Work Practices for All Types of Asbestos Work**

- Vacuum cleaners equipped with HEPA filters to collect all debris and dust containing ACM;
  - Use of water is compulsory for all types of work that manipulate ACMs in order to control employee exposures during asbestos handling, mixing, removal, cutting, application, and cleanup. Wetting is not required where an employer demonstrates that the use of wet methods is infeasible due to, for example, the creation of electrical hazards or equipment malfunctions;
  - Prompt clean-up and disposal of wastes and debris contaminated with asbestos in leak-tight containers;
  - Use precautionary measures to avoid contamination;
  - Use of a respirator is necessary for all types of work;
  - Use of protective clothing is a must for abatement of high risk work, e.g. Group I work (§2.5.1) and possibly for Group II (§2.5.2) and Group III (§2.5.3) work if asbestos is deteriorating, broken, damaged, not sealed or intact;
  - Asbestos waste is treated as hazardous waste;
  - At the end of the work, clean up all tools and equipment used with a HEPA vacuum or damp cloth;
  - A ventilation system with a HEPA filter, as detailed below;
- (Recommendations based on EU Best Practices Guidance, Chapter 9; 29 CFR §1926.1101(g)(1))

Appendix E lists a resource to purchase protective equipment and examples of HEPA respirators and protective clothing

### **Prohibited Work Practices for All Types of Asbestos Work:**

Work practices and engineering controls that shall not be used, regardless of measured levels of asbestos exposure or the results of initial exposure assessments:

- High-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air;
  - Compressed air to remove asbestos, or materials containing asbestos, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air;
  - Dry sweeping, shoveling, or other dry clean-up of dust and debris containing ACM and presumed ACMs;
  - Employee rotation as a means of reducing employee exposure to asbestos;
  - Eating, smoking, drinking, chewing, tobacco or gum in work areas.
- (Recommendations based on EU Best Practices, Chapter 9; 29 CFR §1926.1101(e) and §1926.1101(g)(3))

## **2.2 ENGINEERING CONTROLS**

Employer must implement preventive measures to minimize worker exposure to asbestos fibers and to minimize risks associated with activities involving ACM in the workplace, working environment, means of work, and work equipment. Employer must comply with the S&HW Law, Article 9, 17, 24, 31, and 33.

### **Recommended Engineering Controls of Work Areas**

- Reduce or prevent risks to worker's health and safety identified in Risk Assessment;

- Ensure exposure to asbestos or ACMs must not exceed the PEL;
- Limit access to authorized persons wearing appropriate respiratory protection;
- Ensure designated Safety Expert who is experienced in asbestos removal/abatement oversees work in limited area;
- Demarcate area and restrict access to the work area, appropriately (e.g. tape, signs, barriers or full enclosure);
- Display clear and adequate warning signs at each work area (e.g. asbestos hazard, entry restricted to authorized personnel only);
- Enclose or protect surroundings (e.g. with durable polythene) as needed for the type of work;
- Require the use appropriate respiratory protective equipment and personnel protective equipment (e.g. disposable overalls and washable boots);
- Minimize damage to asbestos-containing materials (e.g. remove and dispose of as whole pieces, e.g. remove and wrap whole boards);
- Use appropriate techniques to control release of fibers (e.g. damping down, wet stripping techniques, local exhaust ventilation, etc);
- Ensure local exhaust ventilation and dust collection use HEPA filters manufactured for use with asbestos particles;
- Ensure all hand-operated and power-operated tools that may produce or release fibers are equipped with local HEPA-filtered exhaust systems;
- Establish decontamination areas and hygiene practices;
- Clean area thoroughly;
- Ensure appropriate containment, labeling, storage, transport, and disposal of all asbestos, ACMs and presumed ACMs.

(Recommendations based on EU Directive 2004/37/EC, Article 5; EU Best Practices Guidance, Chapter 9, and US regulations 29 CFR §1926.1101(e), 29 CFR §1926.1101(j)(1)(i); 29 CFR 1926.1101(k)(7))

If not all the above actions are feasible, implement those that are feasible to reduce worker exposures to the lowest levels achievable and then supplement them with respiratory protection to meet the PEL, as determined by monitoring and air measurements.

### **2.3 EQUIPMENT AND SUPPLIES**

Employer must ensure employee access to personal protective equipment and work equipment necessary to ensure worker safety from exposure to ACM, in accordance with the S&HW Law, Articles 5 and 9. Employer must ensure that workers use the equipment and supplies as intended.

Employer should ensure a competent and responsible person conducts and documents regular inspections of equipment. Employer must ensure that all equipment is serviced regularly. (EU Best Practices Guidance, Chapter 8)

Recommended tools include:

- An access platform (e.g. scaffolding, or mobile elevating work platform);
- Warning tapes and notices;
- Buckets of water and detergent;
- Hoses, watering cans or garden type sprayers;
- Scoops or trowels;
- Rags;

- Hand tools in preference to abrasive tools (such as sanders) or pneumatic impacting tools;)
  - Suitable asbestos waste containers (e.g. a labeled and color coded polythene sack).
- (Recommendations based on EU Best Practices Guidance, Chapter 11)

## **2.4 PERSONAL PROTECTIVE CONTROLS**

### **2.4.1 - GENERAL**

All persons entering active abatement job sites must wear the necessary personal protective equipment. Employer will ensure workers and other persons entering the work area have the necessary and appropriate personal protective equipment for work involving asbestos or ACMs, in accordance with the S&HW Law, Articles 9, 17, 24. Employer will ensure proper and regular training in the use of personal protective equipment, in accordance with the S&HW Law, Article 31.

Section 2.5 below details the personal protective equipment for specific work involving asbestos. Recommended personal protective equipment and procedure include:

- An appropriate respirator e.g. asbestos rated disposable respiratory protection EN 149 Type FFP3, or EN405 half masks –with face-fit testing for suitability to the individual and regular replacement of soiled filters,
- Disposable protective clothing including, but not limited: overalls fitted with a hood (waterproof if weather conditions require), gloves, foot covers (or boots without laces that can be decontaminated);
- Decontamination area
- Face shields / vented goggles, or other appropriate protective equipment to prevent eye irritation

(Recommendations based on EU Best Practices Guidance, Chapter 8 and US regulation 29 CFR §1926.1101(i))

### **2.4.2 RESPIRATORS:**

Where activities (such as repair, maintenance, removal, demolition) may or will cause a release of asbestos fibers, and are liable to give rise to concentrations of asbestos, workers shall be issued with suitable respiratory and other personal protective equipment, which must be worn. Suitable respiratory protective equipment should be selected based on the Risk Assessment and the following considerations:

- the concentration inside the face-piece must be kept as low as possible, and in any case must not exceed the PEL; and
- the equipment must be suitable for the worker and the conditions in which he/she will be working;
  - the nature of the job, e.g. the range of movements that may be required, and any obstructions or restrictions;
  - the site conditions, e.g. suitability for access and movement within the work area;
  - the individual's facial characteristics;
  - his/her medical fitness;
  - the period of time that the wearer will have to use the equipment, and
  - comfort, in the conditions of the particular site, such that people will wear it correctly for the required length of time.

(EU Directive 2003/18/EC; EU Best Practices Guidance, Chapter 8. See also, 29 CFR §1926.1101(h))

## **2.5 SPECIFIC INSTRUCTIONS AND WORK PRACTICES**

All work involving asbestos maintenance, removal, storage, transport and disposal must comply with Macedonian Law on Safety and Health at Work , Official Gazette of the Republic of Macedonia, No. 92/07; Macedonian Law on Waste Management Official Gazette of the Republic of Macedonia No. 68/04 and 71/04 and Macedonian Regulation On The Methods Of Asbestos Waste Treatment And Asbestos Containing Products Waste Treatment, Ministry Of Environment And Spatial Planning – 1402.

These detailed instructions and work practices are based on EU Directives and Best Practices. US regulations are referenced to provide alternative management options to address removal of asbestos materials in the workplace. The Instructions and Work Practices of this O&M Program should be updated and modified when the regulations implementing the Macedonian Law on Safety and Health at Work are finalized and come into effect.

All work must be supervised by a competent person.

### **2.5.1 Group I**

The most potentially hazardous class of asbestos jobs involving:

- A) Removal of thermal system insulation
- B) Removal of sprayed-on or troweled-on surfacing ACM
- C) Removal of presumed ACM.

In addition to the work practices, engineering controls, general equipment, and personal protection equipment detailed in Part II, Section 2.0-2.4 of this AH&S Plan, the following equipment is needed for Group I work:

- methods to ensure that airborne asbestos does not migrate from the work area, e.g.
  - full enclosure (durable polythene sheeting, framework, and negative pressure unit with pressure monitoring equipment) with clear viewing panels or closed circuit television monitoring to enable the work and workers to be inspected without needing to enter the enclosure (EU Best Practice Guidance, Chapter 8); or
  - barrier or isolation method which prevents the migration of airborne asbestos from the regulated area, as verified by perimeter area surveillance during each work shift at each boundary of the work area, showing no visible asbestos dust and a negative pressure unit (exhaust fan with HEPA filter) to keep ventilation inwards into enclosures, with monitoring equipment to check that pressure is maintained (29 CFR §1926.1101(g)(4)); or
  - control method shall enclose, contain, or isolate the processes or sources of airborne asbestos dust, or otherwise capture or redirect such dust before it enters the breathing zone of employees designed and approved by certified industrial hygienist or licensed professional engineer, competent in asbestos work, to reduce direct and indirect employee exposure to below the PELs under worst-case conditions of use (29 CFR §1926.1101(g)(6))

- impermeable drop-cloths shall be placed on surfaces beneath all removal activity;
- all objects within the regulated area shall be covered with impermeable drop-cloths or plastic sheeting that is secured by duct tape or an equivalent.
- local exhaust ventilation equipped with HEPA filter dust collection systems
- dust suppression equipment, for injecting water into asbestos-containing insulation prior to removal, and for spraying surfaces of asbestos-containing material;
- high efficiency full face respirators
- fully cleanable decontamination unit
- filtration of wastewater prevents spread of asbestos
- secure storage for the relevant quantities of asbestos waste.

(Recommendations based on EU Best Practices, Chapter 8 and 29 CFR §1926.1101(g))

### **2.5.2 Group II**

Activities involving removal of asbestos-containing materials that are not thermal system insulation, This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

In addition to the work practices, engineering controls, general equipment, and personal protection equipment detailed in Part II, Section 2.0-2.4 of this AH&S Plan, the following equipment is needed for Group II work.

#### **General Recommendations:**

(A) The material shall be thoroughly wetted with water prior to and during its removal.

(B) The material shall be removed in an intact state unless the employer demonstrates that intact removal is not possible.

(C) Cutting, abrading or breaking the material shall be prohibited unless the employer can demonstrate that methods less likely to result in asbestos fiber release are not feasible. If tools are used, they must be at the lowest power setting and with dust suppression (foams, airless sprays, or local exhaust ventilation).

(D) Employees cleaning up debris and waste in a regulated area where respirators are required shall wear appropriate respirators. Debris in guttering on an asbestos cement roof may contain asbestos and debris should be managed in accordance with these recommendations.

(E) Asbestos-containing material removed, shall be immediately bagged or wrapped, or kept wetted until transferred to a closed receptacle, no later than the end of the work shift.

(Recommendations based on EU Best Practices Guidance, Chapters 11 and 12 and 29 CFR § 1926.1101(g)(8) and (g)(10)(i))

### **Indoor work:**

- where may be exposure above the PEL or where the employer does not remove the ACM in a substantially intact state, use of barriers or other isolation to prevent movement of asbestos fibers from work area
- impermeable drop-cloths shall be placed on surfaces beneath all removal activity;
- all objects within the regulated area shall be covered with impermeable drop-cloths or plastic sheeting that is secured by duct tape or an equivalent.

(Recommendations based on 29 CFR §1926.1101(g)(8))

### **Vinyl and asphalt flooring materials**

Material which contain or are presumed to contain ACM recommended practices in 29 CFR §1926.1101(g)(8)(i);

### **Roofing material containing ACM:**

- Roofing material shall be removed in an intact state to the extent feasible.
- Wet methods shall be used to remove roofing materials that are not intact, or that will be rendered not intact during removal, unless such wet methods are not feasible or will create safety hazards.
- Cutting machines shall be continuously misted during use, unless a competent person determines that misting substantially decreases worker safety.
- Dust collection from cutting or removal of roofing materials shall be collected by a HEPA dust collector, vacuumed using HEPA filters along the cut line, or by gently sweeping and then carefully and completely wiping up the still-wet dust and debris left along the cut line. The dust and debris shall be immediately bagged or placed in covered containers.
- ACMs must be removed from roof no later than end of work-shift by lowering to the ground (not dropped or thrown) via covered, dust-tight chute, crane, or hoist
- Any ACM that is not intact shall be kept wet, placed in an impermeable waste bag, or wrapped in plastic sheeting while on the roof
- Upon being lowered, unwrapped material shall be transferred to a closed receptacle in such manner so as to preclude the dispersion of dust
- Intact roofing less than 2.5 square meters (includes all removal and repair work performed on the same roof on the same day)
  - removal or repair does not require wet methods or HEPA vacuuming
  - manual methods must ensure material stays intact
  - no visible dust shall be created by the removal method used.

(Recommendations based on 29 CFR §1926.1101(g)(8))

**Cementitious asbestos-containing siding and shingles or transite panels containing ACM on building exteriors:**

- Cutting, abrading or breaking is prohibited unless the employer can demonstrate that methods less likely to result in asbestos fiber release cannot be used;
- Each panel or shingle shall be sprayed with water prior to removal;
- Unwrapped or unbagged panels or shingles shall be immediately lowered to the ground via covered dust-tight chute, crane or hoist, or placed in an impervious waste bag or wrapped in plastic sheeting and lowered to the ground no later than the end of the work shift;
- Nails shall be cut with flat, sharp instruments.

(Recommendations based on 29 CFR §1926.1101(g)(8))

**2.5.3 Group III**

Activities involving repair and maintenance operations where ACM, including thermal system insulation, and surfacing ACM and presumed ACMs, may be disturbed, but not removed.

In addition to the work practices, engineering controls, general equipment, and personal protection equipment detailed in Part II, Section 2.0-2.4 of this AH&S Plan, the following equipment is needed for Group II work.

- Work shall be performed using wet methods;
- To the extent feasible, local exhaust ventilation will be used;
- If drilling, cutting, abrading, sanding, chipping, breaking, or sawing of thermal system insulation or surfacing material is required, the employer shall use impermeable dropcloths, and shall isolate the operation using mini-enclosures;
- If PELs are exceeded, or it is not possible to determine if they will be exceeded, the employer must contain the area using impermeable dropcloths and plastic barriers or their equivalent, or another control method to isolate the operation;
- Risk assessment may determine the need for employees to wear appropriate respirators.

(Recommendations based on 29 CFR §1926.1101(g)(9))

**2.5.4 Group IV**

Activities involving custodial work where employees contact but do not disturb ACM or presumed ACM and activities to clean up dust, waste and debris resulting from Group I, II, and III activities.

- ACM (resilient asbestos floor tiles, floor tile mastic) that is not disturbed, cut, or deteriorated can be cleaned using non-abrasive cleaning agents and methods only. Mild detergents applied by soft mops and/or rags is an acceptable practice. No special personal protective equipment is required for this work. This type of ACM is never to be sanded, chipped, gouged, broken, or otherwise made to break down and become friable.

- Employees cleaning up debris and waste in a regulated area where respirators are required shall wear appropriate respirators and personal protective clothing. 29 CFR §1926.1101 (10)(i).

### **3.0 FIBER RELEASE EPISODE**

Accidental fiber releases involving greater than 1 linear or square meter of ACM are to be managed by isolating the site, erecting barriers, shutting off ventilation systems, notifying Safety Expert and other affected personnel, and clean-up under the guidance of the Safety Expert.

Minor releases (less than 1 square or linear meter of ACM) may be handled using wet methods, HEPA vacuums, and notifications and other guidance coordinated by the Safety Expert.

Notification must be given in compliance with the S&HW Law, Article 36

A sample Asbestos Release Report Form is included in Appendix F.

### **4.0 HEALTH AND SAFETY PROGRAMS**

#### **4.1 MEDICAL EXAMS PROGRAM**

The Employer will conduct Employee medical examinations and maintain appropriate medical records as provided in the S&HW Law, Articles 17, 20, 21, 22, and 37

#### **4.2 FIRE AND EMERGENCY NOTIFICATION**

Employer will comply with obligations detailed in the S&HW Law, Articles 17 and 24, concerning fire protection, evacuation and rescuing. Notices shall be provided to Employees in compliance with the S&HW Law, Articles 25 and 26. Incident reports to state authorities shall be complied with as provided in the S&HW Law, Article 36.

#### **4.3 OTHER HEALTH AND SAFETY HAZARDS**

The Employer shall comply with all standards involving other health and safety hazards that may require consideration including but not limited to Work environment; Means of work, Work Equipment, as defined in the S&HW Law and detailed in the S&HW Law, in particular, Articles 5, 8, 9, 11, 17 and 24

### **5.0 TRAINING PROGRAMS**

Employer shall ensure that all Employees whose work requires them to come into contact



with or handle ACM will be appropriately trained as provided in the S&HW Law, Articles 6, 9, 12, 17, 24, and 31. All Employees who perform housekeeping operations in an area that contains ACM shall be provided training in accordance with the S&HW Law, Articles 6, 9, 12, and 31. Representatives shall be trained as provided in the S&HW Law, Article 32

All persons other than Employees working in an area of a building where ACM is located will be notified of the presence of the ACM and will be required and responsible for the appropriate level of training for their employees in accordance with the S&HW Law.

At a minimum, training should include information on: health effects of asbestos, locations of ACM in the building, recognition of ACM damage and deterioration, and proper response to fiber release episodes. More detailed recommendations for training programs are found in EU Best Practices Guidance, Chapter 7.

## **6.0 RULES and NOTIFICATIONS**

### **6.1 LEGAL COMPLIANCE**

All O & M Programs shall be performed in compliance with all applicable Macedonian laws and regulations. Where Macedonia has not yet developed applicable laws or regulations, reference to EU Directives and Best Practices is recommended. Reference to US regulations is recommended for further reference and options. Compliance with these standards shall be overseen by the Employer or designated Safety Expert.

### **6.2 POLICY DEVIATION**

Deviation by any worker or contractor from these established policies shall be investigated and acted on accordingly. The Employer shall not tolerate any mindful deviation from these requirements.

### **6.3 NOTIFICATIONS**

Employer will ensure notification of activities under this plan in accordance with the S&HW Law, Articles, 23, 25, 26, and 36

Recommendations to include in Notifications before commencing asbestos abatement:

At least a brief description of:

- (a) the location of the work site;
- (b) the type and quantities of asbestos used or handled;
- (c) the activities and processes involved;
- (d) the number of workers involved;
- (e) the starting date and duration of the work;
- (f) General Procedures to be used during the Project;
- (g) Specific measures taken to limit the exposure of workers to asbestos;
- (h) Waste Disposal;
- (i) The name of the Contractor.

(Recommendations based on EU Directive 2003/18/EC and EU Best Practices Guidance, Chapter 12)

## **7.0 WASTE PACKAGING, TREATMENT, STORAGE, and DISPOSAL**

All activities involving storage and disposal of ACMs will be in compliance with Macedonian Law on Waste Management Official Gazette of the Republic of Macedonia No. 68/04 and 71/04, Art. 75, and Macedonian Regulation On The Methods Of Asbestos Waste Treatment And Asbestos Containing Products Waste Treatment, Ministry Of Environment And Spatial Planning – 1402.

Compliance with these standards shall be overseen by the Employer or designated Safety Expert.

### **7.1 PACKAGING AND MARKING**

Any asbestos-containing materials that are not in use, or in place on ceilings, walls, floors, or mechanical system components shall be packaged and marked in accordance with applicable Macedonian Law on Waste Management and the Regulation on the Methods Of Asbestos Waste Treatment And Asbestos Containing Products Waste Treatment, Articles 4 and 5:

1. Asbestos waste shall be collected and removed as fast as possible in adequately sealed packaging (plastic foils) marked to indicate clearly that such packaging contains asbestos.
2. Asbestos waste shall be packed in impermeable closed bags with the opening of the cloth or foil completely sealed or soldered.
3. Asbestos waste containing loosely bonded asbestos is packed in bags of cloth made of artificial material or in one-ply polyethylene foils with thickness of at least 0.4 mm to prevent any emission of asbestos fibers into the environment.
4. The containers and bags used to collect or store asbestos waste in temporary storing places are marked in a visible place with the label reading: “Asbestos waste”.

### **7.2 ASBESTOS WASTE STORAGE**

Asbestos waste shall be stored in accordance with applicable Macedonian Law on Waste Management and the Regulation on the Methods Of Asbestos Waste Treatment And Asbestos Containing Products Waste Treatment, Article 10, which states:

When asbestos waste needs to be temporarily stored before disposition, such temporary storage shall ensure that no excessive environmental impact is caused by asbestos emissions.

### **7.3 ASBESTOS WASTE TREATMENT**

Treatment of asbestos waste and discarded equipment containing unbonded asbestos will comply with Macedonian Law on Waste Management and the Regulation on the Methods Of Asbestos Waste Treatment And Asbestos Containing Products Waste Treatment, Articles 6, 7, 8 and 14.

1. Asbestos waste treatment may be surface treatment where the asbestos fibers on the surface are bonded with the surface of the material by application of a binding agent which is the same or equally efficient as the binder binding the asbestos fibers in the material in cases of waste of firmly bonded asbestos, or by application of a binder which is effectively preventing release of asbestos fibers into the environment in the case of waste with loosely bonded asbestos.

2. In the process of asbestos solidification, the asbestos dust, free asbestos waste, or waste containing loosely bonded asbestos, they are mixed with the binder to complete homogenization and binding so as to prevent release of asbestos fibers into the environment.

3. The process of asbestos fibers destruction is a process of chemical, thermal or mechanical treatment whereby asbestos is transformed into other matters, i.e. minerals, or the asbestos loses its fibrous structure.

4. Before removal, asbestos waste and waste containing loosely bonded asbestos shall be:  
- surface treated or subjected to procedures of asbestos fibers solidification or destruction or packed in containers or bags so as to prevent asbestos fibers release into the environment.

5. Asbestos waste and waste containing loosely bonded asbestos shall be treated by application of procedures of solidification already at the site of its creation, if possible, so as to prevent asbestos fibers release into the environment during transport, loading, or unloading and disposal.

a. When using cement or other bonding agents, the solidification procedure should aim to result in strength of pressure higher than  $10 \text{ N/mm}^2$ .

b. Asbestos waste may be solidified through application of other binding agents provided the results of the research into their adequacy regarding release of asbestos fibers are not worse than those obtained when the waste is solidified with cement.

6. Waste of discarded equipment containing unbonded asbestos or its component parts containing asbestos shall before disposal be taken apart and the asbestos material and unbonded asbestos removed from them.

a. Equipment containing asbestos that has not been taken apart shall not be dumped in disposal sites except in cases of smaller parts that cannot be taken apart and that can be packed whole in polyethylene bags in a way ensuring that they will not be damaged in transport or in the process of disposal.

b. Discarded equipment containing asbestos is listed in Appendix 4 of the Macedonian Regulation

#### **7.4 ASBESTOS WASTE TRANSPORT**

Transportation of asbestos wastes will comply with Macedonian Law on Waste Management (2004) and the Regulation on the Methods Of Asbestos Waste Treatment And Asbestos Containing Products Waste Treatment, Article 3:

1. Transportation of waste with tightly bonded asbestos is carried out in closed containers or bags or in enclosed load transport vehicles so that asbestos fibers emission into the environment is prevented to a highest possible degree.
2. Transportation of asbestos waste and of waste with loosely bonded asbestos is carried out after such waste has been treated so as to prevent asbestos fibers emission into the environment.
3. Loading and unloading of asbestos waste to and from the load compartments of the transport vehicles shall be carried out with great care, meaning that the waste shall not be dumped but carefully placed and shall not be broken and scattered around.
4. Where during transportation asbestos-containing load is spilt or scattered, such waste load shall be immediately repackaged and taken to the waste disposal site.

#### **7.5 ASBESTOS WASTE DISPOSAL**

Asbestos, as a hazardous fraction of the construction/demolition waste, requires special techniques of collection, handling, and final disposal. (Waste Management Strategy of the Republic of Macedonia (2008 - 2020).)

Disposal of asbestos wastes will comply with Macedonian Law on Waste Management (2004) and the Regulation on the Methods Of Asbestos Waste Treatment And Asbestos Containing Products Waste Treatment, Articles 11, 12 and 13.

1. At the waste disposal sites, the asbestos waste is disposed of in a previously determined space where asbestos waste is to be discharged and which shall be visibly marked and used exclusively for asbestos waste disposal.
  - a. The access to the asbestos waste disposal site shall be arranged in a way enabling for the waste to be discharged directly from the transport vehicle into a hole or dug-up pit used solely for asbestos waste disposal.
  - b. When the asbestos waste is discharged into a hole or a pit from the edge of such hole or pit, care shall be taken that the waste does not scatter.
  - c. As soon as the waste is discharged into the hole it shall be covered.
  - d. Vehicles and machines shall not drive over the spilled asbestos waste which has not been as yet covered by earth or similar inert material.
2. Asbestos waste and processed loosely bonded asbestos waste are disposed in a hazardous waste disposal site.
  - a. Previously treated asbestos waste containing mainly organic matter, may be destroyed also by burning in waste incinerators.

b. Waste previously treated for solidification or destruction of asbestos fibers may be disposed in a non-hazardous waste disposal site.

3. Waste of tightly bonded asbestos is disposed in non-hazardous waste disposal sites.

a. Waste of tightly bonded asbestos containing mainly organic matter may be disposed also by burning in waste incinerators.

b. Asbestos-cement construction waste with tightly bonded asbestos may be disposed also in inert waste disposal sites provided it is of a composition or treated in a manner preventing release of asbestos fibers into the environment.

Appendix G provides information on asbestos waste disposal sites in Macedonia.

### **7.6 ASBESTOS WASTE PROCESSING OR REUSE**

Processing or reuse of asbestos waste will comply with Macedonian Law on Waste Management (2004) and the Regulation on the Methods Of Asbestos Waste Treatment And Asbestos Containing Products Waste Treatment, Article 9:

1. Reuse of asbestos waste shall be allowed only when such waste has been previously subjected to processes for asbestos fibers destruction.

2. Asbestos-cement construction waste containing waste asbestos-cement construction material shall not be recycled.

### **8.0 PERIODIC INSPECTIONS and RECORDS**

During and after the implementation of this AH&S Plan, the Employer will inspect all areas where ACM has been identified to determine changes in its condition, as provided in the S&HW Law, Articles 19, 23. 33

The Employer is responsible for maintaining records sufficient to indicate when inspections are required and for making the necessary arrangements for the reinspections, in accord with the S&HW Law, Articles 19, 23. 37

### **9.0 AH&S PLAN UPDATES**

The Employer will update this AH&S Plan in accordance with the S&HW Law, Article 11 and as necessary when Macedonia completes development of regulations applying to Asbestos management, removal, treatment and disposal.

## **APPENDICES**

APPENDIX A - Pictures of asbestos based on March 2008 EDD/PPA for Vipro DOOEL

APPENDIX B - Sample Wording for Signs and Warnings

APPENDIX C - Outline for Risk Assessment

APPENDIX D - Checklist for Work Plan to address asbestos from March 2008 EDD/PPA

APPENDIX E – Resources for Personal Protective Equipment and Examples of HEPA respirators and protective clothing

APPENDIX F- Sample Asbestos Fiber Release Occurrence Report

APPENDIX G - Asbestos Waste Disposal Sites

APPENDIX H – Pertinent Sections of March 2008 EDD/PPA for Vipro DOOEL

**APPENDIX A**

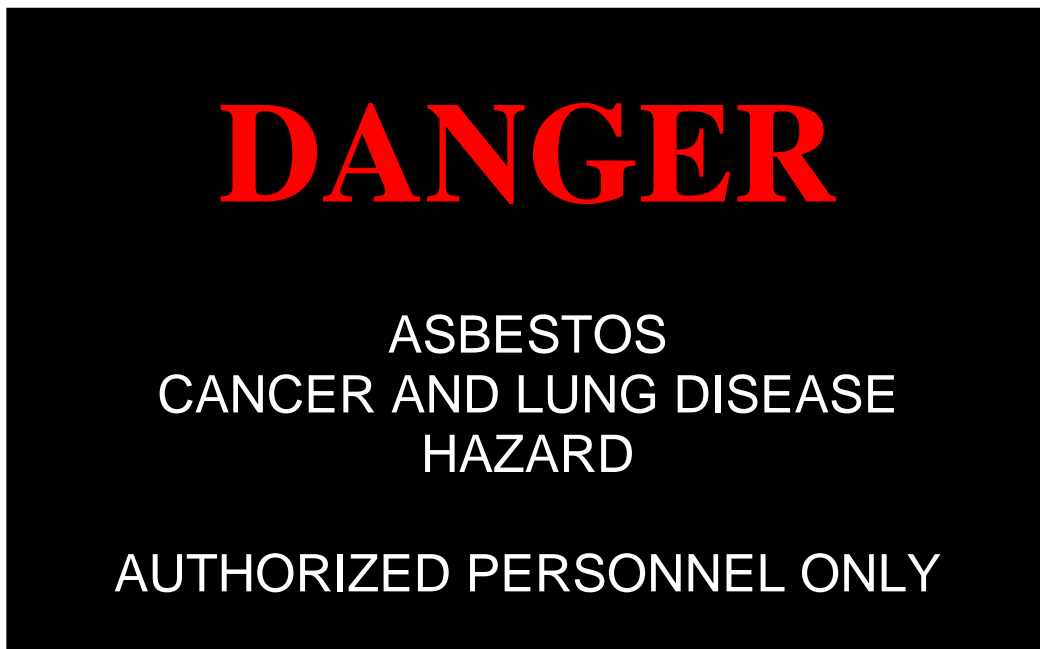
**PICTURES OF ROOFING TILES**



APPENDIX B

SAMPLE WORDING FOR SIGNS AND WARNINGS

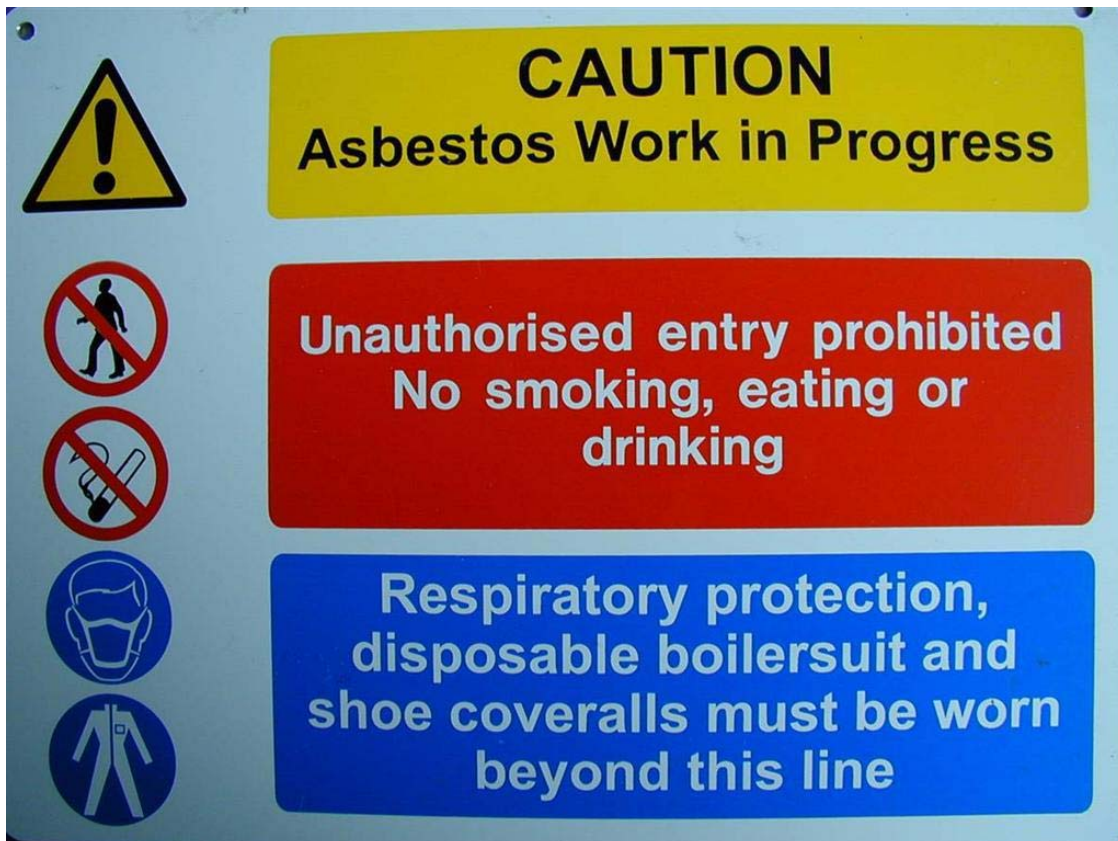
- Warning signs and tapes must demarcate regulated areas
- Warning signs should be provided in Macedonian and English (sample English wording):





Sample Wording For Signs And Warnings (cont.)

- Warning signs should indicate hazards and precautions, in symbols and words (sample English wording and symbols).



## APPENDIX C

### **Outline for Risk Assessment**

Once an Employer decides to remove or repair ACMs, the Employer should prepare a written assessment of the hazard and the consequent risks.

A. The goal of Risk Assessment is to set up a Work Plan for preventive actions.

B. Risk assessment should at a minimum:

1. be site specific, i.e. take account of the details of that site
2. quantify its amount of asbestos
3. identify the type(s) asbestos present (if laboratory tested, use laboratory characterization; if sample not analyzed by laboratory, state it is presumed to be asbestos)
4. establish its condition and level of damage
5. determine its locations(s) and the type of material containing asbestos (e.g. insulation, floor tiling, roof tiling or other roofing materials, cement (board, product, residue, debris, with spray coating, etc.), paper, plastic, textiles, etc.)
6. indicate whether asbestos is protected from damage and fiber release (identify the surface treatments (e.g. Covered by paint, paper or other sealant, plastic, vinyl, rubber material, encased in concrete or other similar substance, protected by an enclosure such as a box, not protected)
7. determine whether it is friable or non-friable
8. identify the routes for potential human exposure to asbestos fibers

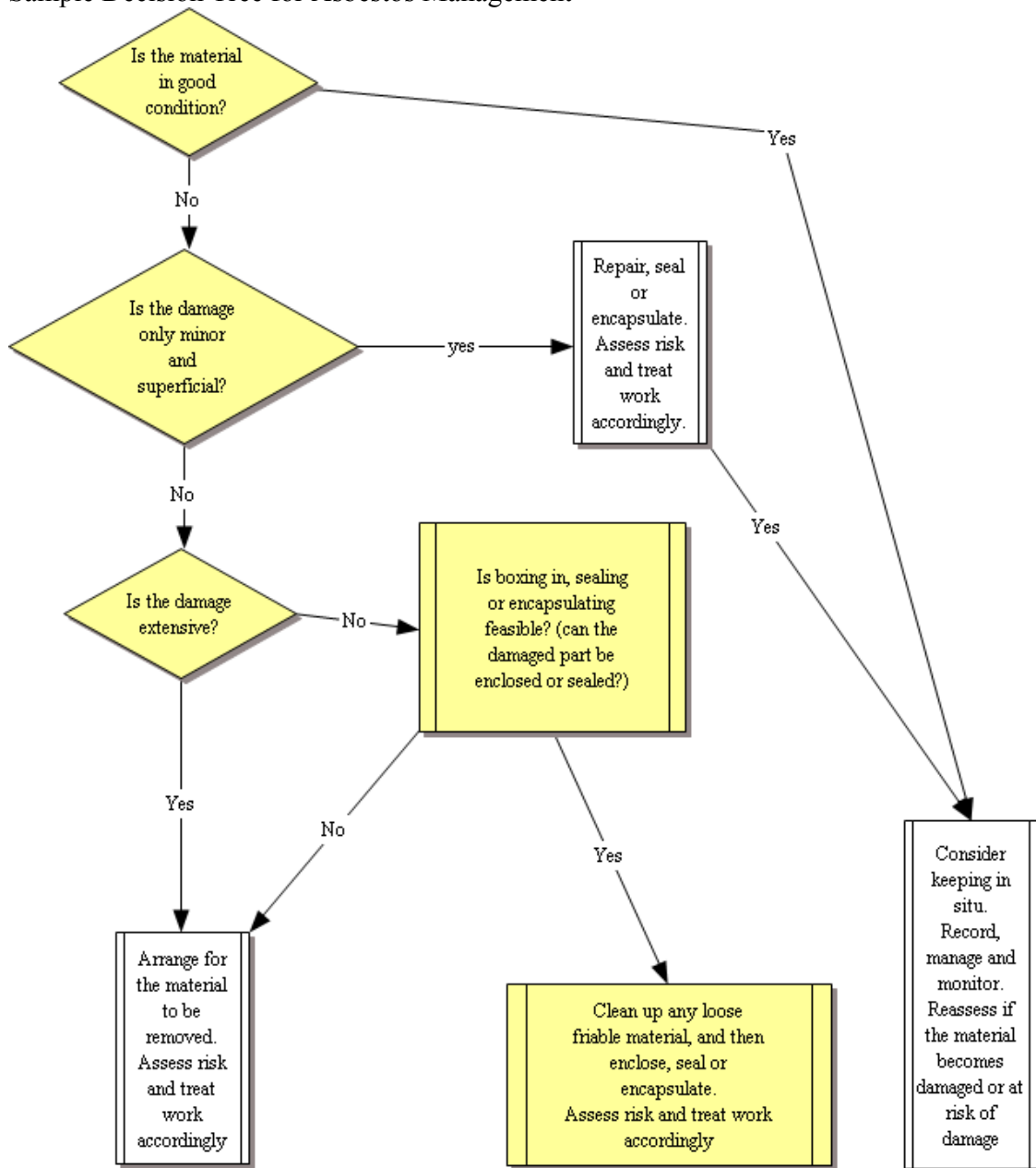
C. Records should be kept of all data concerning presence, condition, and exposure to asbestos. These can include:

1. Surveys of competent experts

D. Development of a Decision Tree (sample decision tree attached)

(Recommendation based on EU Best Practices Chapter 5)

### Sample Decision Tree for Asbestos Management



(Based on decision tree from USAID EDD/PPA)

## APPENDIX D

### VIPRO DOOEL - Checklist for Work Plan

This is a non-exhaustive list of items to be included in the plan of work for removal and disposal of roofing tiles.

## **Vipro DOOEL Work Plan for Removal and Disposal of Asbestos**

**Date:** \_\_\_\_\_

**Title of Project:** Removal and disposal of asbestos roofing tiles

**Types:** Asbestos roofing tiles identified in March 200 EDD/PPA

**Owner's Name:** Mr. Viktor Petkov

**Address:** v.Prdejci, Municipality of Gevgelija, Macedonia

**Phone Number:** +389 (0) 34 211 978

**E-mail Address:** [vipro@mt.net.mk](mailto:vipro@mt.net.mk)

**Safety Expert for site:** \_\_\_\_\_

**\* Administrative information (if necessary and different from company employees)**

- name & address/telephone of person/organization doing removal/disposal work;
- name & telephone of persons in charge of the work;
- laboratory charged with measurements on site (address, telephone, fax)(if necessary);
- subcontractors, especially for preparatory works (if appropriate);
- list of official organizations involved;
- comply with the requirements of the Macedonian Safety and Health at work, Part I, §4 and Part II, §1 of the Asbestos Health and Safety Plan.

**\* Information about the site**

- situation (e.g. roofing tiles on processing building);
- nature of the works planned: removal and disposal (location within or on buildings);
- condition of asbestos shingles or other materials - quantities and extent;
- date and times work will occur;
- designated work areas and signage (types of signs, numbers, and locations);
- factors specific to the site (proximity to other activities; hot conditions; air conditioning or heating systems; working at heights etc.);
- identification of risks associated with the workplace, materials, & equipment used (e.g. asbestos, electricity, gas, steam, fire, machines, working at heights);

**\* Preparing site**

- removal of furniture and materials within building (if necessary);
- identify and obtain materials and equipment needed for the work;

### **Checklist for Work Plan (continued)**

isolate area from persons or work activities;

#### **\* Removal and disposal of Group II asbestos - Activities involving removal of roofing tiles**

- Comply with work practices, engineering controls, general equipment, and personal protection equipment detailed in Part II, Section 2.0-2.4 of the AH&S Plan;
- Personal protective equipment (face mask with HEPA filter and protective coveralls) must be worn by persons removing roofing tiles and shingles;
- Personal protective equipment (face mask with HEPA filter and protective coveralls) must be worn by persons cleaning up asbestos debris and waste after it is removed;
- Roofing material shall be removed in an intact state to the extent feasible.
- Wet methods (water) is used prior to and when removing roofing materials that are not intact, or that are broken or cut during removal, unless wet methods creates a safety hazard.
- Roof tiles and shingles must not be cut, abraded, or broken unless it is not possible to keep tiles/shingles intact. Any tools used must be at the lowest power setting and with dust suppression (such as misting or wetting, unless this creates a safety hazard).
- Cutting machines shall be continuously misted, unless this creates safety hazard.
- Dust from cutting or removal of roofing materials must be collected by a HEPA dust collector, vacuumed using HEPA filters along the cut line, or by gently sweeping and then carefully and completely wiping up the still-wet dust and debris left along the cut line. The dust and debris shall be immediately bagged or placed in covered containers.
- Asbestos materials and debris must be removed from roof no later than end of work-shift by lowering to the ground (not dropped or thrown) using covered chute, crane, or hoist.
- Any asbestos materials that are not intact must be kept wet, placed in an impermeable waste bag, or wrapped in plastic sheeting while on the roof
- Upon being lowered, unwrapped material must be put in a closed container to prevent dust from being released.
- Debris in guttering on an asbestos cement roof may contain asbestos and debris should be managed in accordance with these recommendations.

#### **\*Removal of Waste**

- identify conditions of the waste materials (asbestos and non-asbestos);
- follow procedures for handling and packaging asbestos waste as detailed in §7.0 of Asbestos Health and Safety Plan and Macedonian Regulation On The Methods Of Asbestos Waste Treatment And Asbestos Containing Products Waste Treatment;
- dispose of waste, safe storage on site, and process of disposal to authorized sites.

#### **\*Clean up of the work zone and Restoring area to normal use**

- operational methods for removing surface covering and cleaning surfaces;
- methods for decontamination of materials and equipment used in the work;
- visual inspection and checks on cleanliness.
- final clear up of equipment from the zone.

#### **\*Emergency procedures**

- first aiders; emergency procedures for situations of varying urgency and seriousness;
- procedures put in place for emergency help;
- communications
- co-ordination with external emergency services.

(Adapted from EU Best Practices Guidance, Chapter 5)

[http://ec.europa.eu/employment\\_social/health\\_safety/docs/final\\_guide\\_en.pdf](http://ec.europa.eu/employment_social/health_safety/docs/final_guide_en.pdf)

## APPENDIX E

### **Resource for Personal Protective Equipment**

For *lichna zashtintna oprema* (personal protective equipment).

"Dvornik"

Tel: 02 3224046 / 02 3110624

email: [dvornik@mt.net.mk](mailto:dvornik@mt.net.mk)

Address: Ulica "8 Mart" 1000 Skopje

Sample of Protective Coveralls



Coverall and one type of disposable half face mask with HEPA filter



Coverall and full face mask with HEPA filter



**APPENDIX F**

**Asbestos Fiber Release Occurrence Report**

Each known asbestos fiber release occurrence shall be responded to, coordinated, investigated, documented, and recorded by the Company's Safety Person or by a qualified designated person(s).

**Major** -  (more than 1 linear or square meter)

**Minor** -  (less than 1 linear or square meter)

**1.** Building (or description of area) where the occurrence occurred:

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**2.** Types of Asbestos-containing materials released were Thermal System Insulation-, surfacing-, roofing materials -, flooring materials-, miscellaneous-, friable-.

List the materials that were involved:

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**3.** The release was during demolition-, maintenance-, renovation-, other- work activities.

**4.** Name of Project Manager:

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Name of Contractor/Sub-Contractor:

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**5.** Who reported the release episode:

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Reported on (date/time): \_\_\_\_\_,

Who reported to: \_\_\_\_\_.

**6.** Air sampling and analytical testing was-, was not- involved with this fiber release occurrence.



**Asbestos Fiber Release Occurrence Report – (continued)**

7. Were the area air sampling results over the permissible exposure limit; yes: , no: .

8. Clearance air sampling and analytical testing was-, was not-conducted pertaining to this fiber release occurrence prior to re-opening the work-site area affected by this incident.

9. Describe the release episode:

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10. The asbestos-containing material was-, was not-cleaned up according to the approved procedures. Who performed the clean-up:

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11. Describe the cleanup operation and preventive measures taken:

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12. If ACM is removed, the name and location of the storage or disposal site for ACM.

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*----- Attach Additional Sheets if Necessary -----*

## **APPENDIX G**

### **Asbestos Waste Disposal Sites**

At this time, no landfill sites meet EU specifications for disposal of asbestos wastes. The Draft Waste Management Plan (pending as of October 2, 2008) does direct the development of the network of the recovery/disposal facilities for construction/demolition waste, compliant to EU standards, including safe disposal of asbestos waste.

At this time, the landfill near Skopje is accepting asbestos wastes. The landfill can be contacted at the general number: 02-2722-400

## **APPENDIX H**

### **Pertinent sections of March 2008 EDD/PPA**

EDD Liability and Environmental Concerns: The EDD is focused on the new production site, an old poultry farm close to Prdejci. There are 11 buildings (10,000 m<sup>2</sup>) in very bad condition and roofs are composed of asbestos tiles. Several buildings are partially demolished and the asbestos roof has been removed at one end of one building. The asbestos roof must be removed because Vipro needs a higher roof to accommodate their vegetable processing equipment.

Because of the deteriorated condition of the buildings and asbestos roofs, there are problems with removing tiles. Based on observations of the small amount of tiles removed so far, many tiles have been broken into small pieces. Many asbestos pieces are stacked with the removed panels, but there are asbestos pieces scattered over the construction site. It is either difficult to remove the screws holding tiles in place without breaking them or some of the tiles are in such bad shape that they cannot be removed without breaking. It is also possible that the workers removing the tiles are not very careful.

The building where asbestos was removed is currently being renovated with higher walls. Construction workers are working in the same area where the asbestos roofing was removed and there are asbestos pieces in the construction zone. Workers should be alerted to the dangers of asbestos and warned not to touch tiles. They should contact with construction workers experienced with handling asbestos tiles.

There are significant possible liabilities associated with removal of these asbestos roofs. Each building has approximately 1,000 m<sup>2</sup> of asbestos tiles that will be removed. They will need to be moved to a central collection point, packaged and stored for some time and ultimately disposed in a landfill. Other roofing insulation should also be discarded unless it can be declared free of any asbestos contamination. Metal roofing supports may also be a concern. Before these supports can be reused in the new roof, they will need to be chemically cleaned, protected from corrosion and painted. Cleaning could cause severe pollution if not properly managed.

Mitigation and Monitoring Recommendations: Several mitigations are recommended for the AgBiz potential grant agreement with Vipro. Mitigations are needed to reduce environmental impacts. Mitigations are recommended to reduce the potential liability associated with renovating the buildings at the new site, especially with removal of asbestos roofing. Wastewater treatment and cleaner production assistance are recommended. Other measures include insuring proper permits are received, and that public participation is conducted. The recommendation mitigations are as follows:

Asbestos Removal. Vipro must remove asbestos roofing in accordance with “Regulation for deposition of asbestos”, Official Gazette 89/2006. Vipro must utilize a contractor with experience removing asbestos tiles. Disposable sheeting should be used

**Pertinent sections of March 2008 EDD/PPA (cont.)**

under the roofing to catch asbestos dust/pieces and roofing should be wetted properly to ease tile removal with minimum dust creation. Workers should use disposable overalls, face mask designed for roofing asbestos and disposable gloves. Insulating materials used in the old roof should be discarded unless there is no risk of asbestos contamination in the insulation. Tiles must be packed in polyethylene bags marked "asbestos waste". Bags should be properly stored in a protected area until they can be disposed of in a proper landfill site. Other construction workers should be warned about the dangers of asbestos and provided guidelines for what to do if they find any broken tiles or asbestos waste in the construction zone.