



# TESTING LABORATORY DIRECTORATE

## EUROTEST CONTROL EAD

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Accredited Testing and Calibration Laboratory  
certified by the Bulgarian Accreditation Service, reg. No. 3-LIK, valid by Oct 31, 2011

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### PROTOCOL OF TESTING

**No. 4162/30.04.2010**

- 1** Soils.....  
(product name, type, make, etc.)
- 2** Company which requested the testing: Balkan Mineral and Mining EAD - the samples are provided by the client....  
(name and address of the company, no. and date of the protocol for collection of samples)
- 3** Method of testing: BNS ISO 10390:20002; BNS ISO 14869-1:2002; BNS 11261:2002; ETC V3I1/7.1-4/85;  
ETC V3I1/7.2.3-11/02 - the parameters are listed in items 7.1 and 7.3 of the protocol.....  
(name and no. of the standards or validated methods)
- 4** Date of receipt of the samples for testing in the laboratory, request ref. no. 520/15.04.2010 .....
- 5** Number of tested samples: 8 samples collected from soils, Ada Tepe area, Krumovgrad.....  
(production no., number, and mass of the samples, number of samples shipments, import invoice no., date of production)
- 6** Date/period of the testing: Apr 15, 2010 to Apr 30, 2010.....

**DIRECTOR OF**

**TESTING LABORATORY DIRECTORATE:.....**  
Yu. Akrabova

## 7. TEST RESULTS

## 7.1. Testing/measurements within the scope of accreditation

| #    | Parameter                        | Unit of measurement | Standards/validated methods | Sample no. according to Sample Logbook | Test results (value, below detection) | Parameter value and tolerance | Test conditions |
|------|----------------------------------|---------------------|-----------------------------|--|---------------------------------------|-------------------------------|-----------------|
| 1    | 2                                | 3                   | 4                           | 5                                      | 6                                     | 7                             | 8               |
| 1    | Determinations in water extract: |                     |                             |  |                                       |                               |                 |
| 1.1  | pH                               | pH units            | BNS ISO 10390/02            |  | 6.73 ± 0.10                           | -                             | Standard        |
| 2    | Chemical composition             |                     |                             |  |                                       |                               |                 |
| 2.1  | Chromium (Cr)                    | mg/kg               | BNS ISO 14869-1/02          |  | 50 ± 5                                | -                             | Standard        |
| 2.2  | Manganese (Mn)                   | mg/kg               | BNS ISO 14869-1/02          |  | 330 ± 33                              | -                             | Standard        |
| 2.3  | Iron (Fe)                        | mg/kg               | BNS ISO 14869-1/02          |  | 20530 ± 410                           | -                             | Standard        |
| 2.4  | Cobalt (Co)                      | mg/kg               | BNS ISO 14869-1/02          |  | 10 ± 1                                | -                             | Standard        |
| 2.5  | Nickel (Ni)                      | mg/kg               | BNS ISO 14869-1/02          |  | 13 ± 1                                | -                             | Standard        |
| 2.6  | Copper (Cu)                      | mg/kg               | BNS ISO 14869-1/02          |  | 18 ± 2                                | -                             | Standard        |
| 2.7  | Zinc (Zn)                        | mg/kg               | BNS ISO 14869-1/02          |  | 56 ± 6                                | -                             | Standard        |
| 2.8  | Arsenic (As)                     | mg/kg               | BNS ISO 14869-1/02          |  | 44 ± 4                                | -                             | Standard        |
| 2.9  | Silver (Ag)                      | mg/kg               | BNS ISO 14869-1/02          |  | <1                                    | -                             | Standard        |
| 2.10 | Cadmium (Cd)                     | mg/kg               | BNS ISO 14869-1/02          |  | 1 ± 1                                 | -                             | Standard        |
| 2.11 | Lead (Pb)                        | mg/kg               | BNS ISO 14869-1/02          |  | 24 ± 2                                | -                             | Standard        |
| 2.12 | Gold (Au)                        | mg/kg               | ETC V3II/7.1-4/85           |  | <0.05                                 | -                             | Standard        |
| 3    | Humus                            | %                   | ETC V3II/7.2.3-11/02        |  | 0.54 ± 0.05                           | -                             | Standard        |
| 4    | Kjeldahl nitrogen                | mg/g                | BNS ISO 11261/02            |  | <0.50                                 | -                             | Standard        |

| 1    | 2                                | 3        | 4                    | 5 | 6           | 7 | 8        |
|------|----------------------------------|----------|----------------------|---|-------------|---|----------|
| 1    | Determinations in water extract: |          |                      |   |             |   |          |
| 1.1  | pH                               | pH units | BNS ISO 10390/02     |   | 6.64 ± 0.10 | - | Standard |
| 2    | Chemical composition             |          |                      |   |             |   |          |
| 2.1  | Chromium (Cr)                    | mg/kg    | BNS ISO 14869-1/02   |   | 61 ± 6      | - | Standard |
| 2.2  | Manganese (Mn)                   | mg/kg    | BNS ISO 14869-1/02   |   | 650 ± 65    | - | Standard |
| 2.3  | Iron (Fe)                        | mg/kg    | BNS ISO 14869-1/02   |   | 17931 ± 359 | - | Standard |
| 2.4  | Cobalt (Co)                      | mg/kg    | BNS ISO 14869-1/02   |   | 8 ± 1       | - | Standard |
| 2.5  | Nickel (Ni)                      | mg/kg    | BNS ISO 14869-1/02   |   | 12 ± 1      | - | Standard |
| 2.6  | Copper (Cu)                      | mg/kg    | BNS ISO 14869-1/02   |   | 12 ± 1      | - | Standard |
| 2.7  | Zinc (Zn)                        | mg/kg    | BNS ISO 14869-1/02   |   | 57 ± 6      | - | Standard |
| 2.8  | Arsenic (As)                     | mg/kg    | BNS ISO 14869-1/02   |   | 8 ± 1       | - | Standard |
| 2.9  | Silver (Ag)                      | mg/kg    | BNS ISO 14869-1/02   |   | <1          | - | Standard |
| 2.10 | Cadmium (Cd)                     | mg/kg    | BNS ISO 14869-1/02   |   | 1 ± 1       | - | Standard |
| 2.11 | Lead (Pb)                        | mg/kg    | BNS ISO 14869-1/02   |   | 34 ± 3      | - | Standard |
| 2.12 | Gold (Au)                        | mg/kg    | ETC V3II/7.1-4/85    |   | <0.05       | - | Standard |
| 3    | Humus                            | %        | ETC V3II/7.2.3-11/02 |   | 1.16 ± 0.12 | - | Standard |
| 4    | Kjeldahl nitrogen                | mg/g     | BNS ISO 11261/02     |   | 0.76 ± 0.08 | - | Standard |

| 1    | 2                                | 3        | 4                    | 5 | 6           | 7 | 8        |
|------|----------------------------------|----------|----------------------|---|-------------|---|----------|
| 1    | Determinations in water extract: |          |                      |   |             |   |          |
| 1.1  | pH                               | pH units | BNS ISO 10390/02     |   | 6.66 ± 0.10 | - | Standard |
| 2    | Chemical composition             |          |                      |   |             |   |          |
| 2.1  | Chromium (Cr)                    | mg/kg    | BNS ISO 14869-1/02   |   | 121 ± 12    | - | Standard |
| 2.2  | Manganese (Mn)                   | mg/kg    | BNS ISO 14869-1/02   |   | 809 ± 81    | - | Standard |
| 2.3  | Iron (Fe)                        | mg/kg    | BNS ISO 14869-1/02   |   | 35235 ± 705 | - | Standard |
| 2.4  | Cobalt (Co)                      | mg/kg    | BNS ISO 14869-1/02   |   | 20 ± 2      | - | Standard |
| 2.5  | Nickel (Ni)                      | mg/kg    | BNS ISO 14869-1/02   |   | 32 ± 3      | - | Standard |
| 2.6  | Copper (Cu)                      | mg/kg    | BNS ISO 14869-1/02   |   | 32 ± 3      | - | Standard |
| 2.7  | Zinc (Zn)                        | mg/kg    | BNS ISO 14869-1/02   |   | 86 ± 9      | - | Standard |
| 2.8  | Arsenic (As)                     | mg/kg    | BNS ISO 14869-1/02   |   | 7 ± 1       | - | Standard |
| 2.9  | Silver (Ag)                      | mg/kg    | BNS ISO 14869-1/02   |   | <1          | - | Standard |
| 2.10 | Cadmium (Cd)                     | mg/kg    | BNS ISO 14869-1/02   |   | 1 ± 1       | - | Standard |
| 2.11 | Lead (Pb)                        | mg/kg    | BNS ISO 14869-1/02   |   | 29 ± 3      | - | Standard |
| 2.12 | Gold (Au)                        | mg/kg    | ETC V3II/7.1-4/85    |   | <0.05       | - | Standard |
| 3    | Humus                            | %        | ETC V3II/7.2.3-11/02 |   | 1.66 ± 0.17 | - | Standard |
| 4    | Kjeldahl nitrogen                | mg/g     | BNS ISO 11261/02     |   | 1.20 ± 0.12 | - | Standard |

| 1    | 2                                | 3        | 4                    | 5  | 6           | 7 | 8        |
|------|----------------------------------|----------|----------------------|--|-------------|---|----------|
| 1    | Determinations in water extract: |          |                      | Soil<br>sample PP-004<br>388016/<br>45887272<br>lab no. 1241 from<br>the<br>Ada Tepe area,<br>Krumovgrad |             |   |          |
| 1.1  | pH                               | pH units | BNS ISO 10390/02     |  | 6.33 ± 0.10 | - | Standard |
| 2    | Chemical composition             |          |                      |  |             |   |          |
| 2.1  | Chromium (Cr)                    | mg/kg    | BNS ISO 14869-1/02   |  | 94 ± 9      | - | Standard |
| 2.2  | Manganese (Mn)                   | mg/kg    | BNS ISO 14869-1/02   |  | 665 ± 66    | - | Standard |
| 2.3  | Iron (Fe)                        | mg/kg    | BNS ISO 14869-1/02   |  | 34134 ± 683 | - | Standard |
| 2.4  | Cobalt (Co)                      | mg/kg    | BNS ISO 14869-1/02   |  | 20 ± 2      | - | Standard |
| 2.5  | Nickel (Ni)                      | mg/kg    | BNS ISO 14869-1/02   |  | 33 ± 3      | - | Standard |
| 2.6  | Copper (Cu)                      | mg/kg    | BNS ISO 14869-1/02   |  | 37 ± 4      | - | Standard |
| 2.7  | Zinc (Zn)                        | mg/kg    | BNS ISO 14869-1/02   |  | 79 ± 8      | - | Standard |
| 2.8  | Arsenic (As)                     | mg/kg    | BNS ISO 14869-1/02   |  | 9 ± 1       | - | Standard |
| 2.9  | Silver (Ag)                      | mg/kg    | BNS ISO 14869-1/02   |  | <1          | - | Standard |
| 2.10 | Cadmium (Cd)                     | mg/kg    | BNS ISO 14869-1/02   |  | 1 ± 1       | - | Standard |
| 2.11 | Lead (Pb)                        | mg/kg    | BNS ISO 14869-1/02   |  | 23 ± 2      | - | Standard |
| 2.12 | Gold (Au)                        | mg/kg    | ETC V3II/7.1-4/85    |  | <0.05       | - | Standard |
| 3    | Humus                            | %        | ETC V3II/7.2.3-11/02 |  | 4.42 ± 0.44 | - | Standard |
| 4    | Kjeldahl nitrogen                | mg/g     | BNS ISO 11261/02     |  | 2.38 ± 0.24 | - | Standard |

| 1    | 2                                | 3        | 4                    | 5   | 6           | 7 | 8        |
|------|----------------------------------|----------|----------------------|---|-------------|---|----------|
| 1    | Determinations in water extract: |          |                      | Soil<br>sample PP-005<br>387758/<br>4587301<br>lab no. 1242 from<br>the<br>Ada Tepe area,<br>Krumovgrad |             |   |          |
| 1.1  | pH                               | pH units | BNS ISO 10390/02     |   | 5.85 ± 0.10 | - | Standard |
| 2    | Chemical composition             |          |                      |   |             |   |          |
| 2.1  | Chromium (Cr)                    | mg/kg    | BNS ISO 14869-1/02   |   | 97 ± 10     | - | Standard |
| 2.2  | Manganese (Mn)                   | mg/kg    | BNS ISO 14869-1/02   |   | 685 ± 68    | - | Standard |
| 2.3  | Iron (Fe)                        | mg/kg    | BNS ISO 14869-1/02   |   | 40699 ± 814 | - | Standard |
| 2.4  | Cobalt (Co)                      | mg/kg    | BNS ISO 14869-1/02   |   | 23 ± 2      | - | Standard |
| 2.5  | Nickel (Ni)                      | mg/kg    | BNS ISO 14869-1/02   |   | 28 ± 3      | - | Standard |
| 2.6  | Copper (Cu)                      | mg/kg    | BNS ISO 14869-1/02   |   | 25 ± 2      | - | Standard |
| 2.7  | Zinc (Zn)                        | mg/kg    | BNS ISO 14869-1/02   |   | 74 ± 7      | - | Standard |
| 2.8  | Arsenic (As)                     | mg/kg    | BNS ISO 14869-1/02   |   | 10 ± 1      | - | Standard |
| 2.9  | Silver (Ag)                      | mg/kg    | BNS ISO 14869-1/02   |   | <1          | - | Standard |
| 2.10 | Cadmium (Cd)                     | mg/kg    | BNS ISO 14869-1/02   |   | 1 ± 1       | - | Standard |
| 2.11 | Lead (Pb)                        | mg/kg    | BNS ISO 14869-1/02   |   | 22 ± 2      | - | Standard |
| 2.12 | Gold (Au)                        | mg/kg    | ETC V3II/7.1-4/85    |   | <0.05       | - | Standard |
| 3    | Humus                            | %        | ETC V3II/7.2.3-11/02 |   | 4.17 ± 0.42 | - | Standard |
| 4    | Kjeldahl nitrogen                | mg/g     | BNS ISO 11261/02     |   | 1.41 ± 0.14 | - | Standard |

| 1    | 2                                | 3        | 4                    | 5   | 6           | 7 | 8        |
|------|----------------------------------|----------|----------------------|---|-------------|---|----------|
| 1    | Determinations in water extract: |          |                      | Soil<br>sample PP-006<br>387533/<br>4587913<br>lab no. 1243 from<br>the<br>Ada Tepe area,<br>Krumovgrad |             |   |          |
| 1.1  | pH                               | pH units | BNS ISO 10390/02     |   | 5.00 ± 0.10 | - | Standard |
| 2    | Chemical composition             |          |                      |   |             |   |          |
| 2.1  | Chromium (Cr)                    | mg/kg    | BNS ISO 14869-1/02   |   | 33 ± 3      | - | Standard |
| 2.2  | Manganese (Mn)                   | mg/kg    | BNS ISO 14869-1/02   |   | 383 ± 38    | - | Standard |
| 2.3  | Iron (Fe)                        | mg/kg    | BNS ISO 14869-1/02   |   | 47847 ± 957 | - | Standard |
| 2.4  | Cobalt (Co)                      | mg/kg    | BNS ISO 14869-1/02   |   | 16 ± 2      | - | Standard |
| 2.5  | Nickel (Ni)                      | mg/kg    | BNS ISO 14869-1/02   |   | 21 ± 2      | - | Standard |
| 2.6  | Copper (Cu)                      | mg/kg    | BNS ISO 14869-1/02   |   | 32 ± 3      | - | Standard |
| 2.7  | Zinc (Zn)                        | mg/kg    | BNS ISO 14869-1/02   |   | 104 ± 10    | - | Standard |
| 2.8  | Arsenic (As)                     | mg/kg    | BNS ISO 14869-1/02   |   | 42 ± 4      | - | Standard |
| 2.9  | Silver (Ag)                      | mg/kg    | BNS ISO 14869-1/02   |   | <1          | - | Standard |
| 2.10 | Cadmium (Cd)                     | mg/kg    | BNS ISO 14869-1/02   |   | 1 ± 1       | - | Standard |
| 2.11 | Lead (Pb)                        | mg/kg    | BNS ISO 14869-1/02   |   | 30 ± 3      | - | Standard |
| 2.12 | Gold (Au)                        | mg/kg    | ETC V3II/7.1-4/85    |   | <0.05       | - | Standard |
| 3    | Humus                            | %        | ETC V3II/7.2.3-11/02 |   | 0.50 ± 0.05 | - | Standard |
| 4    | Kjeldahl nitrogen                | mg/g     | BNS ISO 11261/02     |   | <0.50       | - | Standard |

| #    | Parameter                        | Unit of measurement | Standards/validated methods | Sample no. according to Sample Logbook  | Test results (value, below detection) | Parameter value and tolerance | Test conditions |
|------|----------------------------------|---------------------|-----------------------------|---|---------------------------------------|-------------------------------|-----------------|
| 1    | 2                                | 3                   | 4                           | 5   | 6                                     | 7                             | 8               |
| 1    | Determinations in water extract: |                     |                             | Soil sample PP-007 387552/4588153 lab no. 1244 from the Ada Tepe area, Krumovgrad |                                       |                               |                 |
| 1.1  | pH                               | pH units            | BNS ISO 10390/02            |   | 6.01 ± 0.10                           | -                             | Standard        |
| 2    | Chemical composition             |                     |                             |   |                                       |                               |                 |
| 2.1  | Chromium (Cr)                    | mg/kg               | BNS ISO 14869-1/02          |   | 179 ± 18                              | -                             | Standard        |
| 2.2  | Manganese (Mn)                   | mg/kg               | BNS ISO 14869-1/02          |   | 2199 ± 109                            | -                             | Standard        |
| 2.3  | Iron (Fe)                        | mg/kg               | BNS ISO 14869-1/02          |   | 29320 ± 586                           | -                             | Standard        |
| 2.4  | Cobalt (Co)                      | mg/kg               | BNS ISO 14869-1/02          |   | 28 ± 3                                | -                             | Standard        |
| 2.5  | Nickel (Ni)                      | mg/kg               | BNS ISO 14869-1/02          |   | 82 ± 8                                | -                             | Standard        |
| 2.6  | Copper (Cu)                      | mg/kg               | BNS ISO 14869-1/02          |   | 48 ± 5                                | -                             | Standard        |
| 2.7  | Zinc (Zn)                        | mg/kg               | BNS ISO 14869-1/02          |   | 87 ± 9                                | -                             | Standard        |
| 2.8  | Arsenic (As)                     | mg/kg               | BNS ISO 14869-1/02          |   | 122 ± 12                              | -                             | Standard        |
| 2.9  | Silver (Ag)                      | mg/kg               | BNS ISO 14869-1/02          |   | 1 ± 1                                 | -                             | Standard        |
| 2.10 | Cadmium (Cd)                     | mg/kg               | BNS ISO 14869-1/02          |   | 1 ± 1                                 | -                             | Standard        |
| 2.11 | Lead (Pb)                        | mg/kg               | BNS ISO 14869-1/02          |   | 24 ± 2                                | -                             | Standard        |
| 2.12 | Gold (Au)                        | mg/kg               | ETC V3II/7.1-4/85           |   | 0.16 ± 0.02                           | -                             | Standard        |
| 3    | Humus                            | %                   | ETC V3II/7.2.3-11/02        |   | 2.77 ± 0.28                           | -                             | Standard        |
| 4    | Kjeldahl nitrogen                | mg/g                | BNS ISO 11261/02            |   | 2.40 ± 0.24                           | -                             | Standard        |

|      |                                  |          |                      |   |             |   |          |
|------|----------------------------------|----------|----------------------|---|-------------|---|----------|
| 1    | 2                                | 3        | 4                    | 5   | 6           | 7 | 8        |
| 1    | Determinations in water extract: |          |                      | Soil sample PP-008 387551/4588455 lab no. 1245 from the Ada Tepe area, Krumovgrad |             |   |          |
| 1.1  | pH                               | pH units | BNS ISO 10390/02     |   | 5.43 ± 0.10 | - | Standard |
| 2    | Chemical composition             |          |                      |   |             |   |          |
| 2.1  | Chromium (Cr)                    | mg/kg    | BNS ISO 14869-1/02   |   | 224 ± 22    | - | Standard |
| 2.2  | Manganese (Mn)                   | mg/kg    | BNS ISO 14869-1/02   |   | 3345 ± 167  | - | Standard |
| 2.3  | Iron (Fe)                        | mg/kg    | BNS ISO 14869-1/02   |   | 26822 ± 536 | - | Standard |
| 2.4  | Cobalt (Co)                      | mg/kg    | BNS ISO 14869-1/02   |   | 45 ± 4      | - | Standard |
| 2.5  | Nickel (Ni)                      | mg/kg    | BNS ISO 14869-1/02   |   | 96 ± 10     | - | Standard |
| 2.6  | Copper (Cu)                      | mg/kg    | BNS ISO 14869-1/02   |   | 30 ± 3      | - | Standard |
| 2.7  | Zinc (Zn)                        | mg/kg    | BNS ISO 14869-1/02   |   | 70 ± 7      | - | Standard |
| 2.8  | Arsenic (As)                     | mg/kg    | BNS ISO 14869-1/02   |   | 109 ± 11    | - | Standard |
| 2.9  | Silver (Ag)                      | mg/kg    | BNS ISO 14869-1/02   |   | 1 ± 1       | - | Standard |
| 2.10 | Cadmium (Cd)                     | mg/kg    | BNS ISO 14869-1/02   |   | 1 ± 1       | - | Standard |
| 2.11 | Lead (Pb)                        | mg/kg    | BNS ISO 14869-1/02   |   | 24 ± 2      | - | Standard |
| 2.12 | Gold (Au)                        | mg/kg    | ETC V3II/7.1-4/85    |   | 0.08 ± 0.01 | - | Standard |
| 3    | Humus                            | %        | ETC V3II/7.2.3-11/02 |   | 3.08 ± 0.31 | - | Standard |
| 4    | Kjeldahl nitrogen                | mg/g     | BNS ISO 11261/02     |   | 2.98 ± 0.30 | - | Standard |

NOTE I: If required, the protocol of testing may include opinions and interpretations of the tests (conclusions are not allowed) only if compliant with the regulations in item 5.10.5 of BNS EN ISO/IEC 17025.

NOTE II: The test results refer only to the tested samples. Excerpts of the protocol of testing should not be copied without the written consent of the testing laboratory.

PERSONS WHO CARRIED OUT THE TESTING: .....  
S. Dimitrova, Eng.  
.....  
V. Nedelcheva  
.....  
S. Mihaylova

DEPARTMENT  
MANAGER:.....  
A. Raycheva

DIRECTOR OF  
TESTING LABORATORY  
DIRECTORATE: .....  
Yu. Akarova