

Safety and Use Report for Midnight Minerals Rich Earth Onyx Clay Mask

SUMMARY CONCLUSIONS

- When used as directed once daily, the topical application of as much as 125 g of Midnight Minerals Rich Earth Onyx Clay Mask is safe for extended use by adults.
- When used as directed once, the topical application of as much as 125 g of Midnight Minerals Rich Earth Onyx Clay Mask is safe for use by adults.
- When used as directed occasionally (not every day), the topical application of as much as 125 g of Midnight Minerals Rich Earth Onyx Clay Mask is safe for extended use by adults.
- As much as 8 g of Midnight Minerals Rich Earth Onyx Clay Mask may be ingested accidentally at one time by an adult without an appreciable risk of adverse health effects.

INGREDIENT-SPECIFIC CONCLUSIONS

ARSENIC

Assuming that the bioavailability of the inorganic arsenic in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic arsenic (dissolved in water), it can be concluded that, without an appreciable risk of adverse health effects, the acute duration of exposure MRL for the ingestion of inorganic arsenic (dissolved in water) will not be exceeded by 14 days or less of daily accidental or intentional acute ingestion of:

2.5 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by individuals with any body weight.

12.5 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 4 kg.

125 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 38 kg.

Given that over 95% of the adult men and women of any race or age in the US weigh more than 44 kg, it can be concluded that the daily accidental or intentional ingestion of the inorganic arsenic in up to 125 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less by an adult is safe.

Daily accidental or intentional ingestion of as much as 3.287 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for 14 days or less will not exceed the acute duration of exposure MRL for the ingestion of inorganic arsenic (5 µg/kg/day).

Given that over 95% of the adult men and women of any race or age in the US weigh more than 44 kg, it can be concluded that the accidental or intentional ingestion of the inorganic arsenic in up to 125 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask at one time by an adult is safe.

658 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask can be ingested at one time without exceeding the minimum lethal dose of ingested inorganic arsenic (dissolved in water) of 1,000 µg.

Assuming that the bioavailability of the inorganic arsenic in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic arsenic (dissolved in water), it can be concluded that, without an appreciable risk of adverse health effects, the chronic duration of exposure MRL for the ingestion of inorganic arsenic (dissolved in water) will not be exceeded by over 1 year of daily accidental or intentional ingestion of:

2.5 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights

> 12.5 kg.

12.5 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights

> 63 kg.

However, daily accidental or intentional ingestion of 125 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with any body weight will exceed the chronic duration of exposure MRL for the ingestion of inorganic arsenic (dissolved in water).

Daily accidental or intentional ingestion of as much as 0.197 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for over 1 year will not exceed the chronic duration of exposure MRL for the ingestion of inorganic arsenic (0.3 µg/kg/day).

As much as 4.39 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight can be ingested daily over an entire lifetime (an extremely unlikely event) without increasing the risk for developing any cancer by 1%.

Assuming that the bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic arsenic (dissolved in water), it can be concluded that, without an appreciable risk of adverse health effects, the acute duration of exposure MRL for the ingestion of inorganic arsenic (dissolved in water) will not be exceeded by 14 days or less of daily accidental or intentional acute ingestion of:

2.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with any body weight.

12.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 4 kg.

125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 38 kg.

Daily accidental or intentional ingestion of as much as 3.287 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for 14 days or less will not exceed the acute duration of exposure MRL for the ingestion of inorganic arsenic (5 µg/kg/day).

658 g of dry Midnight Minerals Rich Earth Onyx Clay Mask can be ingested at one time without exceeding the minimum lethal dose of ingested inorganic arsenic (dissolved in water) of 1,000 µg.

Assuming that the relative bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask may be about 58% of the bioavailability of the inorganic arsenic in dissolved Midnight Minerals Rich Earth Onyx Clay Mask, it can be concluded that, without an appreciable risk of adverse health effects, the relative bioavailability-adjusted acute duration of exposure MRL for the ingestion of inorganic arsenic (in soil) will not be exceeded by 14 days or less of daily accidental or intentional acute ingestion of:

2.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with any body weight.

12.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 2 kg.

125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 22 kg.

Daily accidental or intentional ingestion of as much as 5.65 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for 14 days or less will not exceed the relative bioavailability-adjusted acute duration of exposure MRL for the ingestion of inorganic arsenic in dry Midnight Minerals Rich Earth Onyx Clay Mask (8.6 µg/kg/day).

1,134 g of dry Midnight Minerals Rich Earth Onyx Clay Mask can be ingested at one time without exceeding the minimum lethal dose of ingested inorganic arsenic (dissolved in water) of 1,000 µg.

Assuming that the bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic arsenic (dissolved in water), it can be concluded that, without an appreciable risk of adverse health effects, the chronic duration of exposure MRL for the ingestion of inorganic arsenic (dissolved in water) will not be exceeded by over 1 year of daily accidental or intentional ingestion of:

2.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 12.5 kg.

12.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 63 kg.

However, daily accidental or intentional ingestion of 125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with any body weight will exceed the chronic duration of exposure MRL for the ingestion of inorganic arsenic (dissolved in water).

Daily accidental or intentional ingestion of as much as 0.197 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for over 1 year will not exceed the chronic duration of exposure MRL for the ingestion of inorganic arsenic (0.3 µg/kg/day). As much as 4.39 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight can be ingested daily over an entire lifetime (an extremely unlikely event) without increasing the risk for developing any cancer by 1%.

Assuming that the relative bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask may be about 58% of the bioavailability of the inorganic arsenic in dissolved Midnight Minerals Rich Earth Onyx Clay Mask, it can be concluded that, without an appreciable risk of adverse health effects, the relative bioavailability-adjusted chronic duration of exposure MRL for the ingestion of inorganic arsenic (in soil) will not be exceeded by over 1 year of daily accidental or intentional ingestion of:

2.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 7 kg.

12.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 36 kg.

However, daily accidental or intentional ingestion of 125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with any body weight will exceed the relative bioavailability adjusted chronic duration of exposure MRL for the ingestion of inorganic arsenic (in soil).

Daily accidental or intentional ingestion of as much as 0.340 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for over 1 year will not exceed the chronic duration of exposure MRL for the ingestion of inorganic arsenic (0.517 µg/kg/day).

As much as 7.57 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight can be ingested daily over an entire lifetime (an extremely unlikely event) without increasing the risk for developing any cancer by 1%.

Assuming that the bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic arsenic (dissolved in water), it can be concluded that, without an appreciable risk of adverse health effects, the acute duration of exposure MRL for the ingestion of inorganic arsenic (dissolved in water) will not be exceeded by 14 days or less of daily topical application of:

2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with any body weight.

12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 4 kg.

125 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 38 kg.

Daily topical application of as much as 3.287 g of Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for 14 days or less will not exceed the acute duration of exposure MRL for the ingestion of inorganic arsenic (5 µg/kg/day).

658 g of Midnight Minerals Rich Earth Onyx Clay Mask can be applied topically at one time without exceeding the minimum lethal dose of ingested inorganic arsenic (dissolved in water) of 1,000 µg.

Assuming that the relative bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability of topically applied inorganic arsenic (in soil), it can be concluded that, without an appreciable risk of adverse health effects, the relative bioavailability-adjusted acute duration of exposure MRL for the topical application of inorganic arsenic (in soil) will not be exceeded by 14 days or less of daily topical application of:

2.5 g, 12.5 g, or 125 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with any body weight.

Daily topical application of as much as 105 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for 14 days or less will not exceed the relative bioavailability-adjusted acute duration of exposure MRL for the ingestion of inorganic arsenic (in soil) (160 µg/kg/day).

21,039 g of Midnight Minerals Rich Earth Onyx Clay Mask can be applied topically at one time without exceeding the minimum lethal dose of ingested inorganic arsenic of 1,000 µg.

Assuming that the bioavailability of topically applied inorganic arsenic (in soil) is the same as the bioavailability of ingested inorganic arsenic (dissolved in water) and that the bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic arsenic (in soil), it can be concluded that, without an appreciable risk of adverse health effects, the chronic duration of exposure MRL for ingested inorganic arsenic (dissolved in water) will not be exceeded by over 1 year of daily topical application of:

2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 12.5 kg.

12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 62.5 kg.

However, daily topical application of 125 g of Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with any body weight will exceed the chronic duration of exposure MRL for ingested inorganic arsenic (dissolved in water).

Daily topical application of as much as 0.197 g of Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for over 1 year will not exceed the chronic duration of exposure MRL for the ingestion of inorganic arsenic (0.3 µg/kg/day).

As much as 4.39 g of Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight can be applied topically every day over an entire lifetime (an extremely unlikely event) without increasing the risk for developing any cancer by 1%.

Assuming that the relative bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability of inorganic arsenic (in soil) and that the relative bioavailability of inorganic arsenic (in soil) is 3.125% of the bioavailability of

inorganic arsenic (dissolved in water), it can be concluded that, without an appreciable risk of adverse health effects, the relative bioavailability-adjusted MRL for chronic daily topical exposure to inorganic arsenic (in soil) will not be exceeded by over 1 year of daily topical application of:

2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with any body weight.

12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 2 kg.

125 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 20 kg.

Daily topical application of as much as 6.31 g of Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for over 1 year will not exceed the relative bioavailability-adjusted chronic duration of exposure MRL for topically applied inorganic arsenic in Midnight Minerals Rich Earth Onyx Clay Mask (9.6 µg/kg/day).

As much as 140.48 g of Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight can be applied topically every day over an entire lifetime (an extremely unlikely event) without increasing the risk for developing any cancer by 1%.

CADMIUM

There is no acute duration of exposure MRL for ingested inorganic cadmium. However, the typically more conservative intermediate duration of exposure (daily for 15 to 365 days) MRL for ingested inorganic cadmium (0.5 µg/kg/day) can be used for making comparisons. However, because acute duration of exposure MRLs tend to be greater than intermediate duration of exposure MRLs for the same substance (often by a factor of 5 or more for heavy metals), it is likely that the inorganic cadmium in Midnight Minerals Rich Earth Onyx Clay Mask poses even less health risk than is implied by these conclusions.

Assuming that the bioavailability of the inorganic cadmium in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic cadmium (dissolved in water), it can be concluded that, without an appreciable risk of adverse health effects, the intermediate duration of exposure MRL for the ingestion of

inorganic cadmium (dissolved in water) will not be exceeded by 15 to 365 days of daily accidental or intentional ingestion of:

2.5 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by individuals with any body weight.

12.5 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights

> 2 kg.

125 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights

> 20 kg.

Daily accidental or intentional ingestion of as much as 6.17 g of Midnight Minerals Face Mask (dissolved in water) per kg of body weight for 15 to 365 days will not exceed the intermediate duration of exposure MRL for the ingestion of inorganic cadmium (0.5 µg/kg/day).

Assuming that the bioavailability of the inorganic cadmium in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic cadmium (dissolved in water), it can be concluded that, without an appreciable risk of adverse health effects, the chronic duration of exposure MRL for the ingestion of inorganic cadmium (dissolved in water) will not be exceeded by over 1 year of daily accidental or intentional ingestion of:

2.5 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights

> 2 kg.

12.5 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights

> 10 kg.

125 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights

> 100 kg.

Daily accidental or intentional ingestion of as much as 1.23 g of Midnight Minerals Face Mask (dissolved in water) per kg of body weight for over 1 year will not exceed the chronic duration of exposure MRL for the ingestion of inorganic cadmium (0.1 µg/kg/day).

Assuming that the bioavailability of the inorganic cadmium in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic cadmium (whether in soil or dissolved in water), it can be concluded that, without an appreciable risk of adverse health effects, the intermediate duration of exposure MRL for the ingestion of inorganic cadmium (whether in soil or dissolved in water) will not be exceeded by 15 to 365 days of daily accidental or intentional ingestion of:

2.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with any body weight.

12.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body > 2 kg.

125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 20 kg.

Assuming that the bioavailability of the inorganic cadmium in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic cadmium (dissolved in water), it can be concluded that, without an appreciable risk of adverse health effects, the chronic duration of exposure MRL for the ingestion of inorganic cadmium (dissolved in water) will not be exceeded by over 1 year of daily accidental or intentional ingestion of:

2.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 2 kg.

12.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 10 kg.

125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 100 kg.

Daily accidental or intentional ingestion of as much as 1.23 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for over 1 year will not exceed the chronic duration of exposure MRL for the ingestion of inorganic cadmium (0.1 µg/kg/day).

Lifelong daily ingestion of the inorganic cadmium in as much as 12.3 g of Midnight Minerals Rich Earth Onyx Clay Mask is likely to be without an appreciable risk of deleterious health effects during a lifetime.

Assuming that the bioavailability of the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic cadmium (whether in soil or dissolved in water), it can be concluded that, without an appreciable risk of adverse health effects, the intermediate duration of exposure MRL for the ingestion of inorganic cadmium (dissolved in water) will not be exceeded by 15 to 365 days of daily topical application of:

2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with any body weight.

12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 2 kg.

125 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 20 kg.

Daily topical application of as much as 6.17 g of Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for 14 days or less will not exceed the intermediate duration of exposure MRL for the ingestion of inorganic cadmium (0.5 µg/kg/day).

Assuming that the bioavailability of the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic cadmium (in soil), it can be concluded that, without an appreciable risk of adverse health effects, the intermediate duration of exposure relative bioavailability-adjusted MRL for topically applied inorganic cadmium (in soil) will not be exceeded by 15 to 365 days of daily topical application of:

Either 2.5 g or 12.5 g, of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with any body weight.

125 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights greater than about 1 kg.

Daily topical application of as much as 90.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for 15 to 365 days will not exceed the relative bioavailability-adjusted acute duration of exposure MRL for the ingestion of inorganic cadmium in dry Midnight Minerals Rich Earth Onyx Clay Mask (7.33 $\mu\text{g iCd/kg/day}$).

Assuming that the bioavailability of topically applied inorganic cadmium (in soil) is the same as the bioavailability of ingested inorganic cadmium (dissolved in water) and that the bioavailability of the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic cadmium (in soil), it can be concluded that, without an appreciable risk of adverse health effects, the chronic duration of exposure MRL for ingested inorganic cadmium (dissolved in water) will not be exceeded by over 1 year of daily topical application of:

2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 2 kg.

12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights >10 kg.

125 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 102 kg.

Daily topical application of as much as 1.23 g of Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for over 1 year will not exceed the chronic duration of exposure MRL for the ingestion of inorganic cadmium (0.1 $\mu\text{g iCd/kg/day}$).

Assuming that the relative bioavailability of the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability of inorganic cadmium (in soil) and that the relative bioavailability of inorganic cadmium (in soil) is 6.82% of the bioavailability of inorganic cadmium (dissolved in water), it can be concluded that, without an appreciable risk of adverse health effects, the relative bioavailability-adjusted chronic duration of exposure MRL for ingested inorganic cadmium (in soil) will not be exceeded by over 1 year of daily topical application of:

Either 2.5 g or 12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with any body weight.

125 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 7 kg.

Daily topical application of as much as 18.15 g of Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for over 1 year will not exceed the relative bioavailability-adjusted chronic duration of exposure MRL for topically applied inorganic cadmium in Midnight Minerals Rich Earth Onyx Clay Mask (1.47 µg iCd/kg/day).

MERCURY

Midnight Minerals Rich Earth Onyx Clay Mask contains 0.058 ppm inorganic mercury, well below the FDA-mandated limit of 1 ppm inorganic mercury for topically applied creams and ointments.

Assuming that the bioavailability of the inorganic mercury in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic mercury (dissolved in water), it can be concluded that, without an appreciable risk of adverse health effects, the acute duration of exposure MRL for the ingestion of inorganic mercury (dissolved in water) will not be exceeded by 14 days or less of daily accidental or intentional ingestion of either 2.5 g, 12.5 g, or 125 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by individuals with any body weight.

Daily accidental or intentional ingestion of as much as 121 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for 14 days or less will not exceed the acute duration of exposure MRL for the ingestion of inorganic mercury (7 µg/kg/day).

172,414 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask can be ingested at one time without exceeding the minimum lethal dose of ingested inorganic mercury (dissolved in water) of 10,000 µg iHg.

Assuming that the bioavailability of the inorganic mercury in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic mercury (dissolved in water), it can be concluded that, without an appreciable risk of adverse health effects, the estimated approximate chronic duration of exposure MRL for the ingestion of inorganic mercury (dissolved in water) will not be exceeded by over 1 year of daily accidental or intentional ingestion of:

2.5 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by individuals with any body weight.

12.5 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 5 kg.

125 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 55 kg.

Daily accidental or intentional ingestion of as much as 34.5 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) per kg of body weight for over 1 year will not exceed the chronic duration of exposure MRL for the ingestion of inorganic mercury (2 µg/kg/day).

Assuming that the bioavailability of the inorganic mercury in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic mercury (dissolved in water), it can be concluded that daily accidental or intentional acute ingestion of either 2.5 g, 12.5 g, or 125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less by individuals with any body weight will not exceed the acute duration of exposure MRL for the ingestion of inorganic mercury (dissolved in water) and is likely to be without an appreciable risk of adverse health effects.

Daily accidental or intentional ingestion of as much as 121 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for 14 days or less will not exceed the acute duration of exposure MRL for the ingestion of inorganic mercury (7 µg/kg/day).

172,414 g of dry Midnight Minerals Rich Earth Onyx Clay Mask can be ingested at one time without exceeding the minimum lethal dose of ingested inorganic mercury (dissolved in water) of 10,000 µg iHg.

Assuming that the bioavailability of the inorganic mercury in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic mercury (dissolved in water), it can be concluded that, without an appreciable risk of adverse health effects, the estimated approximate chronic duration of exposure MRL for the ingestion of inorganic mercury (in soil) will not be exceeded by over 1 year of daily accidental or intentional ingestion of:

2.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with any body weight.

12.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 5 kg.

125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 55 kg.

Assuming that the relative bioavailability of the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic mercury (dissolved in water), it can be concluded that the daily topical application of either 2.5 g, 12.5 g, or 125 g of Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less will not exceed the acute duration of exposure MRL for the ingestion of inorganic mercury (in soil) for any body weight and is likely to be without an appreciable risk of adverse health effects.

172,414 g of Midnight Minerals Rich Earth Onyx Clay Mask can be applied topically at one time without exceeding the minimum lethal dose of ingested inorganic mercury (dissolved in water) of 10,000 µg iHg.

Assuming that the relative bioavailability of the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability of topically applied inorganic mercury in soil, it can be concluded that the daily topical application of either 2.5 g, 12.5 g, or 125 g of Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less by individuals with any body weight will not exceed the relative bioavailability-adjusted acute duration of exposure MRL for topically applied inorganic mercury (in soil) (140 µg iHg/kg/day) and is likely to be without an appreciable risk of adverse health effects.

Daily topical application of as much as 2,759 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for 14 days or less will not exceed the relative bioavailability-adjusted acute duration of exposure MRL for the ingestion of inorganic mercury (in soil) (160 µg/kg/day).

3,448,276 g of Midnight Minerals Rich Earth Onyx Clay Mask can be applied topically at one time without exceeding the minimum lethal dose of ingested inorganic mercury (dissolved in water) of 10,000 µg iHg.

Assuming that the bioavailability of topically applied inorganic mercury (in soil) is the same as the bioavailability of ingested organic mercury (dissolved in water) and that the bioavailability of the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic mercury (in soil), it can be concluded that, without an appreciable risk of adverse health effects, the estimated chronic duration of exposure MRL for topically applied inorganic mercury (in soil) will not be exceeded by over 1 year of daily topical application of:

2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with any body weights.

12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 4 kg.

125 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 55 kg.

Daily topical application of as much as 2.29 g of Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for over 1 year will not exceed the estimated chronic duration of exposure MRL for the ingestion of inorganic mercury (0.133 µg/kg/day).

Assuming that the relative bioavailability of the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability of inorganic mercury (in soil) and that the relative bioavailability of inorganic mercury (in soil) is 5% of the bioavailability of inorganic mercury (dissolved in water), it can be concluded that, without an appreciable risk of adverse health effects, the relative bioavailability-adjusted estimated chronic duration of exposure MRL for ingested inorganic mercury (in soil) will not be exceeded by over 1 year of daily topical application of:

Either 2.5 g or 12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with any body weight.

125 g of Midnight Minerals Rich Earth Onyx Clay Mask by individuals with body weights > 4 kg.

LEAD

In the absence of any other US standards, the FDA “interim reference level” for lead ingested in food or drink (including water) of 3 µg of lead per day for children and an “interim reference level” for lead ingested in food or drink (including water) of 12.5 µg of lead per day for adults (including pregnant and lactating women and the CDC recommended maximum increase in the blood inorganic lead concentration of 1 µg Pb/dL of blood will serve as the referents for evaluating the exposure to the inorganic lead in Midnight Minerals Rich Earth Onyx Clay Mask.

Assuming that the bioavailability of ingested inorganic lead (in soil) in children is the same as the bioavailability of ingested inorganic lead (dissolved in water) in children and assuming that the bioavailability of the inorganic lead in ingested dissolved or dry Midnight Minerals Rich Earth Onyx Clay Mask in children is the same as the bioavailability of ingested inorganic lead (dissolved in water or in soil) in children, and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 3.101 µg of inorganic lead, it can be concluded that:

The amount of dissolved or dry Midnight Minerals Rich Earth Onyx Clay Mask that can be accidentally or intentionally ingested by children without exceeding the “interim reference level” (3 µg/day) for the ingestion of inorganic lead (dissolved in water or in soil) by children with any body weight is 0.967 g/day.

Accidental or intentional ingestion of either 2.5 g, 12.5 g, or 125 g of dissolved or dry Midnight Minerals Rich Earth Onyx Clay Mask by children may exceed the “interim reference level” for the ingestion of inorganic lead (dissolved in water or in soil) by children with any body weight (3 µg/day).

Assuming that the bioavailability of ingested inorganic lead (in soil) in adults is the same as the bioavailability of ingested inorganic lead (dissolved in water) in adults and assuming that the bioavailability of the inorganic lead in ingested dissolved or dry Midnight Minerals Rich Earth Onyx Clay Mask in adults is the same as the bioavailability of ingested inorganic lead (dissolved in water or in soil) in adults, and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 3.101 µg of inorganic lead, it can be concluded that:

The amount of dissolved or dry Midnight Minerals Rich Earth Onyx Clay Mask that can be accidentally or intentionally ingested without exceeding the “interim reference level” (12.5 µg/day) for the ingestion of inorganic lead (dissolved in water or in soil) by adults (including pregnant and lactating women) with any body weight is 4.031 g/day.

Accidental or intentional ingestion of 2.5 g of dissolved or dry Midnight Minerals Rich Earth Onyx Clay Mask by adults will not exceed the “interim reference level” for the ingestion of inorganic lead (dissolved in water or in soil) by adults (including pregnant and lactating women) with any body weight

(12.5 µg iPb/day).

Accidental or intentional ingestion of either 12.5 g or 125 g of dissolved or dry Midnight Minerals Rich Earth Onyx Clay Mask by adults may exceed the “interim reference level” for the ingestion of inorganic lead (dissolved in water or in soil) by adults (including pregnant and lactating women) with any body weight (12.5 µg iPb/day).

Using the accepted ratio that 1 µg of ingested inorganic lead acutely raises the blood inorganic lead concentration by 0.166 µg Pb/dL of blood in children and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 3.101 µg of inorganic lead, the accidental or intentional ingestion of up to 1.94g of dissolved or dry Midnight Minerals Rich Earth Onyx Clay Mask by children will not increase the blood inorganic lead concentration by more than the 1 µg Pb/dL of blood that is considered to increase the risk of experiencing adverse effects.

Using the accepted ratio that 1 µg of ingested inorganic lead acutely raises the blood inorganic lead concentration by 0.04 µg Pb/dL of blood in adults and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 3.101 µg of inorganic lead, the accidental or intentional ingestion of up to 8.06 g of dissolved or dry Midnight Minerals Rich Earth Onyx Clay Mask by adults will not increase the blood inorganic lead concentration by more than the 1 µg Pb/dL of blood that is considered to increase the risk of experiencing adverse effects.

Assuming that the amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be repeatedly applied topically without exceeding the approximate “topical interim reference level” (500 µg iPb/day) for the repeated topical application of inorganic lead (in soil) to children with any body weight is 161 g, it can be concluded that repeated topical application of either 2.5 g, 12.5 g, or 125 g of Midnight Minerals Rich Earth Onyx Clay Mask will not exceed the “topical interim reference level” for the repeated topical application of inorganic lead (in soil) to children with any body weight (500 µg iPb/day).

Using the accepted ratio that 1 µg of ingested inorganic lead acutely raises the blood inorganic lead concentration by 0.166 µg Pb/dL of blood in children, assuming that the relative bioavailability of the inorganic lead in topically applied Midnight Minerals Rich Earth Onyx Clay Mask can be estimated to be about 0.6% of the bioavailability of ingested inorganic lead (dissolved in water) in children, and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 3.101 µg of inorganic lead, the topical application of up to 323 g of Midnight Minerals Rich Earth Onyx Clay Mask by children will not increase the blood inorganic lead concentration by more than the 1 µg Pb/dL of blood that is considered to increase the risk of experiencing adverse effects.

Repeated topical application of either 2.5 g, 12.5 g, or 125 g of Midnight Minerals Rich Earth Onyx Clay Mask will not produce increases in the blood inorganic lead concentration in children in excess of the increase of 1 µg iPb/dL of blood that is considered to increase the risk of experiencing adverse effects.

Assuming that the amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be repeatedly applied topically without exceeding the approximate “topical interim reference level” (417 µg iPb/day) for the repeated topical application of inorganic lead (in soil) to adults with any body weight is 134.5 g, it can be concluded that repeated topical application of either 2.5 g, 12.5 g, or 125 g of Midnight Minerals Rich Earth Onyx Clay Mask will not exceed the “topical interim reference level” for the repeated topical application of inorganic lead (dissolved in water) to adults with any body weight (417 µg iPb/day).

Using the ratio that 1 µg of ingested inorganic lead acutely raises the blood inorganic lead concentration by 0.04 µg Pb/dL of blood in adults, assuming that the relative bioavailability of the inorganic lead in topically applied Midnight Minerals Rich Earth Onyx Clay Mask can be estimated to be about 3% of the bioavailability of ingested inorganic lead (dissolved in water) in adults, and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 3.101 µg of inorganic lead, the topical application of up to 268 g of Midnight Minerals Rich Earth Onyx Clay Mask by adults will not increase the blood inorganic lead concentration by more than the 1 µg Pb/dL of blood that is considered to increase the risk of experiencing adverse effects.

Repeated topical application of either 2.5 g, 12.5 g, or 125 g of Midnight Minerals Rich Earth Onyx Clay Mask will not produce increases in the blood inorganic lead concentration in adults in excess of the increase of 1 µg iPb/dL of blood that is considered to increase the risk of experiencing adverse effects.

Midnight Minerals Rich Earth Onyx Clay Mask contains 3.101 ppm inorganic lead, well below the FDA- and ICCR mandated limit of 10 ppm inorganic lead for topically applied creams and ointments.

The Safety of the Inorganic Arsenic (As) in Midnight Minerals Rich Earth Onyx Clay Mask Powder

When arsenic (dissolved in water) was intentionally or accidentally ingested, the efficiency of gastrointestinal absorption of ingested inorganic arsenic (dissolved in water) was reported to range between 55% and 95% in humans.^{1,2,3,4,5,6} The International Agency for Research on Cancer of the World Health Organization (IARC) has recommended using 96% in the absence of sample specific data.⁷ The efficiency of the gastrointestinal absorption of ingested inorganic arsenic in large numbers of soil samples has been estimated to be between 1% and 80% as efficient as the gastrointestinal absorption of ingested inorganic arsenic (dissolved in water).^{6,8-17} The EPA has recommended using 60% to estimate the oral relative bioavailability (RBA) of inorganic arsenic in humans in the absence of sample specific data.

Exposure to inorganic arsenic does not necessarily mean that adverse health effects will result; toxicity of exposure to inorganic arsenic depends on dose and duration of oral exposure. A Minimal Risk Level (MRL) is defined as an estimate of daily human exposure to a substance that is likely to be without an appreciable risk of adverse health effects over a specified duration of exposure and is determined by the US Agency for Toxic Substances and Disease Registry of the

Centers for Disease Control and Prevention (ATSDR).¹⁸ Although the term, MRL, may seem to imply a slight level of risk, MRLs are, in fact, considered to represent safe levels of exposure for all populations, including sensitive subgroups. MRLs are derived when reliable and sufficient data exist to identify the target organ(s) of effect or the most sensitive health effect(s) for a specific duration within a given route of exposure. MRLs are based on noncancerous health effects only and do not consider carcinogenic effects. MRLs can be derived for acute (daily for 14 days or less), intermediate (daily for 15 days to 365 days), and chronic (daily for over 1 year) duration exposures for inhalation and oral routes of exposure. Appropriate methodology does not exist to develop MRLs for dermal exposure. An MRL is set below a level of exposure that might cause adverse health effects in the people most sensitive to such substance-induced effects and is neither a threshold for toxicity nor a level beyond which toxicity is likely to occur. Nonetheless, MRLs are the current standard against which to evaluate exposures to arsenic. The ATSDR has derived an acute duration of exposure (daily for 14 days or less) MRL for ingested inorganic arsenic (iAs) (dissolved in water) of 5 µg iAs/kg/day and a chronic duration of exposure (daily for over 1 year) MRL for ingested inorganic arsenic (dissolved in water) of 0.3 µg iAs/kg/day.^{19,20} The ATSDR has not derived an intermediate duration of exposure (daily for 15 to 365 days) MRL for ingested inorganic arsenic, or any MRLs for ingested organic arsenic or for acute, intermediate, or chronic dermal exposure to organic or inorganic arsenic compounds.¹⁹⁻²¹

The ATSDR^{19,20} and the US Environmental Protection Agency (EPA)²² have concluded that no adverse effects have been reported in adult humans routinely consuming up to 0.8 µg iAs/kg of body weight daily (an approximate total of 40 µg iAs to 80 µg iAs daily). In addition, the ATSDR has determined that chronic daily intakes of as much as 0.3 µg of iAs/kg of body weight (an approximate total of 15 µg iAs to 30 µg iAs daily) should not produce any adverse effects in adult humans.^{21,23} The EPA has derived a chronic oral reference dose (RfD; an estimate (with 14 uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious health effects during a lifetime) of 0.3 µg iAs/kg/day.²² EPA has calculated that the risk for developing any cancer increases by 0.15% per µg/kg of continuous daily inorganic arsenic ingestion over a lifetime.^{22,24} The Department of Complementary and Alternative Medicines and Traditional Medicines, Federal Institute for Drugs and Medical Devices, (Bonn, Germany) has established an Acceptable Amount per Day of chronic inorganic arsenic ingestion via homeopathic medicines of 0.3 µg iAs/kg/day.²⁵

There is no FDA-mandated limit on the inorganic arsenic content of creams and ointments. Case reports of death in humans due to ingestion of high doses of arsenic include lethal doses that ranged from 22,000 µg iAs/kg to 121,000 µg iAs/kg in cases where known amounts were ingested as a single bolus^{26,27} and estimates of the minimum lethal dose of ingested arsenic include 70,000 µg iAs to 180,000 µg iAs (about 1,000 µg iAs/kg to 3,000 µg iAs/kg) acutely by adults, µg iAs/kg/day ingested chronically by adults, and 50 µg iAs/kg/day to 100 µg iAs/kg/day ingested chronically by children.^{19,28,29} Chronic studies observed treatment-related mortality in monkeys that ingested 3,000 µg iAs/kg/day as arsenate,³⁰ dogs that

ingested 2,400 µg iAs/kg/day as arsenite or arsenate,³¹ and rats that ingested 30,000 µg iAs/kg/day as lead arsenate.³²

Although adverse effects from dermal exposure to inorganic or organic arsenicals have not been extensively investigated, there have been no reports of death, cancer, or adverse respiratory, cardiovascular, gastrointestinal, hematological, musculoskeletal, hepatic, renal, endocrine, ocular, or body weight effects in humans after dermal exposure to inorganic arsenicals.¹⁹

Reflecting the absence of any data upon which to be an estimate of the toxicity of organic arsenic-containing compounds at the time (2001), the Institute of Medicine Food and Nutrition Board has declined to establish a Tolerable Upper Limit for inorganic or organic arsenic compounds (a Tolerable Upper Limit is the greatest amount of daily intake that is likely to pose no risk of adverse health effects for almost all individuals).³³ On the other hand, the Institute of Medicine Food and Nutrition Board has concluded that there is evidence that arsenic plays a beneficial role in some physiological processes and that data from limited human studies suggest beneficial roles for arsenic.³³ In addition, there is evidence that arsenic plays a facilitative role in the hepatic conversion of SAH to SAM^{34,35} and may be required for some of the methylation/demethylation reactions that regulate DNA transcription and gene expression^{33,36,37} and proper methionine metabolism.³⁶ The Food and Nutrition Board of the National Research Council has recognized the essentiality of arsenic for proper growth and reproductive performance, although the Board was unable to determine a Recommended Daily Allowance for this trace element.³³

The daily human requirement for inorganic arsenic appears to be 12 µg to 25 µg.^{34,36-39} Reports suggest that average-to-below average total adult or childhood daily arsenic consumption from all sources does not affect the risks for developing: asthma, chronic bronchitis, emphysema, chronic cough, wheezing, or phlegm production;⁴⁰ dementia;⁴¹ low birth weight, preterm delivery, or decreased birth size;⁴² preeclampsia;⁴³ spontaneous miscarriage;⁴⁴ elevated resting systolic or diastolic blood pressures;^{45,46} hypertension;⁴⁶ insulin resistance;⁴⁷ glomerular damage;⁴⁸ or endometriosis.⁴⁹

Arsenic trioxide (As₂O₃) exhibits general anticancer potency.⁵⁰ Human acute promyelocytic leukemia (PML) is especially sensitive to intravenous infusions of As₂O₃, which has been approved by the US Food and Drug Administration for the treatment of PML.⁵¹ Human PML cells exposed to As₂O₃ exhibit reduced GSH activity, increased intracellular H₂O₂ content, reduced cellular mitochondrial membrane potential, increased release of cytochrome c into the cytoplasm, activation of caspase 3, fragmentation of DNA, and apoptosis.⁵²⁻⁵⁴ In double-blind, randomized, placebo-controlled human clinical trials, patients with PML who received intravenous infusions of As₂O₃ (150 µg per kg body weight infused over 5 hours, daily) experienced disease remission (90% or more) and 5-year disease-free survival rates of 95% or more.⁵⁵⁻⁵⁸ Some patients remained in remission for at least 14 years, when their clinical status was published.⁵⁸

In human studies of arsenic nutrition, telomere lengths in circulating leukocytes⁵⁹ and mononuclear cells⁶⁰ were directly proportional to urinary total arsenic excretion (a presumptive indicator of arsenic intake). Men and women with PML have been found to have, on average, shorter telomeres in their peripheral blood mononuclear cells, with the likelihood of complete remission and survival directly proportional to telomere length in these cells.⁶¹ In addition, within the cancer cells themselves, As₂O₃ treatment enhanced the survival of replacement nonleukemic cells with longer telomere lengths, allowing a greater percentage of cancer cells to achieve apoptotic death more rapidly, increasing the likelihood of their replacement by noncancerous cells, and increasing the chances of remission and reducing the risk of relapse.⁶¹

Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 ppm inorganic arsenic (iAs).⁶²
1.521 ppm = 1.521 µg/g; therefore:

1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains (1.521 µg iAs/g)(1 g) =
1.521 µg iAs

2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask contains (1.521 µg iAs/g)(2.5 g) =
3.8025 µg iAs

12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask contains (1.521 µg iAs/g)(12.5 g)
= 19.0125 µg iAs

125 g of Midnight Minerals Rich Earth Onyx Clay Mask contains (1.521 µg iAs/g)(125 g) =
190.125 µg iAs

Acute Ingestion of Inorganic Arsenic in Midnight Minerals Rich Earth Onyx Clay Mask
Powder (completely dissolved in water).

Given the acute duration of exposure MRL for ingested inorganic arsenic (dissolved in water) of 5 µg iAs/kg/day, the amount of inorganic arsenic (dissolved in water) that can be ingested daily without exceeding the acute duration of exposure MRL for ingested inorganic arsenic (dissolved in water) of 5 µg iAs/kg/day can be calculated for individuals with different body weights:

1 kg bw: (1 kg)(5 µg iAs/kg/day) = 5 µg of iAs/day

10 kg bw: (10 kg)(5 µg iAs/kg/day) = 50 µg of iAs/day

20 kg bw: (20 kg)(5 µg iAs/kg/day) = 100 µg of iAs/day

30 kg bw: (30 kg)(5 µg iAs/kg/day) = 150 µg of iAs/day

40 kg bw: (40 kg)(5 µg iAs/kg/day) = 200 µg of iAs/day

50 kg bw: (50 kg)(5 µg iAs/kg/day) = 250 µg of iAs/day

60 kg bw: (60 kg)(5 µg iAs/kg/day) = 300 µg of iAs/day

70 kg bw: (70 kg)(5 µg iAs/kg/day) = 350 µg of iAs/day

80 kg bw: (80 kg)(5 µg iAs/kg/day) = 400 µg of iAs/day

90 kg bw: (90 kg)(5 µg iAs/kg/day) = 450 µg of iAs/day

100 kg bw: (100 kg)(5 µg iAs/kg/day) = 500 µg of iAs/day

Assuming that the bioavailability of the inorganic arsenic in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic arsenic (dissolved in water) and given that 1 g of Midnight Minerals Rich Earth Onyx

Clay Mask contains 1.521 µg of inorganic arsenic, the amount of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) that can be ingested daily before exceeding the acute duration of exposure MRL for ingested inorganic arsenic of 5 µg iAs/kg/day can be calculated for individuals with different body weights:

1 kg bw: $(5 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 3.3 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

10 kg bw: $(50 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 33.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

20 kg bw: $(100 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 66.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

30 kg bw: $(150 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 99.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

40 kg bw: $(200 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 132.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

50 kg bw: $(250 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 165.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

60 kg bw: $(300 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 198.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

70 kg bw: $(350 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 230.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

80 kg bw: $(400 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 263.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

90 kg bw: $(450 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 296.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

100 kg bw: $(500 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 329.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the bioavailability of the inorganic arsenic in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic arsenic (dissolved in water), it can be concluded that 1) daily accidental or intentional acute ingestion of 2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) for 14 days or less by individuals with any body weight will not exceed the acute duration of exposure MRL for the ingestion of inorganic arsenic and is likely to be without an appreciable risk of adverse health effects in those individuals; 2) daily accidental or intentional acute ingestion of 12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) for 14 days or less by individuals with body weights greater than about 4 kg will not exceed the acute duration of exposure MRL for the ingestion of inorganic arsenic and is likely to be without an appreciable risk of adverse health effects in those individuals; and 3) daily accidental or intentional acute ingestion of 125 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) for 14 days or less by individuals with body weights greater than about 38 kg will not exceed the acute duration of exposure MRL for the ingestion of inorganic arsenic and is likely to be without an appreciable risk of adverse health effects in those individuals.

Given that over 95% of the adult women of any race or age in the US weigh more than 44 kg,(new ref 63) it can be concluded that the daily accidental or intentional ingestion of the inorganic arsenic in up to 125 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less by an adult woman is unlikely to produce adverse health effects.

Given that over 95% of the adult men of any race or age in the US weigh more than 48 kg,(new ref 63) it can be concluded that the daily accidental or intentional ingestion of the inorganic arsenic in up to 125 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less by an adult man is unlikely to produce adverse health effects.

Assuming that the bioavailability of the inorganic arsenic in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic arsenic (dissolved in water) and because 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 µg of inorganic arsenic, daily accidental or intentional ingestion of as much as 3.287 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) per kg of body weight for 14 days or less will not exceed the acute duration of exposure MRL for the ingestion of inorganic arsenic (5 µg/kg/day).

Assuming that the bioavailability of the inorganic arsenic in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic arsenic (dissolved in water) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 µg of inorganic arsenic, the amount of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) that can be ingested at one time without exceeding the minimum lethal dose of ingested inorganic arsenic of 1,000 µg iAs is $(1,000 \mu\text{g iAs}) / (1.521 \mu\text{g iAs/g}) = 658 \text{ g}$ Midnight Minerals Rich Earth Onyx Clay Mask.

1 kg bw: $(0.3 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 0.20 \text{ g}$ of Midnight Minerals Rich Earth Onyx Clay Mask/day

10 kg bw: $(3.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 1.97 \text{ g}$ of Midnight Minerals Rich Earth Onyx Clay Mask/day

20 kg bw: $(6.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 3.94 \text{ g}$ of Midnight Minerals Rich Earth Onyx Clay Mask/day

30 kg bw: $(9.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 5.92 \text{ g}$ of Midnight Minerals Rich Earth Onyx Clay Mask/day

40 kg bw: $(12.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 7.89 \text{ g}$ of Midnight Minerals Rich Earth Onyx Clay Mask/day

50 kg bw: $(15.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 9.86 \text{ g}$ of Midnight Minerals Rich Earth Onyx Clay Mask/day

60 kg bw: $(18.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 11.83 \text{ g}$ of Midnight Minerals Rich Earth Onyx Clay Mask/day

70 kg bw: $(21.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 13.81 \text{ g}$ of Midnight Minerals Rich Earth Onyx Clay Mask/day

80 kg bw: $(24.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 15.78 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

90 kg bw: $(27.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 17.75 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

100 kg bw: $(30.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 19.72 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the bioavailability of the inorganic arsenic in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic arsenic (dissolved in water), it can be concluded that 1) daily accidental or intentional ingestion of 2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) for over 1 year by individuals with body weights greater than about 12.5 kg will not exceed the chronic duration of exposure MRL for the ingestion of inorganic arsenic and is likely to be without an appreciable risk of adverse health effects in those individuals; 2) daily accidental or intentional ingestion of 12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) for over 1 year by individuals with body weights greater than about 63 kg will not exceed the chronic duration of exposure MRL for the ingestion of inorganic arsenic and is likely to be without an appreciable risk of adverse health effects in those individuals; and 3) daily accidental or intentional ingestion of 125 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) for over 1 year by individuals with any body weight will exceed the chronic duration of exposure MRL for the ingestion of inorganic arsenic.

Assuming that the bioavailability of the inorganic arsenic in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic arsenic (dissolved in water) and because 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 μg of inorganic arsenic, daily accidental or intentional ingestion of as much as 0.197 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) per kg of body weight for over 1 year will not exceed the chronic duration of exposure MRL for the ingestion of inorganic arsenic (0.3 $\mu\text{g/kg/day}$).

Assuming that the bioavailability of the inorganic arsenic in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic arsenic (dissolved in water) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 μg of inorganic arsenic, and given that the inorganic arsenic in 1 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) ingested every day over an entire lifetime may increase the risk of developing any cancer by as much as 0.23%, as much as 4.39 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) per kg of body weight can be ingested daily over an entire lifetime (an extremely unlikely event) without increasing the risk for developing any cancer by 1%.

Acute Ingestion of Inorganic Arsenic in Dry Midnight Minerals Rich Earth Onyx Clay Mask Powder. Given the acute duration of exposure MRL for ingested inorganic arsenic (dissolved in water) of 5 $\mu\text{g iAs/kg/day}$, the amount of inorganic arsenic (dissolved in water) that can be ingested daily without exceeding the acute duration of exposure MRL for ingested inorganic arsenic of 5 $\mu\text{g iAs/kg/day}$ can be calculated for individuals with different body weights:

1 kg bw: (1 kg)(5 µg iAs/kg/day) = 5 µg of iAs/day
10 kg bw: (10 kg)(5 µg iAs/kg/day) = 50 µg of iAs/day
20 kg bw: (20 kg)(5 µg iAs/kg/day) = 100 µg of iAs/day
30 kg bw: (30 kg)(5 µg iAs/kg/day) = 150 µg of iAs/day
40 kg bw: (40 kg)(5 µg iAs/kg/day) = 200 µg of iAs/day
50 kg bw: (50 kg)(5 µg iAs/kg/day) = 250 µg of iAs/day
60 kg bw: (60 kg)(5 µg iAs/kg/day) = 300 µg of iAs/day
70 kg bw: (70 kg)(5 µg iAs/kg/day) = 350 µg of iAs/day
80 kg bw: (80 kg)(5 µg iAs/kg/day) = 400 µg of iAs/day
90 kg bw: (90 kg)(5 µg iAs/kg/day) = 450 µg of iAs/day
100 kg bw: (100 kg)(5 µg iAs/kg/day) = 500 µg of iAs/day

Assuming that the bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic arsenic (dissolved in water) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 µg of inorganic arsenic, the amount of dry Midnight Minerals Rich Earth Onyx Clay Mask that can be ingested daily before exceeding the acute duration of exposure MRL for ingested inorganic arsenic of 5 µg iAs/kg/day can be calculated for individuals with different body weights:

1 kg bw: (5 µg of iAs/day)/(1.521 µg iAs/g) = 3.3 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
10 kg bw: (50 µg of iAs/day)/(1.521 µg iAs/g) = 33.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
20 kg bw: (100 µg of iAs/day)/(1.521 µg iAs/g) = 66.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
30 kg bw: (150 µg of iAs/day)/(1.521 µg iAs/g) = 99.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
40 kg bw: (200 µg of iAs/day)/(1.521 µg iAs/g) = 132.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
50 kg bw: (250 µg of iAs/day)/(1.521 µg iAs/g) = 165.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
60 kg bw: (300 µg of iAs/day)/(1.521 µg iAs/g) = 198.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
70 kg bw: (350 µg of iAs/day)/(1.521 µg iAs/g) = 230.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
80 kg bw: (400 µg of iAs/day)/(1.521 µg iAs/g) = 263.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
90 kg bw: (450 µg of iAs/day)/(1.521 µg iAs/g) = 296.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
100 kg bw: (500 µg of iAs/day)/(1.521 µg iAs/g) = 329.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day

From these data and calculations, assuming that the bioavailability of the inorganic arsenic in

ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic arsenic (dissolved in water), it can be concluded that 1) daily accidental or intentional acute ingestion of 2.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less by individuals with any body weight will not exceed the acute duration of exposure MRL for the ingestion of inorganic arsenic and is likely to be without an appreciable risk of adverse health effects in those individuals; 2) daily accidental or intentional acute ingestion of 12.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less by individuals with body weights greater than about 4 kg will not exceed the acute duration of exposure MRL for the ingestion of inorganic arsenic and is likely to be without an appreciable risk of adverse health effects in those individuals; and 3) daily accidental or intentional acute ingestion of 125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less by individuals with body weights greater than about 38 kg will not exceed the acute duration of exposure MRL for the ingestion of inorganic arsenic and is likely to be without an appreciable risk of adverse health effects in those individuals.

Assuming that the bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic arsenic (dissolved in water) and because 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 µg of inorganic arsenic, daily accidental or intentional ingestion of as much as 3.287 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for 14 days or less will not exceed the acute duration of exposure MRL for the ingestion of inorganic arsenic (5µg/kg/day).

Assuming that the bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic arsenic (dissolved in water) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 µg of inorganic arsenic, the amount of dry Midnight Minerals Rich Earth Onyx Clay Mask that can be ingested at one time without exceeding the minimum lethal dose of ingested inorganic arsenic of 1,000 µg iAs is $(1,000 \mu\text{g iAs}) / (1.521 \mu\text{g iAs/g}) = 658 \text{ g}$ Midnight Minerals Rich Earth Onyx Clay Mask.

However, because MRLs for the ingestion of a substance reflect a dose-response relationship that is independent of the efficiency of the gastrointestinal absorption of a substance but are based on clinical outcomes or biomarkers of clinical outcomes that presume relative constancy in that efficiency, a decrease in the efficiency of the gastrointestinal absorption of ingested inorganic arsenic (in soil), compared to the efficiency of the gastrointestinal absorption of ingested inorganic arsenic (dissolved in water), will increase the amount of inorganic arsenic that can be ingested before those referent outcomes will appear. In effect, the exposure duration-dependent MRL for ingested inorganic arsenic (in soil) will be increased in proportion to the relative decrease in the bioavailability of ingested inorganic arsenic (in soil) compared to the bioavailability of ingested inorganic arsenic (dissolved in water). A relative bioavailability adjusted acute duration of exposure MRL for the ingestion of inorganic arsenic (in soil) can be estimated.

Assuming that the efficiency of the gastrointestinal absorption of ingested inorganic arsenic (in soil) into human blood may be about 60%¹⁰ and the efficiency of gastrointestinal absorption of ingested inorganic arsenic (dissolved in water) into human blood may be 96%,⁷ correcting the acute duration of exposure MRL for ingested inorganic arsenic (dissolved in water) of 5 µg iAs/kg/day for the less efficient gastrointestinal absorption of ingested inorganic arsenic (in soil) into the blood (60%) compared to the efficiency of the gastrointestinal absorption of ingested inorganic arsenic (dissolved in water) into the blood (96%), a relative gastrointestinal absorption efficiency (relative bioavailability; RBA) of 58% (60%/96%) for ingested inorganic arsenic (in soil) can be estimated. After adjusting the acute duration of exposure MRL for ingested inorganic arsenic (dissolved in water) to account for the RBA of 58% for ingested inorganic arsenic (in soil), a relative bioavailability-adjusted acute duration of exposure MRL for ingested inorganic arsenic (in soil) can be calculated: $[(5 \mu\text{g iAs/kg/day})/(0.58)] = 8.6 \mu\text{g iAs/kg/day}$.

Assuming that the relative bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask may be about 58% of the bioavailability of the inorganic arsenic in dissolved Midnight Minerals Rich Earth Onyx Clay Mask, and given the relative bioavailability-adjusted acute duration of exposure MRL for ingested inorganic arsenic (in soil) (8.6 µg iAs/kg/day), the amount of inorganic arsenic in dry Midnight Minerals Rich Earth Onyx Clay Mask that can be ingested daily for 14 days or less without exceeding the relative bioavailability-adjusted acute duration of exposure MRL for ingested inorganic arsenic (in soil) of 8.6 µg iAs/kg/day can be calculated for individuals with different body weights:

- 1 kg bw: (1 kg)(8.6 µg iAs/kg/day) = 8.6 µg of iAs/day
- 10 kg bw: (10 kg)(8.6 µg iAs/kg/day) = 86.0 µg of iAs/day
- 20 kg bw: (20 kg)(8.6 µg iAs/kg/day) = 172.0 µg of iAs/day

- 30 kg bw: (30 kg)(8.6 µg iAs/kg/day) = 258.0 µg of iAs/day
- 40 kg bw: (40 kg)(8.6 µg iAs/kg/day) = 344.0 µg of iAs/day
- 50 kg bw: (50 kg)(8.6 µg iAs/kg/day) = 430.0 µg of iAs/day
- 60 kg bw: (60 kg)(8.6 µg iAs/kg/day) = 516.0 µg of iAs/day
- 70 kg bw: (70 kg)(8.6 µg iAs/kg/day) = 602.0 µg of iAs/day
- 80 kg bw: (80 kg)(8.6 µg iAs/kg/day) = 688.0 µg of iAs/day
- 90 kg bw: (90 kg)(8.6 µg iAs/kg/day) = 774.0 µg of iAs/day
- 100 kg bw: (100 kg)(8.6 µg iAs/kg/day) = 860.0 µg of iAs/day

Assuming that the relative bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask may be about 58% of the bioavailability of the inorganic arsenic in dissolved Midnight Minerals Rich Earth Onyx Clay Mask, given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 µg of inorganic arsenic, and given the relative bioavailability-adjusted acute duration of exposure MRL for ingested inorganic arsenic (in soil) (8.6 µg iAs/kg/day), the amount of dry Midnight Minerals Rich Earth Onyx Clay Mask that can be ingested daily without exceeding the relative bioavailability-adjusted acute duration

of exposure MRL for ingested inorganic arsenic (in soil) of 8.6 µg iAs/kg/day can be calculated for individuals with different body weights:

1 kg bw: $(8.6 \text{ µg of iAs/day}) / (1.521 \text{ µg iAs/g}) = 5.7 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

10 kg bw: $(86.0 \text{ µg of iAs/day}) / (1.521 \text{ µg iAs/g}) = 57.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

20 kg bw: $(172.0 \text{ µg of iAs/day}) / (1.521 \text{ µg iAs/g}) = 114.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

30 kg bw: $(258.0 \text{ µg of iAs/day}) / (1.521 \text{ µg iAs/g}) = 171.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

40 kg bw: $(344.0 \text{ µg of iAs/day}) / (1.521 \text{ µg iAs/g}) = 228.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

50 kg bw: $(430.0 \text{ µg of iAs/day}) / (1.521 \text{ µg iAs/g}) = 285.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

60 kg bw: $(516.0 \text{ µg of iAs/day}) / (1.521 \text{ µg iAs/g}) = 342.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

70 kg bw: $(602.0 \text{ µg of iAs/day}) / (1.521 \text{ µg iAs/g}) = 399.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

80 kg bw: $(688.0 \text{ µg of iAs/day}) / (1.521 \text{ µg iAs/g}) = 456.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

90 kg bw: $(774.0 \text{ µg of iAs/day}) / (1.521 \text{ µg iAs/g}) = 513.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

100 kg bw: $(860.0 \text{ µg of iAs/day}) / (1.521 \text{ µg iAs/g}) = 570.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the relative bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask may be about 58% of the bioavailability of the inorganic arsenic in dissolved Midnight Minerals Rich Earth Onyx Clay Mask, it can be concluded that 1) daily accidental or intentional acute ingestion of 2.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less by individuals with any body weight will not exceed the relative bioavailability-adjusted acute duration of exposure MRL for the ingestion of inorganic arsenic (in soil) and is likely to be without an appreciable risk of adverse health effects in those individuals; 2) daily accidental or intentional acute ingestion of 12.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less by individuals with body weights greater than about 2 kg will not exceed the relative bioavailability-adjusted acute duration of exposure MRL for the ingestion of inorganic arsenic (in soil) and is likely to be without an appreciable risk of adverse health effects in those individuals; and 3) daily accidental or intentional acute ingestion of 125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less by individuals with body weights greater than about 22 kg will not exceed the relative bioavailability-adjusted acute duration of exposure MRL for the ingestion of inorganic arsenic (in soil) and is likely to be without an appreciable risk of adverse health effects in those individuals.

Assuming that the relative bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is about 58% of the relative bioavailability of ingested inorganic arsenic (in soil) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 µg of inorganic arsenic, daily accidental or intentional ingestion of as much as 5.65 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for 14 days or less will not exceed the relative bioavailability-adjusted acute duration of exposure MRL for the ingestion of inorganic arsenic in dry Midnight Minerals Rich Earth Onyx Clay Mask (8.6 µg/kg/day).

Assuming that the relative bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is about 58% of the relative bioavailability of ingested inorganic arsenic (in soil) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 µg of inorganic arsenic, the amount of dry Midnight Minerals Rich Earth Onyx Clay Mask that can be ingested at one time without exceeding the minimum lethal dose of ingested inorganic arsenic of 1,000 µg iAs is $[(1,000 \text{ µg iAs}) / (1.521 \text{ µg iAs/g})] / 0.58 = 1,134 \text{ g}$ Midnight Minerals Rich Earth Onyx Clay Mask.

Chronic Ingestion of Inorganic Arsenic in Dry Midnight Minerals Rich Earth Onyx Clay Mask Powder. Given the chronic duration of exposure (daily for over 1 year) MRL for ingested inorganic arsenic (dissolved in water) of 0.3 µg iAs/kg/day, the amount of inorganic arsenic (dissolved in water) that can be ingested daily without exceeding the chronic duration of exposure MRL for ingested inorganic arsenic of 0.3 µg iAs/kg/day can be calculated for individuals with different body weights:

1 kg bw: $(1 \text{ kg})(0.3 \text{ µg iAs/kg/day}) = 0.3 \text{ µg of iAs/day}$
10 kg bw: $(10 \text{ kg})(0.3 \text{ µg iAs/kg/day}) = 3.0 \text{ µg of iAs/day}$
20 kg bw: $(20 \text{ kg})(0.3 \text{ µg iAs/kg/day}) = 6.0 \text{ µg of iAs/day}$
30 kg bw: $(30 \text{ kg})(0.3 \text{ µg iAs/kg/day}) = 9.0 \text{ µg of iAs/day}$
40 kg bw: $(40 \text{ kg})(0.3 \text{ µg iAs/kg/day}) = 12.0 \text{ µg of iAs/day}$
50 kg bw: $(50 \text{ kg})(0.3 \text{ µg iAs/kg/day}) = 15.0 \text{ µg of iAs/day}$
60 kg bw: $(60 \text{ kg})(0.3 \text{ µg iAs/kg/day}) = 18.0 \text{ µg of iAs/day}$
70 kg bw: $(70 \text{ kg})(0.3 \text{ µg iAs/kg/day}) = 21.0 \text{ µg of iAs/day}$
80 kg bw: $(80 \text{ kg})(0.3 \text{ µg iAs/kg/day}) = 24.0 \text{ µg of iAs/day}$
90 kg bw: $(90 \text{ kg})(0.3 \text{ µg iAs/kg/day}) = 27.0 \text{ µg of iAs/day}$
100 kg bw: $(100 \text{ kg})(0.3 \text{ µg iAs/kg/day}) = 30.0 \text{ µg of iAs/day}$

Assuming that the bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic arsenic (dissolved in water) and given that 1g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 µg of inorganic arsenic, the amount of dry Midnight Minerals Rich Earth Onyx Clay Mask that can be ingested daily before exceeding the chronic duration of exposure MRL for ingested inorganic arsenic (dissolved in water) of 0.3 µg iAs/kg/day can be calculated for individuals with different body weights:

1 kg bw: $(0.3 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 0.20 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

10 kg bw: $(3.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 1.97 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

20 kg bw: $(6.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 3.94 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

30 kg bw: $(9.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 5.92 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

40 kg bw: $(12.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 7.89 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

50 kg bw: $(15.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 9.86 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

60 kg bw: $(18.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 11.83 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

70 kg bw: $(21.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 13.81 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

80 kg bw: $(24.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 15.78 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

90 kg bw: $(27.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 17.75 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

100 kg bw: $(30.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 19.72 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic arsenic (dissolved in water), it can be concluded that 1) chronic daily accidental or intentional ingestion of 2.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with body weights greater than about 12.5 kg will not exceed the chronic duration of exposure MRL for the ingestion of inorganic arsenic (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals; 2) chronic daily accidental or intentional ingestion of 12.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with body weights greater than about 63 kg will not exceed the chronic duration of exposure MRL for the ingestion of inorganic arsenic (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals; and 3) chronic daily accidental or intentional ingestion of 125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with any body weight will exceed the chronic duration of exposure MRL for the ingestion of inorganic arsenic (dissolved in water).

Assuming that the bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic arsenic (dissolved in water) and because 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 μg of inorganic arsenic, daily accidental or intentional ingestion of as much as 0.197 g of dry Midnight

Minerals Rich Earth Onyx Clay Mask per kg of body weight for over 1 year will not exceed the chronic duration of exposure MRL for the ingestion of inorganic arsenic (0.3 µg/kg/day).

Assuming that the bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic arsenic (dissolved in water), given that the inorganic arsenic in 1 g of dry Midnight Minerals Rich Earth Onyx Clay Mask ingested every day over an entire lifetime may increase the risk of developing any cancer by as much as 0.23%, and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 µg of inorganic arsenic, as much as 4.39 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight can be ingested daily over an entire lifetime (an extremely unlikely event) without increasing the risk for developing any cancer by 1%.

However, because MRLs for the ingestion of a substance reflect a dose-response relationship that is independent of the efficiency of the gastrointestinal absorption of a substance but are based on clinical outcomes or biomarkers of clinical outcomes that presume relative constancy in that efficiency, a decrease in the efficiency of the gastrointestinal absorption of ingested inorganic arsenic (in soil), compared to the efficiency of the gastrointestinal absorption of ingested inorganic arsenic (dissolved in water), will increase the amount of inorganic arsenic that can be ingested before those referent outcomes will appear. In effect, the exposure duration-dependent MRL for ingested inorganic arsenic (in soil) will be increased in proportion to the relative decrease in the bioavailability of ingested inorganic arsenic (in soil) compared to the bioavailability of ingested inorganic arsenic (dissolved in water). A relative bioavailability-adjusted acute duration of exposure MRL for the ingestion of inorganic arsenic (in soil) can be estimated.

Assuming that the efficiency of the gastrointestinal absorption of ingested inorganic arsenic (in soil) into human blood may be about 60% and the efficiency of gastrointestinal absorption of ingested inorganic arsenic (dissolved in water) into human blood may be 96%,⁷ correcting the chronic duration of exposure MRL for ingested inorganic arsenic (dissolved in water) of 0.3 µg iAs/kg/day for the less efficient gastrointestinal absorption of ingested inorganic arsenic (in soil) into the blood (60%) compared to the efficiency of the gastrointestinal absorption of ingested inorganic arsenic (dissolved in water) into the blood (96%), a relative gastrointestinal absorption efficiency (relative bioavailability; RBA) of 58% (60%/96%) for ingested inorganic arsenic (in soil) can be estimated. After adjusting the chronic duration of exposure MRL for ingested inorganic arsenic (dissolved in water) to account for the RBA of 58% for ingested inorganic arsenic (in soil), a relative bioavailability-adjusted chronic duration of exposure MRL for ingested inorganic arsenic (in soil) can be calculated: $[(0.3 \mu\text{g iAs/kg/day})/(0.58)] = 0.517 \mu\text{g iAs/kg/day}$.

Assuming that the relative bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask may be about 58% of the bioavailability of the inorganic arsenic in dissolved Midnight Minerals Rich Earth Onyx Clay Mask and given the relative bioavailability-adjusted chronic duration of exposure MRL for ingested inorganic arsenic (in soil) of 0.517 µg iAs/kg/day, the amount of inorganic arsenic in dry Midnight Minerals Rich Earth

Onyx Clay Mask that can be ingested daily for over 1 year without exceeding the relative bioavailability-adjusted chronic duration of exposure MRL for ingested inorganic arsenic (in soil) of 0.517 µg iAs/kg/day can be calculated for individuals with different body weights:

1 kg bw: (1 kg)(0.517 µg iAs/kg/day) = 0.52 µg of iAs/day
10 kg bw: (10 kg)(0.517 µg iAs/kg/day) = 5.17 µg of iAs/day
20 kg bw: (20 kg)(0.517 µg iAs/kg/day) = 10.34 µg of iAs/day
30 kg bw: (30 kg)(0.517 µg iAs/kg/day) = 15.51 µg of iAs/day
40 kg bw: (40 kg)(0.517 µg iAs/kg/day) = 20.68 µg of iAs/day
50 kg bw: (50 kg)(0.517 µg iAs/kg/day) = 25.85 µg of iAs/day
60 kg bw: (60 kg)(0.517 µg iAs/kg/day) = 31.02 µg of iAs/day
70 kg bw: (70 kg)(0.517 µg iAs/kg/day) = 36.19 µg of iAs/day
80 kg bw: (80 kg)(0.517 µg iAs/kg/day) = 41.36 µg of iAs/day
90 kg bw: (90 kg)(0.517 µg iAs/kg/day) = 46.53 µg of iAs/day
100 kg bw: (100 kg)(0.517 µg iAs/kg/day) = 51.70 µg of iAs/day

Assuming that the relative bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask may be about 58% of the bioavailability of the inorganic arsenic in dissolved Midnight Minerals Rich Earth Onyx Clay Mask, given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 µg of inorganic arsenic, and given the relative bioavailability-adjusted chronic duration of exposure MRL for ingested inorganic arsenic (in soil) of 0.517 µg iAs/kg/day, the amount of dry Midnight Minerals Rich Earth Onyx Clay Mask that can be ingested daily for over 1 year without exceeding the relative bioavailability-adjusted chronic duration of exposure MRL for ingested inorganic arsenic (in soil) of 0.517 µg iAs/kg/day can be calculated for individuals with different body weights:

1 kg bw: (0.52 µg of iAs/day)/(1.521 µg iAs/g) = 0.34 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
10 kg bw: (5.17 µg of iAs/day)/(1.521 µg iAs/g) = 3.40 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
20 kg bw: (10.34 µg of iAs/day)/(1.521 µg iAs/g) = 6.80 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
30 kg bw: (15.51 µg of iAs/day)/(1.521 µg iAs/g) = 10.20 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
40 kg bw: (20.68 µg of iAs/day)/(1.521 µg iAs/g) = 13.60 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
50 kg bw: (25.85 µg of iAs/day)/(1.521 µg iAs/g) = 17.00 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
60 kg bw: (31.02 µg of iAs/day)/(1.521 µg iAs/g) = 20.39 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
70 kg bw: (36.19 µg of iAs/day)/(1.521 µg iAs/g) = 23.79 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
80 kg bw: (41.36 µg of iAs/day)/(1.521 µg iAs/g) = 27.19 g of Midnight Minerals Rich Earth Onyx Clay Mask/day

90 kg bw: $(46.53 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 30.59 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

100 kg bw: $(51.70 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 33.99 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the relative bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask may be about 58% of the bioavailability of the inorganic arsenic in dissolved Midnight Minerals Rich Earth Onyx Clay Mask, it can be concluded that 1) chronic daily accidental or intentional ingestion of 2.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with body weights greater than about 7 kg will not exceed the relative bioavailability adjusted chronic duration of exposure MRL for the ingestion of inorganic arsenic (in soil) and is likely to be without an appreciable risk of adverse health effects in those individuals; 2) chronic daily accidental or intentional ingestion of 12.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with body weights greater than about 36 kg will not exceed the relative bioavailability-adjusted chronic duration of exposure MRL for the ingestion of inorganic arsenic (in soil) and is likely to be without an appreciable risk of adverse health effects in those individuals; and 3) chronic daily accidental or intentional ingestion of 125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with any body weight will exceed the relative bioavailability-adjusted chronic duration of exposure MRL for the ingestion of inorganic arsenic (in soil).

Assuming that the relative bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask may be about 58% of the bioavailability of the inorganic arsenic in dissolved Midnight Minerals Rich Earth Onyx Clay Mask and because 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 μg of inorganic arsenic, daily accidental or intentional ingestion of as much as 0.340 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for over 1 year will not exceed the relative bioavailability-adjusted chronic duration of exposure MRL for ingested inorganic arsenic (in soil) ($0.517 \mu\text{g/kg/day}$).

Assuming that the relative bioavailability of the inorganic arsenic in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask may be about 58% of the bioavailability of the inorganic arsenic in dissolved Midnight Minerals Rich Earth Onyx Clay Mask, given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 μg of inorganic arsenic, and given that the inorganic arsenic in 1 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) ingested every day over an entire lifetime may increase the risk of developing any cancer by as much as 0.23%, as much as 7.57 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight can be ingested daily over an entire lifetime (an extremely unlikely event) without increasing the risk for developing any cancer by 1%.

Acute Topical Application of Inorganic Arsenic in Midnight Minerals Rich Earth Onyx Clay Mask Powder. There are no MRLs for topically applied inorganic arsenic, but useful approximations can be made. Assuming that the efficiency of the transdermal absorption of ingested inorganic arsenic (in soil) is the same as the efficiency of the gastrointestinal absorption of inorganic

arsenic (dissolved in water), the daily amount of inorganic arsenic (in soil) that can be applied topically without exceeding the acute duration of exposure MRL for ingested inorganic arsenic (dissolved in water) of 5 µg iAs/kg/day can be calculated for individuals with different body weights:

1 kg bw: (1 kg)(5 µg iAs/kg/day) = 5 µg of iAs/day
10 kg bw: (10 kg)(5 µg iAs/kg/day) = 50 µg of iAs/day
20 kg bw: (20 kg)(5 µg iAs/kg/day) = 100 µg of iAs/day
30 kg bw: (30 kg)(5 µg iAs/kg/day) = 150 µg of iAs/day
40 kg bw: (40 kg)(5 µg iAs/kg/day) = 200 µg of iAs/day
50 kg bw: (50 kg)(5 µg iAs/kg/day) = 250 µg of iAs/day
60 kg bw: (60 kg)(5 µg iAs/kg/day) = 300 µg of iAs/day
70 kg bw: (70 kg)(5 µg iAs/kg/day) = 350 µg of iAs/day
80 kg bw: (80 kg)(5 µg iAs/kg/day) = 400 µg of iAs/day
90 kg bw: (90 kg)(5 µg iAs/kg/day) = 450 µg of iAs/day
100 kg bw: (100 kg)(5 µg iAs/kg/day) = 500 µg of iAs/day

Assuming that the bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic arsenic (dissolved in water) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 µg of inorganic arsenic, the daily amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically before exceeding the acute duration of exposure MRL for ingested inorganic arsenic (dissolved in water) of 5 µg iAs/kg/day can be calculated for individuals with different body weights:

1 kg bw: (5 µg of iAs/day)/(1.521 µg iAs/g) = 3.3 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
10 kg bw: (50 µg of iAs/day)/(1.521 µg iAs/g) = 33.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
20 kg bw: (100 µg of iAs/day)/(1.521 µg iAs/g) = 66.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
30 kg bw: (150 µg of iAs/day)/(1.521 µg iAs/g) = 99.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
40 kg bw: (200 µg of iAs/day)/(1.521 µg iAs/g) = 132.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
50 kg bw: (250 µg of iAs/day)/(1.521 µg iAs/g) = 165.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
60 kg bw: (300 µg of iAs/day)/(1.521 µg iAs/g) = 198.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
70 kg bw: (350 µg of iAs/day)/(1.521 µg iAs/g) = 230.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
80 kg bw: (400 µg of iAs/day)/(1.521 µg iAs/g) = 263.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day

90 kg bw: $(450 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 296.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

100 kg bw: $(500 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 329.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic arsenic (dissolved in water), it can be concluded that 1) daily topical application of 2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less by individuals with any body weight will not exceed the acute duration of exposure MRL for the ingestion of inorganic arsenic (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals; 2) daily topical application of 12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less by individuals with body weights greater than about 4 kg will not exceed the acute duration of exposure MRL for the ingestion of inorganic arsenic (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals; and 3) daily topical application of 125 g of Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less by individuals with body weights greater than about 38 kg will not exceed the acute duration of exposure MRL for the ingestion of inorganic arsenic (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals.

Assuming that the bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic arsenic (dissolved in water) and because 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 μg of inorganic arsenic, daily topical application of as much as 3.287 g of Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for 14 days or less will not exceed the acute duration of exposure MRL for the ingestion of inorganic arsenic (5 $\mu\text{g/kg/day}$).

Assuming that the bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic arsenic (dissolved in water) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 μg of inorganic arsenic, the amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically at one time without exceeding the minimum lethal dose of ingested inorganic arsenic (dissolved in water) of 1,000 $\mu\text{g iAs}$ is $(1,000 \mu\text{g iAs}) / (1.521 \mu\text{g iAs/g}) = 658 \text{ g Midnight Minerals Rich Earth Onyx Clay Mask}$.

However, because MRLs for the ingestion of a substance reflect a dose-response relationship that is independent of the efficiency of the transfer of a substance into the circulation but are based on clinical outcomes or biomarkers of clinical outcomes that presume relative constancy in that efficiency, a decrease in the efficiency of the transdermal absorption of topically applied inorganic arsenic (in soil), compared to the efficiency of the gastrointestinal absorption of ingested inorganic arsenic (dissolved in water), will increase the amount of inorganic arsenic that can be applied topically before those referent outcomes will appear. In effect, the

exposure duration-dependent MRL for topically applied inorganic arsenic (in soil) will be increased in proportion to the relative decrease in the bioavailability of topically applied inorganic arsenic (in soil) compared to the bioavailability of ingested inorganic arsenic (dissolved in water). A relative bioavailability-adjusted MRL for the topical application of inorganic arsenic can be estimated.

The transdermal absorption of inorganic arsenic after its topical application to human skin is poorly understood.¹⁹ It has been reported that after inorganic arsenic mixed with arsenic containing soils (collected from near a pesticide production facility or from an area historically treated with arsenical-containing pesticides) was applied to the skin of live Rhesus monkeys for 24 hours, the efficiency of the transdermal absorption of arsenic varied from 0% to 0.85% and less than 1% was detected in urine.⁶³ Consistent with these data, during the 24 hours following the application of 73As as arsenic acid (H3AsO4) mixed with soil to skin harvested from human cadavers, 0.43% of the applied inorganic arsenic had passed through the skin and 0.33% remained in the skin after washing.⁶⁴ The presence of iron oxide, iron silicate, iron sulfate, or fulvic acid (in soil) and clay hinders the dermal transit of arsenic.^{19, 65-68}

Assuming that the efficiency of transfer of topically applied inorganic arsenic (in soil) into human blood may be as high as 1%⁶³ and applying an additional uncertainty factor of 3 for human variability,⁶⁹ the efficiency of transfer of topically applied inorganic arsenic (in soil) into human blood can be assumed to be 3% (or less; (1%)(3) = 3%).

Assuming that the efficiency of the transdermal transfer of topically applied inorganic arsenic (in soil) into human blood is 3% and the efficiency of gastrointestinal absorption of ingested inorganic arsenic (dissolved in water) is 96%,⁷ correcting the acute duration of exposure MRL for ingested inorganic arsenic (dissolved in water; 5 µg iAs/kg/day) for the less efficient transfer of topically applied inorganic arsenic (in soil) into the blood (3%) compared to the efficiency of the transfer of ingested inorganic arsenic (dissolved in water) into the blood (96%), a relative transdermal transfer efficiency (transdermal relative bioavailability; RBA) of 3.125% (3%/96%) for topically applied inorganic arsenic (in soil) can be estimated. After adjusting the acute duration of exposure MRL for ingested inorganic arsenic (dissolved in water) to account for the RBA of 3.125% for topically applied inorganic arsenic (in soil), a relative bioavailability adjusted acute duration of exposure MRL for topically applied inorganic arsenic (in soil) can be calculated: $(5 \mu\text{g iAs/kg/day}) / (.03125) = 160 \mu\text{g iAs/kg/day}$.

Assuming that the bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic arsenic (in soil), and using the relative bioavailability-adjusted acute duration of exposure MRL for topically applied inorganic arsenic (in soil) of 160 µg iAs/kg/day, the daily amount of inorganic arsenic in Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically for 14 days or less without exceeding the relative bioavailability-adjusted acute duration of exposure MRL for topically applied inorganic arsenic (in soil) of 160 µg iAs/kg/day can be calculated for individuals with different body weights:

1 kg bw: (1 kg)(160 µg iAs/kg/day) = 160 µg of iAs/day
10 kg bw: (10 kg)(160 µg iAs/kg/day) = 1,600 µg of iAs/day
20 kg bw: (20 kg)(160 µg iAs/kg/day) = 3,200 µg of iAs/day
30 kg bw: (30 kg)(160 µg iAs/kg/day) = 4,800 µg of iAs/day
40 kg bw: (40 kg)(160 µg iAs/kg/day) = 6,400 µg of iAs/day
50 kg bw: (50 kg)(160 µg iAs/kg/day) = 8,000 µg of iAs/day
60 kg bw: (60 kg)(160 µg iAs/kg/day) = 9,600 µg of iAs/day
70 kg bw: (70 kg)(160 µg iAs/kg/day) = 11,200 µg of iAs/day
80 kg bw: (80 kg)(160 µg iAs/kg/day) = 12,800 µg of iAs/day
90 kg bw: (90 kg)(160 µg iAs/kg/day) = 14,400 µg of iAs/day
100 kg bw: (100 kg)(160 µg iAs/kg/day) = 16,000 µg of iAs/day

Assuming that the bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic arsenic (in soil) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 µg of arsenic, the daily amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically without exceeding the relative bioavailability-adjusted acute duration of exposure MRL for topically applied inorganic arsenic (in soil) of 160 µg As/kg/day can be calculated for individuals with different body weights:

1 kg bw: (160 µg of iAs/day)/(1.521 µg iAs/g) = 105 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
10 kg bw: (1,600 µg of iAs/day)/(1.521 µg iAs/g) = 1,052 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
20 kg bw: (3,200 µg of iAs/day)/(1.521 µg iAs/g) = 2,104 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
30 kg bw: (4,800 µg of iAs/day)/(1.521 µg iAs/g) = 3,156 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
40 kg bw: (6,400 µg of iAs/day)/(1.521 µg iAs/g) = 4,208 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
50 kg bw: (8,000 µg of iAs/day)/(1.521 µg iAs/g) = 5,260 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
60 kg bw: (9,600 µg of iAs/day)/(1.521 µg iAs/g) = 6,312 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
70 kg bw: (11,200 µg of iAs/day)/(1.521 µg iAs/g) = 7,364 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
80 kg bw: (12,800 µg of iAs/day)/(1.521 µg iAs/g) = 8,416 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
90 kg bw: (14,400 µg of iAs/day)/(1.521 µg iAs/g) = 9,467 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
100 kg bw: (16,000 µg of iAs/day)/(1.521 µg iAs/g) = 10,519 g of Midnight Minerals Rich Earth Onyx Clay Mask/day

From these data and calculations, assuming that the relative bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability of topically applied inorganic arsenic (in soil), it can be concluded that the daily topical application of either 2.5 g, 12.5 g, or 125 g of Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less by individuals with any body weight will not exceed the relative bioavailability-adjusted acute duration of exposure MRL for the topical application of inorganic arsenic (in soil) (160 µg iAs/kg/day) and is likely to be without an appreciable risk of adverse health effects.

Assuming that the relative bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability of ingested inorganic arsenic (in soil) and that the relative bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is 3.125% of the bioavailability of the inorganic arsenic in dissolved ingested Midnight Minerals Rich Earth Onyx Clay Mask, given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 µg of inorganic arsenic, daily topical application of as much as 105 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for 14 days or less will not exceed the relative bioavailability-adjusted acute duration of exposure MRL for the ingestion of inorganic arsenic (in soil) (160 µg/kg/day).

Assuming that the relative bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability of ingested inorganic arsenic (in soil) and that the relative bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is 3.125% of the bioavailability of the inorganic arsenic in dissolved ingested Midnight Minerals Rich Earth Onyx Clay Mask, and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 µg of inorganic arsenic, the amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically at one time without exceeding the minimum lethal dose of ingested inorganic arsenic (dissolved in water) of 1,000 µg iAs is $[(1,000 \mu\text{g iAs}) / (1.521 \mu\text{g iAs/g})] / 0.03125 = 21,039 \text{ g}$ Midnight Minerals Rich Earth Onyx Clay Mask.

Chronic Topical Application of Inorganic Arsenic in Midnight Minerals Rich Earth Onyx Clay Mask Powder

A chronic duration of exposure (daily for over 1 year) MRL for topically applied inorganic arsenic has not been established. However, assuming that the bioavailability of topically applied inorganic arsenic (in soil) is the same as the bioavailability of ingested inorganic arsenic (dissolved in water) and given the chronic duration of exposure MRL for ingested inorganic arsenic (dissolved in water) of 0.3 µg iAs/kg/day, the daily amount of inorganic arsenic (in soil) that can be applied topically without exceeding the chronic duration of exposure MRL for ingested inorganic arsenic (dissolved in water) of 0.3 µg iAs/kg/day can be calculated for individuals with different body weights:

$$1 \text{ kg bw: } (1 \text{ kg})(0.3 \mu\text{g iAs/kg/day}) = 0.3 \mu\text{g of iAs/day}$$

$$10 \text{ kg bw: } (10 \text{ kg})(0.3 \mu\text{g iAs/kg/day}) = 3.0 \mu\text{g of iAs/day}$$

$$20 \text{ kg bw: } (20 \text{ kg})(0.3 \mu\text{g iAs/kg/day}) = 6.0 \mu\text{g of iAs/day}$$

30 kg bw: $(30 \text{ kg})(0.3 \mu\text{g iAs/kg/day}) = 9.0 \mu\text{g of iAs/day}$
40 kg bw: $(40 \text{ kg})(0.3 \mu\text{g iAs/kg/day}) = 12.0 \mu\text{g of iAs/day}$
50 kg bw: $(50 \text{ kg})(0.3 \mu\text{g iAs/kg/day}) = 15.0 \mu\text{g of iAs/day}$
60 kg bw: $(60 \text{ kg})(0.3 \mu\text{g iAs/kg/day}) = 18.0 \mu\text{g of iAs/day}$
70 kg bw: $(70 \text{ kg})(0.3 \mu\text{g iAs/kg/day}) = 21.0 \mu\text{g of iAs/day}$
80 kg bw: $(80 \text{ kg})(0.3 \mu\text{g iAs/kg/day}) = 24.0 \mu\text{g of iAs/day}$
90 kg bw: $(90 \text{ kg})(0.3 \mu\text{g iAs/kg/day}) = 27.0 \mu\text{g of iAs/day}$
100 kg bw: $(100 \text{ kg})(0.3 \mu\text{g iAs/kg/day}) = 30.0 \mu\text{g of iAs/day}$

Assuming that the bioavailability of topically applied inorganic arsenic (in soil) is the same as the bioavailability of ingested inorganic arsenic (dissolved in water) and that the bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic arsenic (in soil), and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 μg of inorganic arsenic, the daily amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically for over 1 year without exceeding the chronic duration of exposure MRL for ingested inorganic arsenic (dissolved in water) of 0.3 $\mu\text{g iAs/kg/day}$ can be calculated for individuals with different body weights:

1 kg bw: $(0.3 \mu\text{g of iAs/day})/(1.521 \mu\text{g iAs/g}) = 0.20 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
10 kg bw: $(3.0 \mu\text{g of iAs/day})/(1.521 \mu\text{g iAs/g}) = 1.97 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
20 kg bw: $(6.0 \mu\text{g of iAs/day})/(1.521 \mu\text{g iAs/g}) = 3.94 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
30 kg bw: $(9.0 \mu\text{g of iAs/day})/(1.521 \mu\text{g iAs/g}) = 5.92 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
40 kg bw: $(12.0 \mu\text{g of iAs/day})/(1.521 \mu\text{g iAs/g}) = 7.89 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
50 kg bw: $(15.0 \mu\text{g of iAs/day})/(1.521 \mu\text{g iAs/g}) = 9.86 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
60 kg bw: $(18.0 \mu\text{g of iAs/day})/(1.521 \mu\text{g iAs/g}) = 11.83 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
70 kg bw: $(21.0 \mu\text{g of iAs/day})/(1.521 \mu\text{g iAs/g}) = 13.81 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
80 kg bw: $(24.0 \mu\text{g of iAs/day})/(1.521 \mu\text{g iAs/g}) = 15.78 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
90 kg bw: $(27.0 \mu\text{g of iAs/day})/(1.521 \mu\text{g iAs/g}) = 17.75 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
100 kg bw: $(30.0 \mu\text{g of iAs/day})/(1.521 \mu\text{g iAs/g}) = 19.72 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the bioavailability of topically applied inorganic arsenic (in soil) is the same as the bioavailability of ingested inorganic arsenic (dissolved in

water) and that the bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic arsenic (in soil), it can be concluded that 1) daily topical application of 2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year will not exceed the chronic duration of exposure MRL for ingested inorganic arsenic (dissolved in water) in individuals with body weights greater than about 12.5 kg and is likely to be without an appreciable risk of adverse health effects in those individuals; 2) daily topical application of 12.5g of Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year will not exceed the chronic duration of exposure MRL for ingested inorganic arsenic (dissolved in water) in individuals with body weights greater than about 62.5 kg and is likely to be without an appreciable risk of adverse health effects in those individuals; and 3) daily topical application of 125 g of Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year will exceed the chronic duration of exposure MRL for ingested inorganic arsenic (dissolved in water) in all individuals.

Assuming that the bioavailability of topically applied inorganic arsenic (in soil) is the same as the bioavailability of ingested inorganic arsenic (dissolved in water) and that the bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic arsenic (in soil), and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 µg of inorganic arsenic, daily topical application of as much as 0.197 g of Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for over 1 year will not exceed the chronic duration of exposure MRL for the ingestion of inorganic arsenic (0.3 µg/kg/day).

Assuming that the bioavailability of topically applied inorganic arsenic (in soil) is the same as the bioavailability of ingested inorganic arsenic (dissolved in water) and that the bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic arsenic (in soil), and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 µg of inorganic arsenic, and given that the inorganic arsenic in 1 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) ingested every day over an entire lifetime may increase the risk of developing any cancer by as much as 0.23%, as much as 4.39 g of Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight can be applied topically every day over an entire lifetime (an extremely unlikely event) without increasing the risk for developing any cancer by 1%.

However, the estimated relative efficiency of transdermal transfer of inorganic arsenic (in soil) into the blood (RBA) is only 3.125% of the efficiency of gastrointestinal absorption of ingested inorganic arsenic (dissolved in water). Therefore, an approximate relative bioavailability adjusted chronic duration of exposure MRL for topically applied inorganic arsenic (in soil) can be estimated: $[(0.3 \mu\text{g iAs/kg/day})/(0.03125)] = 9.6 \mu\text{g iAs/kg/day}$.

Assuming that the relative bioavailability-adjusted chronic duration of exposure MRL for the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability-adjusted chronic duration of exposure MRL for topically applied inorganic

arsenic (in soil), the daily amount of inorganic arsenic in Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically for over 1 year without exceeding the relative bioavailability-adjusted chronic duration of exposure MRL for topically applied inorganic arsenic (in soil) of 9.6 µg iAs/kg/day can be calculated for individuals with different body weights:

1 kg bw: (1 kg)(9.6 µg iAs/kg/day) = 9.6 µg of iAs/day
10 kg bw: (10 kg)(9.6 µg iAs/kg/day) = 96.0 µg of iAs/day
20 kg bw: (20 kg)(9.6 µg iAs/kg/day) = 192.0 µg of iAs/day
30 kg bw: (30 kg)(9.6 µg iAs/kg/day) = 288.0 µg of iAs/day
40 kg bw: (40 kg)(9.6 µg iAs/kg/day) = 384.0 µg of iAs/day
50 kg bw: (50 kg)(9.6 µg iAs/kg/day) = 480.0 µg of iAs/day
60 kg bw: (60 kg)(9.6 µg iAs/kg/day) = 576.0 µg of iAs/day
70 kg bw: (70 kg)(9.6 µg iAs/kg/day) = 672.0 µg of iAs/day
80 kg bw: (80 kg)(9.6 µg iAs/kg/day) = 768.0 µg of iAs/day
90 kg bw: (90 kg)(9.6 µg iAs/kg/day) = 864.0 µg of iAs/day
100 kg bw: (100 kg)(9.6 µg iAs/kg/day) = 960.0 µg of iAs/day

Assuming that the relative bioavailability-adjusted chronic duration of exposure MRL for the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability-adjusted chronic duration of exposure MRL for topically applied inorganic arsenic in (soil) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 1.521 µg of inorganic arsenic, the daily amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically without exceeding the relative bioavailability-adjusted chronic duration of exposure MRL for topically applied inorganic arsenic (in soil) of 9.6 µg iAs/kg/day can be calculated for individuals with different body weights:

1 kg bw: (9.6 µg of iAs/day)/(1.521 µg iAs/g) = 6.3 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
10 kg bw: (96.0 µg of iAs/day)/(1.521 µg iAs/g) = 63.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
20 kg bw: (192.0 µg of iAs/day)/(1.521 µg iAs/g) = 126.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
30 kg bw: (288.0 µg of iAs/day)/(1.521 µg iAs/g) = 189.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
40 kg bw: (384.0 µg of iAs/day)/(1.521 µg iAs/g) = 252.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
50 kg bw: (480.0 µg of iAs/day)/(1.521 µg iAs/g) = 316.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
60 kg bw: (576.0 µg of iAs/day)/(1.521 µg iAs/g) = 379.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
70 kg bw: (672.0 µg of iAs/day)/(1.521 µg iAs/g) = 442.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day

80 kg bw: $(768.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 505.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

90 kg bw: $(864.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 568.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

100 kg bw: $(960.0 \mu\text{g of iAs/day}) / (1.521 \mu\text{g iAs/g}) = 631.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the relative bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability of inorganic arsenic (in soil) and that the relative bioavailability of inorganic arsenic (in soil) is 3.125% of the bioavailability of inorganic arsenic (dissolved in water), it can be concluded that 1) daily topical application of 2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with any body weight will not exceed the relative bioavailability-adjusted MRL for chronic daily topical exposure to inorganic arsenic (in soil) and is likely to be without an appreciable risk of adverse health effects in those individuals; 2) daily topical application of 12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with body weights greater than about 2 kg will not exceed the relative bioavailability-adjusted MRL for chronic daily topical exposure to inorganic arsenic (in soil) and is likely to be without an appreciable risk of adverse health effects in those individuals; and 3) daily topical application of 125 g of Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with body weights greater than about 20 kg will not exceed the relative bioavailability-adjusted MRL for chronic daily topical exposure to inorganic arsenic (in soil) and is likely to be without an appreciable risk of adverse health effects in those individuals.

Assuming that the bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask may be about 3.125% of the bioavailability of the inorganic arsenic in dissolved Midnight Minerals Rich Earth Onyx Clay Mask, the relative bioavailability-adjusted chronic duration of exposure MRL for the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask can be estimated to be $9.6 \mu\text{g iAs/kg/day}$. Because 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains $1.521 \mu\text{g}$ of inorganic arsenic, daily topical application of as much as 6.31 g of Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for over 1 year will not exceed the relative bioavailability-adjusted chronic duration of exposure MRL for topically applied inorganic arsenic in Midnight Minerals Rich Earth Onyx Clay Mask ($9.6 \mu\text{g/kg/day}$).

Assuming that the bioavailability of the inorganic arsenic in topically applied Midnight Minerals Rich Earth Onyx Clay Mask may be about 3.125% of the bioavailability of the inorganic arsenic in dissolved Midnight Minerals Rich Earth Onyx Clay Mask, given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains $1.521 \mu\text{g}$ of inorganic arsenic, and given that the inorganic arsenic in 1 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) ingested every day over an entire lifetime may increase the risk of developing any cancer by as much as 0.23%, as much as 140.48 g of Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight can be applied topically every day over an entire lifetime (an extremely unlikely event) without increasing the risk for developing any cancer by 1%.

The Safety of the Inorganic Cadmium (Cd) in Midnight Minerals Rich Earth Onyx Clay Mask Powder

Estimations of the efficiency of intestinal absorption of ingested cadmium by individuals range from <1% to 22%.⁶⁹⁻⁷⁴ The body store of iron influences cadmium absorption; subjects with low iron stores exhibited mean cadmium absorption rates of 8.9%,⁶⁹ while subjects with adequate iron stores exhibited mean cadmium absorption rates of 2.3%.⁶⁹ Females may absorb slightly greater amounts of cadmium across the gastrointestinal tract.⁶⁹

In a study of the percutaneous absorption of cadmium, approximately 0.1% to 0.6% of the cadmium in cadmium chloride in water was absorbed through human cadaver skin while 2.4% to 12.7% of the applied cadmium remained in the skin.⁷⁵ When cadmium-contaminated soil (13 ppb cadmium chloride) was applied to the skin surface, from 0.02% to 0.07% of the applied cadmium was absorbed while the skin retained 0.06% to 0.13% of the applied cadmium. These investigators calculated that the average efficiency of transdermal transfer of inorganic cadmium is 0.5%.

Exposure to inorganic cadmium does not necessarily mean that adverse health effects will result; toxicity of exposure to inorganic cadmium depends on dose and duration of oral exposure. A Minimal Risk Level (MRL) is defined as an estimate of daily human exposure to a substance that is likely to be without an appreciable risk of adverse health effects over a specified duration of exposure and is determined by the US Agency for Toxic Substances and Disease Registry of the Centers for Disease Control and Prevention (ATSDR).¹⁸ Although the term, MRL, may seem to imply a slight level of risk, MRLs are, in fact, considered to represent safe levels of exposure for all populations, including sensitive subgroups. MRLs are derived when reliable and sufficient data exist to identify the target organ(s) of effect or the most sensitive health effect(s) for a specific duration within a given route of exposure. MRLs are based on noncancerous health effects only and do not consider carcinogenic effects. MRLs can be derived for acute (daily for 14 days or less), intermediate (daily for 15 days to 365 days), and chronic (daily for over 1 year) duration exposures for inhalation and oral routes of exposure. Appropriate methodology does not exist to develop MRLs for dermal exposure. An MRL is set below a level of exposure that might cause adverse health effects in the people most sensitive to such substance-induced effects and is neither a threshold for toxicity nor a level beyond which toxicity is likely to occur.

Nonetheless, MRLs are the current standard against which to evaluate exposures to cadmium. Although there is no acute duration of exposure MRL for ingested inorganic cadmium, the typically more conservative⁶² intermediate duration of exposure (daily for 15 to 365 days) MRL for ingested inorganic cadmium (dissolved in water; 0.5 µg iCd/kg/day^{21,69}) can be used for making comparisons. The ATSDR has derived an intermediate duration of exposure (daily for 15 to 365 days) MRL for ingested inorganic cadmium (iCd) in water of 0.5 µg/kg/day and a chronic duration of exposure (daily for over 1 year) MRL for ingested inorganic cadmium in water of 0.1 µg/kg/day.^{21,69}

The ATSDR has not derived any MRLs for acute, intermediate, or chronic dermal exposure to organic or inorganic cadmium compounds in soil or dissolved in water.⁶⁹

The EPA has derived chronic oral reference doses (RfDs; estimates (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious health effects during a lifetime) of 0.5 µg iCd/kg/day for the inorganic cadmium in water and 1 µg iCd/kg/day for the inorganic cadmium in food.⁷⁶

There is no FDA-mandated limit on the inorganic cadmium content of creams and ointments. No studies have observed death in humans after dermal exposure to cadmium⁶⁹ and there have been no reports of respiratory, cardiovascular, gastrointestinal, hematological, immunological, musculoskeletal, hepatic, renal, ocular, neurological, reproductive, developmental, or carcinogenic effects in humans after dermal exposure to cadmium.⁶⁹ Dermal exposure to cadmium may produce irritation of the skin; routine patch tests among patients with dermatitis and eczema using up to 2% cadmium chloride solutions have found skin irritation at 2%, but no evidence of allergic reactions at a dose of 1%.^{69,77} There was no evidence of allergic reactions among workers occupationally exposed to cadmium.⁷⁷ Individuals with yellow tattoos containing cadmium sulfide often experience swelling of the surrounding skin on exposure to ultra violet (UV) irradiation, but this may be the result of dermal damage from the photoconductivity of cadmium sulfide rather than a direct immunological reaction.⁶⁹

There may be a human requirement for cadmium for proper reproductive performance.^{37,38} Among 1,262 men participating in the third National Health and Nutrition Examination Survey (1988-1991), the serum total and free testosterone concentrations were directly correlated with the creatinine-corrected urinary Cd+2 excretion.⁷⁸ There have been reports of positive correlations between blood cadmium concentrations and serum concentrations of serum luteinizing hormone, follicle stimulating hormone, prolactin, and testosterone.⁷⁹⁻⁸²

Midnight Minerals Rich Earth Onyx Clay Mask

Midnight Minerals Rich Earth Onyx Clay Mask contains 0.081 ppm inorganic cadmium (iCd).⁶²
0.081 ppm = 0.081 µg/g; therefore:

1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains (0.081 µg iCd/g)(1 g) = 0.081 µg iCd

2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask contains (0.081 µg iCd/g)(2.5 g) = 0.2025 µg iCd

12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask contains (0.081 µg iCd/g)(12.5 g) = 1.0125 µg iCd

125 g of Midnight Minerals Rich Earth Onyx Clay Mask contains (0.081 µg iCd/g)(125 g) = 10.125 µg iCd

Ingestion of Inorganic Cadmium in Midnight Minerals Rich Earth Onyx Clay Mask Powder (completely dissolved in water) for 15 to 365 Days. Assuming that the bioavailability of the inorganic cadmium in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic cadmium (dissolved in water) and

given the intermediate duration of exposure MRL for ingested inorganic cadmium (dissolved in water) of 0.5 µg iCd/kg/day, the amount of inorganic cadmium ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) that can be ingested daily without exceeding the intermediate duration of exposure MRL for ingested inorganic cadmium (dissolved in water) of 0.5 µg iCd/kg/day can be calculated for individuals with different body weights:

1 kg bw: (1 kg)(0.5 µg iCd/kg/day) = 0.5 µg of iCd/day
10 kg bw: (10 kg)(0.5 µg iCd/kg/day) = 5.0 µg of iCd/day
20 kg bw: (20 kg)(0.5 µg iCd/kg/day) = 10.0 µg of iCd/day
30 kg bw: (30 kg)(0.5 µg iCd/kg/day) = 15.0 µg of iCd/day
40 kg bw: (40 kg)(0.5 µg iCd/kg/day) = 20.0 µg of iCd/day
50 kg bw: (50 kg)(0.5 µg iCd/kg/day) = 25.0 µg of iCd/day
60 kg bw: (60 kg)(0.5 µg iCd/kg/day) = 30.0 µg of iCd/day
70 kg bw: (70 kg)(0.5 µg iCd/kg/day) = 35.0 µg of iCd/day
80 kg bw: (80 kg)(0.5 µg iCd/kg/day) = 40.0 µg of iCd/day
90 kg bw: (90 kg)(0.5 µg iCd/kg/day) = 45.0 µg of iCd/day
100 kg bw: (100 kg)(0.5 µg iCd/kg/day) = 50.0 µg of iCd/day

Assuming that the bioavailability of the inorganic cadmium in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic cadmium (dissolved in water) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.081 µg of inorganic cadmium, the amount of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) that can be ingested daily without exceeding the intermediate duration of exposure MRL for ingested inorganic cadmium of 0.5 µg iCd/kg/day can be calculated for individuals with different body weights:

1 kg bw: (0.5 µg of iCd/day)/(0.081 µg iCd/g) = 6.2 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
10 kg bw: (5.0 µg of iCd/day)/(0.081 µg iCd/g) = 62.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
20 kg bw: (10.0 µg of iCd/day)/(0.081 µg iCd/g) = 124.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
30 kg bw: (15.0 µg of iCd/day)/(0.081 µg iCd/g) = 186.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
40 kg bw: (20.0 µg of iCd/day)/(0.081 µg iCd/g) = 248.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
50 kg bw: (25.0 µg of iCd/day)/(0.081 µg iCd/g) = 310.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
60 kg bw: (30.0 µg of iCd/day)/(0.081 µg iCd/g) = 372.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
70 kg bw: (35.0 µg of iCd/day)/(0.081 µg iCd/g) = 434.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
80 kg bw: (40.0 µg of iCd/day)/(0.081 µg iCd/g) = 496.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day

90 kg bw: $(45.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 558.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

100 kg bw: $(50.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 620.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the bioavailability of the inorganic cadmium in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic cadmium (dissolved in water), it can be concluded that 1) daily accidental or intentional ingestion of 2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) for 15 to 365 days by individuals with any body weight will not exceed the intermediate duration of exposure MRL for the ingestion of inorganic cadmium and is likely to be without an appreciable risk of adverse health effects in those individuals; 2) daily accidental or intentional ingestion of 12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) for 15 to 365 days by individuals with body weights greater than about 2 kg will not exceed the intermediate duration of exposure MRL for the ingestion of inorganic cadmium and is likely to be without an appreciable risk of adverse health effects in those individuals; and 3) daily accidental or intentional ingestion of 125 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) for 15 to 365 days by individuals with body weights greater than about 20 kg will not exceed the intermediate duration of exposure MRL for the ingestion of inorganic cadmium and is likely to be without an appreciable risk of adverse health effects in those individuals. Furthermore, because acute duration of exposure MRLs tend to be greater than intermediate duration of exposure MRLs for the same substance (often by a factor of 5 or more for heavy metals),²¹ it is likely that daily accidental or intentional ingestion of 125 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) for 14 days or less will not pose any cadmium-induced risks in individuals with any body weight.

Assuming that the bioavailability of the inorganic cadmium in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic cadmium (dissolved in water) and because 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.081 μg of inorganic cadmium, daily accidental or intentional ingestion of as much as 6.17 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) per kg of body weight for 15 to 365 days will not exceed the intermediate duration of exposure MRL for the ingestion of inorganic cadmium (0.5 $\mu\text{g/kg/day}$).

The minimum lethal acute dose of inorganic cadmium is not known. Chronic Ingestion of Inorganic Cadmium in Midnight Minerals Rich Earth Onyx Clay Mask Powder (completely dissolved in water).

Assuming that the bioavailability of the inorganic cadmium in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic cadmium (dissolved in water) and given the chronic duration of exposure (daily for over 1 year) MRL for ingested inorganic cadmium (dissolved in water) of 0.1 $\mu\text{g iCd/kg/day}$, the amount of inorganic cadmium in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) that can be ingested daily without exceeding the chronic duration of

exposure MRL for ingested inorganic cadmium (dissolved in water) of 0.1 µg iCd/kg/day can be calculated for individuals with different body weights:

1 kg bw: (1 kg)(0.1 µg iCd/kg/day) = 0.1 µg of iCd/day
10 kg bw: (10 kg)(0.1 µg iCd/kg/day) = 1.0 µg of iCd/day
20 kg bw: (20 kg)(0.1 µg iCd/kg/day) = 2.0 µg of iCd/day
30 kg bw: (30 kg)(0.1 µg iCd/kg/day) = 3.0 µg of iCd/day
40 kg bw: (40 kg)(0.1 µg iCd/kg/day) = 4.0 µg of iCd/day
50 kg bw: (50 kg)(0.1 µg iCd/kg/day) = 5.0 µg of iCd/day
60 kg bw: (60 kg)(0.1 µg iCd/kg/day) = 6.0 µg of iCd/day
70 kg bw: (70 kg)(0.1 µg iCd/kg/day) = 7.0 µg of iCd/day
80 kg bw: (80 kg)(0.1 µg iCd/kg/day) = 8.0 µg of iCd/day
90 kg bw: (90 kg)(0.1 µg iCd/kg/day) = 9.0 µg of iCd/day
100 kg bw: (100 kg)(0.1 µg iCd/kg/day) = 10.0 µg of iCd/day

Assuming that the bioavailability of the inorganic cadmium in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic cadmium (dissolved in water) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.081 µg of inorganic cadmium, the amount of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) that can be ingested daily before exceeding the chronic duration of exposure MRL for ingested inorganic cadmium of 0.1 µg iCd/kg/day can be calculated for individuals with different body weights:

1 kg bw: (0.1 µg of iCd/day)/(0.081 µg iCd/g) = 1.24 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
10 kg bw: (1.0 µg of iCd/day)/(0.081 µg iCd/g) = 12.35 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
20 kg bw: (2.0 µg of iCd/day)/(0.081 µg iCd/g) = 24.69 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
30 kg bw: (3.0 µg of iCd/day)/(0.081 µg iCd/g) = 37.04 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
40 kg bw: (4.0 µg of iCd/day)/(0.081 µg iCd/g) = 49.38 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
50 kg bw: (5.0 µg of iCd/day)/(0.081 µg iCd/g) = 61.73 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
60 kg bw: (6.0 µg of iCd/day)/(0.081 µg iCd/g) = 74.07 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
70 kg bw: (7.0 µg of iCd/day)/(0.081 µg iCd/g) = 86.42 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
80 kg bw: (8.0 µg of iCd/day)/(0.081 µg iCd/g) = 98.77 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
90 kg bw: (9.0 µg of iCd/day)/(0.081 µg iCd/g) = 111.11 g of Midnight Minerals Rich Earth Onyx Clay Mask/day

100 kg bw: $(10.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 123.46 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the bioavailability of the inorganic cadmium in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic cadmium (dissolved in water), it can be concluded that 1) daily accidental or intentional ingestion of 2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) for over 1 year by individuals with body weights greater than about 2 kg will not exceed the chronic duration of exposure MRL for the ingestion of inorganic cadmium and is likely to be without an appreciable risk of adverse health effects in those individuals; 2) daily accidental or intentional ingestion of 12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) for over 1 year by individuals with body weights greater than about 10 kg will not exceed the chronic duration of exposure MRL for the ingestion of inorganic cadmium and is likely to be without an appreciable risk of adverse health effects in those individuals; and 3) daily accidental or intentional ingestion of 125 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) for over 1 year by individuals with body weights greater than about 100 kg will not exceed the chronic duration of exposure MRL for the ingestion of inorganic cadmium (dissolved in water).

Assuming that the bioavailability of the inorganic cadmium in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic cadmium (dissolved in water) and because 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.081 μg of inorganic cadmium, daily accidental or intentional ingestion of as much as 1.23 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) per kg of body weight for over 1 year will not exceed the chronic duration of exposure MRL for the ingestion of inorganic cadmium ($0.1 \mu\text{g/kg/day}$).

Ingestion of Inorganic Cadmium in Dry Midnight Minerals Rich Earth Onyx Clay Mask Powder for 15 to 365 Days. The efficiency of the gastrointestinal absorption of ingested inorganic cadmium (in soil) is not known to be different from the efficiency of the gastrointestinal absorption of inorganic cadmium (dissolved in water). Assuming that the bioavailability of ingested inorganic cadmium (in soil) is the same as the bioavailability of ingested inorganic cadmium (dissolved in water), the amount of inorganic cadmium (in soil) that can be ingested daily without exceeding the intermediate duration of exposure MRL for ingested inorganic cadmium (dissolved in water) of $0.5 \mu\text{g iCd/kg/day}$ can be calculated for individuals with different body weights:

1 kg bw: $(1 \text{ kg})(0.5 \mu\text{g iCd/kg/day}) = 0.5 \mu\text{g of iCd/day}$
10 kg bw: $(10 \text{ kg})(0.5 \mu\text{g iCd/kg/day}) = 5.0 \mu\text{g of iCd/day}$
20 kg bw: $(20 \text{ kg})(0.5 \mu\text{g iCd/kg/day}) = 10.0 \mu\text{g of iCd/day}$
30 kg bw: $(30 \text{ kg})(0.5 \mu\text{g iCd/kg/day}) = 15.0 \mu\text{g of iCd/day}$
40 kg bw: $(40 \text{ kg})(0.5 \mu\text{g iCd/kg/day}) = 20.0 \mu\text{g of iCd/day}$
50 kg bw: $(50 \text{ kg})(0.5 \mu\text{g iCd/kg/day}) = 25.0 \mu\text{g of iCd/day}$
60 kg bw: $(60 \text{ kg})(0.5 \mu\text{g iCd/kg/day}) = 30.0 \mu\text{g of iCd/day}$

70 kg bw: $(70 \text{ kg})(0.5 \mu\text{g iCd/kg/day}) = 35.0 \mu\text{g of iCd/day}$
80 kg bw: $(80 \text{ kg})(0.5 \mu\text{g iCd/kg/day}) = 40.0 \mu\text{g of iCd/day}$
90 kg bw: $(90 \text{ kg})(0.5 \mu\text{g iCd/kg/day}) = 45.0 \mu\text{g of iCd/day}$
100 kg bw: $(100 \text{ kg})(0.5 \mu\text{g iCd/kg/day}) = 50.0 \mu\text{g of iCd/day}$

Assuming that the bioavailability of the inorganic cadmium in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic cadmium (dissolved in water) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.081 μg of inorganic cadmium, the amount of dry Midnight Minerals Rich Earth Onyx Clay Mask that can be ingested daily without exceeding the intermediate duration of exposure MRL for ingested inorganic cadmium (dissolved in water) of 0.5 $\mu\text{g iCd/kg/day}$ can be calculated for individuals with different body weights:

1 kg bw: $(0.5 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 6.2 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
10 kg bw: $(5.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 62.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
20 kg bw: $(10.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 124.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
30 kg bw: $(15.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 186.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
40 kg bw: $(20.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 248.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
50 kg bw: $(25.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 310.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
60 kg bw: $(30.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 372.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
70 kg bw: $(35.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 434.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
80 kg bw: $(40.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 496.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
90 kg bw: $(45.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 558.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
100 kg bw: $(50.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 620.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the bioavailability of the inorganic cadmium in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic cadmium (dissolved in water), it can be concluded that 1) daily accidental or intentional ingestion of 2.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for 15 to 365 days by individuals with any body weight will not exceed the intermediate duration of exposure MRL for the ingestion of inorganic cadmium (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals; 2) daily accidental or intentional ingestion of 12.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for 15 to 365 days by

individuals with body weights greater than about 2 kg will not exceed the intermediate duration of exposure MRL for the ingestion of inorganic cadmium (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals; and 3) daily accidental or intentional ingestion of 125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for 15 to 365 days by individuals with body weights greater than about 20 kg will not exceed the intermediate duration of exposure MRL for the ingestion of inorganic cadmium (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals. Furthermore, because acute duration of exposure MRLs tend to be greater than intermediate duration of exposure MRLs for the same substance (often by a factor of 5 or more for heavy metals),²¹ it is likely that daily accidental or intentional ingestion of 125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less will not pose any cadmium-induced risks in individuals with any body weight.

Chronic Ingestion of Inorganic Arsenic in Dry Midnight Minerals Rich Earth Onyx Clay Mask

Assuming that the bioavailability of the inorganic cadmium in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic cadmium (dissolved in water) and given the chronic duration of exposure (daily for over 1 year) MRL for ingested inorganic cadmium (dissolved in water) of 0.1 µg iCd/kg/day, the amount of inorganic cadmium in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask that can be ingested daily without exceeding the chronic duration of exposure MRL for ingested inorganic cadmium (dissolved in water) of 0.1 µg iCd/kg/day can be calculated for individuals with different body weights:

1 kg bw: (1 kg)(0.1 µg iCd/kg/day) = 0.1 µg of iCd/day
10 kg bw: (10 kg)(0.1 µg iCd/kg/day) = 1.0 µg of iCd/day
20 kg bw: (20 kg)(0.1 µg iCd/kg/day) = 2.0 µg of iCd/day
30 kg bw: (30 kg)(0.1 µg iCd/kg/day) = 3.0 µg of iCd/day
40 kg bw: (40 kg)(0.1 µg iCd/kg/day) = 4.0 µg of iCd/day
50 kg bw: (50 kg)(0.1 µg iCd/kg/day) = 5.0 µg of iCd/day
60 kg bw: (60 kg)(0.1 µg iCd/kg/day) = 6.0 µg of iCd/day
70 kg bw: (70 kg)(0.1 µg iCd/kg/day) = 7.0 µg of iCd/day
80 kg bw: (80 kg)(0.1 µg iCd/kg/day) = 8.0 µg of iCd/day
90 kg bw: (90 kg)(0.1 µg iCd/kg/day) = 9.0 µg of iCd/day
100 kg bw: (100 kg)(0.1 µg iCd/kg/day) = 10.0 µg of iCd/day

Assuming that the bioavailability of the inorganic cadmium in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic cadmium (dissolved in water) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.081 µg of inorganic cadmium, the amount of dry Midnight Minerals Rich Earth Onyx Clay Mask that can be ingested daily before exceeding the chronic duration of exposure MRL for ingested inorganic cadmium (dissolved in water) of 0.1 µg iCd/kg/day can be calculated for individuals with different body weights:

1 kg bw: $(0.1 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 1.24 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

10 kg bw: $(1.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 12.35 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

20 kg bw: $(2.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 24.69 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

30 kg bw: $(3.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 37.04 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

40 kg bw: $(4.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 49.38 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

50 kg bw: $(5.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 61.73 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

60 kg bw: $(6.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 74.07 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

70 kg bw: $(7.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 86.42 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

80 kg bw: $(8.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 98.77 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

90 kg bw: $(9.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 111.11 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

100 kg bw: $(10.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 123.46 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the bioavailability of the inorganic cadmium in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic cadmium (dissolved in water), it can be concluded that 1) daily accidental or intentional ingestion of 2.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with body weights greater than about 2 kg will not exceed the chronic duration of exposure MRL for the ingestion of inorganic cadmium (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals; 2) daily accidental or intentional ingestion of 12.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with body weights greater than about 10 kg will not exceed the chronic duration of exposure MRL for the ingestion of inorganic cadmium (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals; and 3) daily accidental or intentional ingestion of 125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with body weights greater than about 100 kg will not exceed the chronic duration of exposure MRL for the ingestion of inorganic cadmium (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals.

Assuming that the bioavailability of the inorganic cadmium in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic cadmium (dissolved in water) and because 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.081 μg of inorganic cadmium, daily accidental or intentional ingestion of as much as 1.23 g of

dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for over 1 year will not exceed the chronic duration of exposure MRL for the ingestion of inorganic cadmium (0.1 µg/kg/day).

The EPA has determined that the lifelong daily ingestion of 1 µg iCd/kg/day of inorganic cadmium in food is likely to be without an appreciable risk of deleterious health effects during a lifetime. Because 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.081 µg of inorganic cadmium, lifelong daily ingestion of the inorganic cadmium in as much as 12.3 g of Midnight Minerals Rich Earth Onyx Clay Mask is likely to be without an appreciable risk of deleterious health effects during a lifetime.

Topical Application of Inorganic Cadmium in Midnight Minerals Rich Earth Onyx Clay Mask Powder for 15 to 365 Days. There are no MRLs for topically applied inorganic cadmium, but useful approximations can be made.

Assuming that the efficiency of transdermal absorption of ingested inorganic cadmium (in soil) is the same as the efficiency of the gastrointestinal absorption of inorganic cadmium (dissolved in water), the daily amount of inorganic cadmium (in soil) that can be applied topically without exceeding the intermediate duration of exposure MRL for ingested inorganic cadmium of 0.5 µg iCd/kg/day can be calculated for individuals with different body weights:

1 kg bw: (1 kg)(0.5 µg iCd/kg/day) = 0.5 µg of iCd/day
10 kg bw: (10 kg)(0.5 µg iCd/kg/day) = 5.0 µg of iCd/day
20 kg bw: (20 kg)(0.5 µg iCd/kg/day) = 10.0 µg of iCd/day
30 kg bw: (30 kg)(0.5 µg iCd/kg/day) = 15.0 µg of iCd/day
40 kg bw: (40 kg)(0.5 µg iCd/kg/day) = 20.0 µg of iCd/day
50 kg bw: (50 kg)(0.5 µg iCd/kg/day) = 25.0 µg of iCd/day
60 kg bw: (60 kg)(0.5 µg iCd/kg/day) = 30.0 µg of iCd/day
70 kg bw: (70 kg)(0.5 µg iCd/kg/day) = 35.0 µg of iCd/day
80 kg bw: (80 kg)(0.5 µg iCd/kg/day) = 40.0 µg of iCd/day
90 kg bw: (90 kg)(0.5 µg iCd/kg/day) = 45.0 µg of iCd/day
100 kg bw: (100 kg)(0.5 µg iCd/kg/day) = 50.0 µg of iCd/day

Assuming that the bioavailability of the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic cadmium (in soil) and given that 1g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.081 µg of inorganic cadmium, the daily amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically without exceeding the intermediate duration of exposure MRL for ingested inorganic cadmium (dissolved in water) of 0.5 µg iCd/kg/day can be calculated for individuals with different body weights:

1 kg bw: (0.5 µg of iCd/day)/(0.081 µg iCd/g) = 6.2 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
10 kg bw: (5.0 µg of iCd/day)/(0.081 µg iCd/g) = 62.0 g of Midnight Minerals Rich Earth Onyx Clay Mask/day

20 kg bw: $(10.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 124.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

30 kg bw: $(15.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 186.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

40 kg bw: $(20.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 248.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

50 kg bw: $(25.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 310.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

60 kg bw: $(30.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 372.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

70 kg bw: $(35.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 434.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

80 kg bw: $(40.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 496.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

90 kg bw: $(45.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 558.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

100 kg bw: $(50.0 \mu\text{g of iCd/day}) / (0.081 \mu\text{g iCd/g}) = 620.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the bioavailability of the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic cadmium (whether in soil), it can be concluded that 1) daily topical application of 2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask for 15 to 365 days by individuals with any body weight will not exceed the intermediate duration of exposure MRL for the ingestion of inorganic cadmium (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals; 2) daily topical application of 12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask for 15 to 365 days by individuals with body weights greater than about 2 kg will not exceed the intermediate duration of exposure MRL for the ingestion of inorganic cadmium (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals; and 3) daily topical application of 125 g of Midnight Minerals Rich Earth Onyx Clay Mask for 15 to 365 days by individuals with body weights greater than about 20 kg will not exceed the intermediate duration of exposure MRL for the ingestion of inorganic cadmium (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals. Furthermore, because acute duration of exposure MRLs tend to be greater than intermediate duration of exposure MRLs for the same substance (often by a factor of 5 or more for heavy metals),(21) it is likely that the daily topical application of 125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less will not pose any cadmium induced risks in individuals with any body weight.

Assuming that the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask or in dissolved ingested Midnight Minerals Rich Earth Onyx Clay Mask is equally bioavailable and because 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.081 μg of inorganic cadmium, daily topical application of as much as 6.17 g of Midnight Minerals Rich

Earth Onyx Clay Mask per kg of body weight for 14 days or less will not exceed the intermediate duration of exposure MRL for the ingestion of inorganic cadmium (0.5 µg/kg/day).

However, because MRLs for the ingestion of a substance reflect a dose-response relationship that is independent of the efficiency of the transfer into the blood of a substance but are based on clinical outcomes or biomarkers of clinical outcomes that presume relative constancy in that efficiency, a decrease in the efficiency of the transdermal absorption of topically applied inorganic cadmium (in soil), compared to the efficiency of the gastrointestinal absorption of ingested inorganic cadmium (dissolved in water), will increase the amount of inorganic cadmium that can be applied topically before those referent outcomes will appear. In effect, the exposure duration-dependent MRL for topically applied inorganic cadmium (in soil) will be increased in proportion to the relative decrease in the bioavailability of topically applied inorganic cadmium (in soil) compared to the bioavailability of ingested inorganic cadmium (dissolved in water). A relative bioavailability-adjusted MRL (TRBA-MRL) for the topical application of inorganic cadmium can be estimated.

Assuming that the efficiency of the transdermal transfer of topically applied inorganic cadmium (in soil) into human blood may be as high as 0.5%⁷⁵ and applying an additional uncertainty factor of 3 for human variability,⁶⁹ the efficiency of transfer of topically applied inorganic cadmium (in soil) into human blood can be assumed to be 1.5% (or less; (0.5%)(3) = 1.5%). Assuming that the efficiency of the transdermal transfer of topically applied inorganic cadmium (in soil) into human blood is 1.5% and the efficiency of gastrointestinal absorption of ingested inorganic cadmium into human blood may be as great as 22%,⁷⁰⁻⁷⁴ correcting the intermediate duration of exposure MRL for ingested inorganic cadmium (0.5 µg iCd/kg/day) for the less efficient transfer of topically applied inorganic cadmium (in soil) into the blood (1.5%) compared to the efficiency of the transfer of ingested inorganic cadmium (in soil) into the blood (22%), a relative transdermal transfer efficiency (transdermal relative bioavailability; RBA) of 6.82% (1.5%/22%) for topically applied inorganic cadmium (in soil) can be estimated. After adjusting the intermediate duration of exposure MRL for ingested inorganic cadmium (dissolved in water) to account for the RBA of 6.82% for topically applied inorganic cadmium (in soil), a relative bioavailability-adjusted intermediate duration of exposure MRL for topically applied inorganic cadmium (in soil) can be calculated: $[(0.5 \mu\text{g iCd/kg/day})]/(.0682) = 7.33 \mu\text{g iCd/kg/day}$.

Assuming that the bioavailability of the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic cadmium (in soil), and using the relative bioavailability-adjusted intermediate duration of exposure MRL for topically applied inorganic cadmium (7.33 µg iCd/kg/day), the daily amount of inorganic cadmium in Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically for 15 to 365 days without exceeding the relative bioavailability-adjusted intermediate duration of exposure MRL for topically applied inorganic cadmium (in soil) of 7.33 µg iCd/kg/day can be calculated for individuals with different body weights:

$$1 \text{ kg bw: } (1 \text{ kg})(7.33 \mu\text{g iCd/kg/day}) = 7.3 \mu\text{g of iCd/day}$$

10 kg bw: (10 kg)(7.33 µg iCd/kg/day) = 73.3 µg of iCd/day
20 kg bw: (20 kg)(7.33 µg iCd/kg/day) = 144.6 µg of iCd/day
30 kg bw: (30 kg)(7.33 µg iCd/kg/day) = 219.9 µg of iCd/day
40 kg bw: (40 kg)(7.33 µg iCd/kg/day) = 293.2 µg of iCd/day
50 kg bw: (50 kg)(7.33 µg iCd/kg/day) = 366.5 µg of iCd/day
60 kg bw: (60 kg)(7.33 µg iCd/kg/day) = 439.8 µg of iCd/day
70 kg bw: (70 kg)(7.33 µg iCd/kg/day) = 513.1 µg of iCd/day
80 kg bw: (80 kg)(7.33 µg iCd/kg/day) = 586.4 µg of iCd/day
90 kg bw: (90 kg)(7.33 µg iCd/kg/day) = 659.7 µg of iCd/day
100 kg bw: (100 kg)(7.33 µg iCd/kg/day) = 733.0 µg of iCd/day

Assuming that the bioavailability of the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic cadmium (in soil) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.081 µg of inorganic cadmium, the daily amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically without exceeding the relative bioavailability-adjusted intermediate duration of exposure MRL for topically applied inorganic cadmium (in soil) of 7.33 µg iCd/kg/day can be calculated for individuals with different bodyweights:

1 kg bw: (7.3 µg of iCd/day)/(0.081 µg iCd/g) = 91 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
10 kg bw: (73.3 µg of iCd/day)/(0.081 µg iCd/g) = 905 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
20 kg bw: (144.6 µg of iCd/day)/(0.081 µg iCd/g) = 1,810 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
30 kg bw: (219.9 µg of iCd/day)/(0.081 µg iCd/g) = 2,715 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
40 kg bw: (293.2 µg of iCd/day)/(0.081 µg iCd/g) = 3,620 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
50 kg bw: (366.5 µg of iCd/day)/(0.081 µg iCd/g) = 4,525 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
60 kg bw: (439.8 µg of iCd/day)/(0.081 µg iCd/g) = 5,430 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
70 kg bw: (513.1 µg of iCd/day)/(0.081 µg iCd/g) = 6,335 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
80 kg bw: (586.4 µg of iCd/day)/(0.081 µg iCd/g) = 7,240 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
90 kg bw: (659.7 µg of iCd/day)/(0.081 µg iCd/g) = 8,144 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
100 kg bw: (733.0 µg of iCd/day)/(0.081 µg iCd/g) = 9,049 g of Midnight Minerals Rich Earth Onyx Clay Mask/day

From these data and calculations, assuming that the bioavailability of the inorganic cadmium in

topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic cadmium (in soil), it can be concluded that 1) daily topical application of either 2.5 g or 12.5 g, of Midnight Minerals Rich Earth Onyx Clay Mask for 15 to 365 days by individuals with any body weight will not exceed the intermediate duration of exposure relative bioavailability-adjusted MRL for topically applied inorganic cadmium (in soil) and is likely to be without an appreciable risk of adverse health effects in those individuals; and 2) daily topical application of 125 g of Midnight Minerals Rich Earth Onyx Clay Mask for 15 to 365 days by individuals with body weights greater than about 1 kg will not exceed the intermediate duration of exposure relative bioavailability-adjusted MRL for topically applied inorganic cadmium (in soil) and is likely to be without an appreciable risk of adverse health effects in those individuals.

Assuming that the relative bioavailability of the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability of ingested inorganic cadmium (in soil) and that the relative bioavailability of the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is 6.82% of the bioavailability of the inorganic cadmium in dissolved Midnight Minerals Rich Earth Onyx Clay Mask, given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.081 µg of inorganic cadmium, daily topical application of as much as 90.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for 15 to 365 days will not exceed the relative bioavailability-adjusted acute duration of exposure MRL for the ingestion of inorganic cadmium in dry Midnight Minerals Rich Earth Onyx Clay Mask (7.33 µg iCd/kg/day).

Chronic Topical Application of Inorganic Cadmium in Midnight Minerals Rich Earth Onyx Clay Mask Powder

A chronic duration of exposure (daily for over 1 year) MRL for topically applied inorganic cadmium has not been established. However, assuming that the bioavailability of topically applied inorganic cadmium (in soil) is the same as the bioavailability of ingested inorganic cadmium (dissolved in water) and given the chronic duration of exposure MRL for ingested inorganic cadmium (dissolved in water) of 0.1 µg iCd/kg/day, the daily amount of inorganic cadmium (in soil) that can be applied topically without exceeding the chronic duration of exposure MRL for ingested inorganic cadmium (dissolved in water) of 0.1 µg iCd/kg/day can be calculated for individuals with different body weights:

1 kg bw: (1 kg)(0.1 µg iCd/kg/day) = 0.1 µg of iCd/day
10 kg bw: (10 kg)(0.1 µg iCd/kg/day) = 1.0 µg of iCd/day
20 kg bw: (20 kg)(0.1 µg iCd/kg/day) = 2.0 µg of iCd/day
30 kg bw: (30 kg)(0.1 µg iCd/kg/day) = 3.0 µg of iCd/day
40 kg bw: (40 kg)(0.1 µg iCd/kg/day) = 4.0 µg of iCd/day
50 kg bw: (50 kg)(0.1 µg iCd/kg/day) = 5.0 µg of iCd/day
60 kg bw: (60 kg)(0.1 µg iCd/kg/day) = 6.0 µg of iCd/day
70 kg bw: (70 kg)(0.1 µg iCd/kg/day) = 7.0 µg of iCd/day

80 kg bw: $(80 \text{ kg})(0.1 \mu\text{g iCd/kg/day}) = 8.0 \mu\text{g of iCd/day}$
90 kg bw: $(90 \text{ kg})(0.1 \mu\text{g iCd/kg/day}) = 9.0 \mu\text{g of iCd/day}$
100 kg bw: $(100 \text{ kg})(0.1 \mu\text{g iCd/kg/day}) = 10.0 \mu\text{g of iCd/day}$

Assuming that the bioavailability of topically applied inorganic cadmium (in soil) is the same as the bioavailability of ingested inorganic cadmium (dissolved in water) and that the bioavailability of the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic cadmium (in soil), and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.081 μg of inorganic cadmium, the daily amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically for over 1 year without exceeding the chronic duration of exposure MRL for ingested inorganic cadmium (dissolved in water) of 0.1 $\mu\text{g iCd/kg/day}$ can be calculated for individuals with different body weights:

1 kg bw: $(0.1 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 1.2 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
10 kg bw: $(1.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 12.3 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
20 kg bw: $(2.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 24.7 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
30 kg bw: $(3.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 37.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
40 kg bw: $(4.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 49.4 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
50 kg bw: $(5.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 61.7 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
60 kg bw: $(6.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 74.1 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
70 kg bw: $(7.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 86.4 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
80 kg bw: $(8.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 98.8 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
90 kg bw: $(9.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 111.1 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
100 kg bw: $(10.0 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 123.5 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the bioavailability of topically applied inorganic cadmium (in soil) is the same as the bioavailability of ingested inorganic cadmium (dissolved in water) and that the bioavailability of the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic cadmium (in soil), it can be concluded that 1) daily topical application of 2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask daily for over 1 year by individuals with body weights greater than about 2 kg will not exceed the chronic duration of exposure MRL for

ingested inorganic cadmium (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals; 2) daily topical application of 12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask daily for over 1 year by individuals with body weights greater than 10 kg will not exceed the chronic duration of exposure MRL for ingested inorganic cadmium (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals; and 3) daily topical application of 125 g of Midnight Minerals Rich Earth Onyx Clay Mask daily for over 1 year by individuals with body weights greater than 102 kg will not exceed the chronic duration of exposure MRL for ingested inorganic cadmium (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals.

Assuming that the bioavailability of topically applied inorganic cadmium (in soil) is the same as the bioavailability of ingested inorganic cadmium (dissolved in water) and that the bioavailability of the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic cadmium (in soil), and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.081 µg of inorganic cadmium, daily topical application of as much as 1.23 g of Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for over 1 year will not exceed the chronic duration of exposure MRL for the ingestion of inorganic cadmium (0.1 µg iCd/kg/day).

However, the estimated relative efficiency of transdermal transfer of inorganic cadmium (in soil) into the blood (RBA) is only 6.82% of the efficiency of the gastrointestinal absorption of inorganic cadmium (dissolved in water). Therefore, an approximate relative transfer efficiency adjusted chronic duration of exposure estimated MRL for topically applied inorganic cadmium (in soil) can be calculated: $[(0.1 \mu\text{g iCd/kg/day})/0.0682] = 1.47 \mu\text{g iCd/kg/day}$.

Assuming that the relative bioavailability-adjusted chronic duration of exposure MRL for the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability-adjusted chronic duration of exposure MRL for topically applied inorganic cadmium (in soil), the daily amount of inorganic cadmium in Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically for over 1 year without exceeding the relative bioavailability-adjusted chronic duration of exposure MRL for topically applied inorganic cadmium (in soil) of 1.47 µg iCd/kg/day can be calculated for individuals with different body weights:

1 kg bw: (1 kg)(1.47 µg iCd/kg/day) = 1.47 µg of iCd/day
10 kg bw: (10 kg)(1.47 µg iCd/kg/day) = 14.70 µg of iCd/day
20 kg bw: (20 kg)(1.47 µg iCd/kg/day) = 29.40 µg of iCd/day
30 kg bw: (30 kg)(1.47 µg iCd/kg/day) = 44.10 µg of iCd/day
40 kg bw: (40 kg)(1.47 µg iCd/kg/day) = 58.80 µg of iCd/day
50 kg bw: (50 kg)(1.47 µg iCd/kg/day) = 73.50 µg of iCd/day
60 kg bw: (60 kg)(1.47 µg iCd/kg/day) = 88.20 µg of iCd/day
70 kg bw: (70 kg)(1.47 µg iCd/kg/day) = 102.90 µg of iCd/day

80 kg bw: $(80 \text{ kg})(1.47 \mu\text{g iCd/kg/day}) = 117.60 \mu\text{g of iCd/day}$
90 kg bw: $(90 \text{ kg})(1.47 \mu\text{g iCd/kg/day}) = 132.30 \mu\text{g of iCd/day}$
100 kg bw: $(100 \text{ kg})(1.47 \mu\text{g iCd/kg/day}) = 147.00 \mu\text{g of iCd/day}$

Assuming that the relative bioavailability-adjusted chronic duration of exposure MRL for the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability-adjusted chronic duration of exposure MRL for topically applied inorganic cadmium (in soil) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.081 μg of inorganic cadmium, the daily amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically for over 1 year without exceeding the relative bioavailability-adjusted chronic duration of exposure MRL for topically applied inorganic cadmium (in soil) of 1.47 $\mu\text{g iCd/kg/day}$ can be calculated for individuals with different body weights:

1 kg bw: $(1.47 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 18.1 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
10 kg bw: $(14.70 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 181.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
20 kg bw: $(29.40 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 363.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
30 kg bw: $(44.10 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 544.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
40 kg bw: $(58.80 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 726.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
50 kg bw: $(73.50 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 907.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
60 kg bw: $(88.20 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 1,089.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
70 kg bw: $(102.90 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 1,270.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
80 kg bw: $(117.60 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 1,452.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
90 kg bw: $(132.30 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 1,633.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
100 kg bw: $(147.00 \mu\text{g of iCd/day})/(0.081 \mu\text{g iCd/g}) = 1,815.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the relative bioavailability of the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability of inorganic cadmium (in soil) and that the relative bioavailability of inorganic cadmium (in soil) is 6.82% of the bioavailability of inorganic cadmium (dissolved in water), it can be concluded that 1) daily topical application of either 2.5 g or 12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year will not exceed the relative bioavailability-adjusted chronic duration of exposure MRL for ingested inorganic cadmium (in soil) for

individuals with any body weight and is likely to be without an appreciable risk of adverse health effects in those individuals; and 2) daily topical application of 125 g of Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year will not exceed the relative bioavailability-adjusted chronic duration of exposure MRL for ingested inorganic cadmium (in soil) for individuals with body weights greater than about 7 kg and is likely to be without an appreciable risk of adverse health effects in those individuals.

Assuming that the bioavailability of the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask may be about 6.82% of the bioavailability of the inorganic cadmium in dissolved Midnight Minerals Rich Earth Onyx Clay Mask, the relative bioavailability-adjusted chronic duration of exposure MRL for the inorganic cadmium in topically applied Midnight Minerals Rich Earth Onyx Clay Mask can be estimated to be 1.47 $\mu\text{g iCd/kg/day}$. Because 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.081 μg of inorganic cadmium, daily topical application of as much as 18.15 g of Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for over 1 year will not exceed the relative bioavailability-adjusted chronic duration of exposure MRL for topically applied inorganic cadmium in Midnight Minerals Rich Earth Onyx Clay Mask (1.47 $\mu\text{g iCd/kg/day}$).

The Safety of the Inorganic Mercury (Hg) in Midnight Minerals Rich Earth Onyx Clay Mask Powder

Reports of ingestion of substantial amounts of metallic mercury indicate that absorption in humans is negligible.⁸³ The percentage of ingested inorganic mercuric salts that is absorbed into the circulation is about 20%.^{84,85} The bioavailability of mercuric sulfide is less than that of mercuric chloride.⁸⁶ Approximately 95% of an oral dose of methylmercury is absorbed in humans.⁸⁷

Limited information is available regarding the dermal absorption of inorganic or organic mercury compounds in humans. Skin biopsies taken from 2 to 96 hours after application of a 0.1% solution of mercuric chloride observed electron-dense deposits, tentatively identified as mercury, in the cells in the dermis, indicating that mercuric chloride could penetrate the outer layer of the skin.⁸⁸ A case history indicates nearly complete absorption of dimethylmercury through the skin.⁸⁹

Health effects of exposure to mercury depend upon the amount of exposure, the form of mercury, and the route of exposure. Each form and route leads to different effects. The major target organs of toxicity following the ingestion of inorganic mercury are the kidneys^{84,90-93} and central nervous system.⁹²

The limited information on any adverse effects caused by topical application of ointments and creams that contain inorganic mercury compounds has concerned case studies. These ointments and creams are used in attempts to lighten the color of the skin (usually discrete patches) because mercury inhibits melanin synthesis,⁹⁴⁻⁹⁶ enhancing the lightening effect of the other ingredients (which can include hydroquinone, mequinol, topical retinoids, azelaic acid, arbutin and deoxyarbutin, kojic acid, salicylic acid, titanium dioxide, licorice extract, ascorbic

acid, vitamin E, soy, aleosin, niacinamide, and N-acetylglucosamine^{97,98}). Prolonged daily topical application of such ointments and creams often produces pain in the limbs, head, abdomen, or lower back, proteinuria (indicative of kidney damage), membranous nephropathy, irritability, insomnia, depression, anxiety, or memory loss⁹⁹⁻¹⁰³ when the products contain more than the FDA mandated limit of 1 ppm mercury.¹⁰⁴ Typically, products associated with these adverse reactions have contained 423 ppm inorganic mercury to 221,000 ppm inorganic mercury.^{99,101,105-115}

However, the topical application of creams and ointments containing 1 ppm or less of inorganic mercury, even for many years, usually does not produce any adverse effects.^{99, 116}

Exposure to inorganic mercury does not necessarily mean that adverse health effects will result; toxicity of exposure to inorganic mercury depends on dose and duration of oral exposure. A Minimal Risk Level (MRL) is defined as an estimate of daily human exposure to a substance that is likely to be without an appreciable risk of adverse health effects over a specified duration of exposure and is determined by the US Agency for Toxic Substances and Disease Registry of the Centers for Disease Control and Prevention (ATSDR).¹⁸ Although the term, MRL, may seem to imply a slight level of risk, MRLs are, in fact, considered to represent safe levels of exposure for all populations, including sensitive subgroups. MRLs are derived when reliable and sufficient data exist to identify the target organ(s) of effect or the most sensitive health effect(s) for a specific duration within a given route of exposure. MRLs are based on noncancerous health effects only and do not consider carcinogenic effects. MRLs can be derived for acute (daily for 14 days or less), intermediate (daily for 15 days to 365 days), and chronic (daily for over 1 year) duration exposures for inhalation and oral routes of exposure. Appropriate methodology does not exist to develop MRLs for dermal exposure. An MRL is set below a level of exposure that might cause adverse health effects in the people most sensitive to such substance-induced effects and is neither a threshold for toxicity nor a level beyond which toxicity is likely to occur.

Nonetheless, MRLs are the current standard against which to evaluate exposures to mercury. Estimates of the amounts of ingested inorganic mercury posing minimal risk to humans (MRLs) have been made for acute duration and intermediate duration daily exposures to ingested mercury but not for the chronic daily ingestion of inorganic mercury.¹¹⁷ The ATSDR has derived an acute duration of exposure MRL for ingested inorganic mercury (iHg) in water of 7 µg iHg/kg/day and an intermediate duration of exposure MRL for ingested inorganic mercury in water of 2 µg iHg/kg/day.^{21,117} The ATSDR has also established a chronic duration of exposure MRL for ingested methylmercury of 0.3 µg methylmercury/kg/day (equivalent to 21 µg methylmercury/day for a 70-kg adult); MRLs for acute or intermediate durations of oral methylmercury ingestion have not been determined.¹¹⁷ Appropriate methodology does not exist to develop MRLs for dermal exposures to either inorganic mercury or methylmercury.¹¹⁷ The FDA-mandated limit is 1 ppm inorganic mercury for topically applied creams and ointments that are to be applied daily for prolonged periods of time.¹⁰⁴

Acute lethal doses of inorganic mercury estimated from post-dosing tissue concentrations of inorganic mercury range from 10,000 µg iHg to 93,000 µg iHg.¹¹⁷⁻¹²⁰

Midnight Minerals Rich Earth Onyx Clay Mask

Midnight Minerals Rich Earth Onyx Clay Mask contains 0.058 ppm inorganic mercury (iHg).
 $0.058 \text{ ppm} = 0.058 \text{ } \mu\text{g/g}$; therefore:

1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains $(0.058 \text{ } \mu\text{g iHg/g})(1 \text{ g}) = 0.058 \text{ } \mu\text{g iHg}$

2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask contains $(0.058 \text{ } \mu\text{g iHg/g})(2.5 \text{ g}) = 0.145 \text{ } \mu\text{g iHg}$

12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask contains $(0.058 \text{ } \mu\text{g iHg/g})(12.5 \text{ g}) = 0.725 \text{ } \mu\text{g iHg}$

125 g of Midnight Minerals Rich Earth Onyx Clay Mask contains $(0.058 \text{ } \mu\text{g iHg/g})(125 \text{ g}) = 7.25 \text{ } \mu\text{g iHg}$

Acute Ingestion of Inorganic Mercury in Midnight Minerals Rich Earth Onyx Clay Mask Powder (completely dissolved in water).

Given the acute duration of exposure MRL for ingested inorganic mercury (dissolved in water) of $7 \text{ } \mu\text{g iHg/kg/day}$, the amount of inorganic mercury (dissolved in water) that can be ingested daily without exceeding the acute duration of exposure MRL for ingested inorganic mercury (dissolved in water) of $7 \text{ } \mu\text{g iHg/kg/day}$ can be calculated for individuals with different body weights:

1 kg bw: $(1 \text{ kg})(7 \text{ } \mu\text{g iHg/kg/day}) = 7 \text{ } \mu\text{g of iHg/day}$
10 kg bw: $(10 \text{ kg})(7 \text{ } \mu\text{g iHg/kg/day}) = 70 \text{ } \mu\text{g of iHg/day}$
20 kg bw: $(20 \text{ kg})(7 \text{ } \mu\text{g iHg/kg/day}) = 140 \text{ } \mu\text{g of iHg/day}$
30 kg bw: $(30 \text{ kg})(7 \text{ } \mu\text{g iHg/kg/day}) = 210 \text{ } \mu\text{g of iHg/day}$
40 kg bw: $(40 \text{ kg})(7 \text{ } \mu\text{g iHg/kg/day}) = 280 \text{ } \mu\text{g of iHg/day}$
50 kg bw: $(50 \text{ kg})(7 \text{ } \mu\text{g iHg/kg/day}) = 350 \text{ } \mu\text{g of iHg/day}$
60 kg bw: $(60 \text{ kg})(7 \text{ } \mu\text{g iHg/kg/day}) = 420 \text{ } \mu\text{g of iHg/day}$
70 kg bw: $(70 \text{ kg})(7 \text{ } \mu\text{g iHg/kg/day}) = 490 \text{ } \mu\text{g of iHg/day}$
80 kg bw: $(80 \text{ kg})(7 \text{ } \mu\text{g iHg/kg/day}) = 560 \text{ } \mu\text{g of iHg/day}$
90 kg bw: $(90 \text{ kg})(7 \text{ } \mu\text{g iHg/kg/day}) = 630 \text{ } \mu\text{g of iHg/day}$
100 kg bw: $(100 \text{ kg})(7 \text{ } \mu\text{g iHg/kg/day}) = 700 \text{ } \mu\text{g of iHg/day}$

Assuming that the bioavailability of the inorganic mercury in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic mercury (dissolved in water) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains $0.058 \text{ } \mu\text{g}$ of inorganic mercury, the amount of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) that can be ingested daily without exceeding the acute duration of exposure MRL for ingested inorganic mercury of $7 \text{ } \mu\text{g iHg/kg/day}$ can be calculated for individuals with different body weights:

1 kg bw: $(7 \text{ } \mu\text{g of iHg/day})/(0.058 \text{ } \mu\text{g iHg/g}) = 121 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

10 kg bw: $(70 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 1,207 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

20 kg bw: $(140 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 2,414 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

30 kg bw: $(210 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 3,621 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

40 kg bw: $(280 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 4,828 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

50 kg bw: $(350 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 6,035 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

60 kg bw: $(420 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 7,241 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

70 kg bw: $(490 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 8,448 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

80 kg bw: $(560 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 9,655 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

90 kg bw: $(630 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 10,862 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

100 kg bw: $(700 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 12,069 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the bioavailability of the inorganic mercury in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic mercury (dissolved in water), it can be concluded that daily accidental or intentional ingestion of either 2.5 g, 12.5 g, or 125 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) for 14 days or less by individuals with any body weight will not exceed the acute duration of exposure MRL for the ingestion of inorganic mercury (dissolved in water) and is likely to be without an appreciable risk of adverse health effects.

Assuming that the bioavailability of the inorganic mercury in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic mercury (dissolved in water) and because 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.058 μg of inorganic mercury, daily accidental or intentional ingestion of as much as 121 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) per kg of body weight for 14 days or less will not exceed the acute duration of exposure MRL for the ingestion of inorganic mercury (7 $\mu\text{g}/\text{kg}/\text{day}$).

Assuming that the bioavailability of the inorganic mercury in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic mercury (dissolved in water) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.058 μg of mercury, the amount of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) that can be ingested at one time without exceeding the minimum

lethal dose of ingested inorganic mercury (dissolved in water) of 10,000 µg iHg is $(10,000 \mu\text{g iHg}) / (0.058 \mu\text{g iHg/g}) = 172,414 \text{ g}$ Midnight Minerals Rich Earth Onyx Clay Mask.

Chronic Ingestion of Inorganic Mercury in Midnight Minerals Rich Earth Onyx Clay Mask Powder (completely dissolved in water). A chronic duration of exposure (daily for over 1 year) MRL for ingested inorganic mercury (dissolved in water) has not been established. However, an intermediate duration MRL for ingested inorganic mercury (dissolved in water) has been determined (2 µg iHg/kg/day) and from this an approximate chronic duration of exposure MRL for ingested inorganic mercury (dissolved in water) can be estimated. Using as analogies the ratios of the intermediate duration of exposure MRLs to the chronic duration of exposure MRLs for ingested inorganic cadmium [(0.5 µg Cd/kg/day):(0.1 µg Cd/kg/day)] and ingested inorganic chromium(IV) [(5 µg Cr/kg/day):(0.9 µg Cr/kg/day)],²¹ dividing the intermediate duration of exposure MRL for ingested inorganic mercury (2 µg iHg/kg/day) by the common factor of 5 yields a reasonable approximation of a chronic duration of exposure MRL for ingested inorganic mercury of 0.4 µg iHg/kg/day (2 µg iHg/kg/day)/5). Further dividing by an uncertainty factor of 3 for human variability⁶⁹ results in an approximate chronic duration of exposure MRL for ingested inorganic mercury (dissolved in water) of 0.133 µg iHg/kg/day.

Assuming that the estimated approximate chronic duration of exposure MRL for ingested inorganic mercury (dissolved in water) is 0.133 µg iHg/kg/day, the amount of inorganic mercury (dissolved in water) that can be ingested daily without exceeding the estimated approximate chronic duration of exposure MRL for ingested inorganic mercury (dissolved in water) of 0.133 µg iHg/kg/day can be calculated for individuals with different body weights:

1 kg bw: $(1 \text{ kg})(0.133 \mu\text{g iHg/kg/day}) = 0.133 \mu\text{g of iHg/day}$
10 kg bw: $(10 \text{ kg})(0.133 \mu\text{g iHg/kg/day}) = 1.330 \mu\text{g of iHg/day}$
20 kg bw: $(20 \text{ kg})(0.133 \mu\text{g iHg/kg/day}) = 2.660 \mu\text{g of iHg/day}$
30 kg bw: $(30 \text{ kg})(0.133 \mu\text{g iHg/kg/day}) = 3.990 \mu\text{g of iHg/day}$
40 kg bw: $(40 \text{ kg})(0.133 \mu\text{g iHg/kg/day}) = 5.320 \mu\text{g of iHg/day}$
50 kg bw: $(50 \text{ kg})(0.133 \mu\text{g iHg/kg/day}) = 6.650 \mu\text{g of iHg/day}$
60 kg bw: $(60 \text{ kg})(0.133 \mu\text{g iHg/kg/day}) = 7.980 \mu\text{g of iHg/day}$
70 kg bw: $(70 \text{ kg})(0.133 \mu\text{g iHg/kg/day}) = 9.310 \mu\text{g of iHg/day}$
80 kg bw: $(80 \text{ kg})(0.133 \mu\text{g iHg/kg/day}) = 10.640 \mu\text{g of iHg/day}$
90 kg bw: $(90 \text{ kg})(0.133 \mu\text{g iHg/kg/day}) = 11.970 \mu\text{g of iHg/day}$
100 kg bw: $(100 \text{ kg})(0.133 \mu\text{g iHg/kg/day}) = 13.300 \mu\text{g of iHg/day}$

Assuming that the bioavailability of the inorganic mercury in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic mercury (dissolved in water) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.058 µg of inorganic mercury, the amount of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) that can be ingested daily before exceeding the estimated approximate chronic duration of exposure MRL for ingested inorganic mercury of 0.133 µg iHg/kg/day can be calculated for individuals with different body weights:

1 kg bw: $(0.133 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 2.3 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

10 kg bw: $(1.330 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 22.9 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

20 kg bw: $(2.660 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 45.9 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

30 kg bw: $(3.990 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 68.8 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

40 kg bw: $(5.320 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 91.7 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

50 kg bw: $(6.650 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 114.7 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

60 kg bw: $(7.980 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 137.6 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

70 kg bw: $(9.310 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 160.5 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

80 kg bw: $(10.640 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 183.4 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

90 kg bw: $(11.970 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 206.4 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

100 kg bw: $(13.300 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 229.3 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the bioavailability of the inorganic mercury in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic mercury (dissolved in water), it can be concluded that 1) daily accidental or intentional ingestion of 2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) for over 1 year by individuals with any body weight will not exceed the estimated approximate chronic duration of exposure MRL for the ingestion of inorganic mercury (dissolved in water) and is likely to be without an appreciable risk of adverse health effects; 2) daily accidental or intentional ingestion of 12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) for over 1 year by individuals with body weights greater than about 5 kg will not exceed the estimated approximate chronic duration of exposure MRL for the ingestion of inorganic mercury (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals; and 3) daily accidental or intentional ingestion of 125 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) for over 1 year by individuals with body weights greater than about 55 kg will not exceed the estimated approximate chronic duration of exposure MRL for the ingestion of inorganic mercury (dissolved in water) and is likely to be without an appreciable risk of adverse health effects in those individuals.

Assuming that the bioavailability of the inorganic mercury in ingested Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) is the same as the bioavailability of ingested inorganic mercury (dissolved in water) and because 1 g of Midnight Minerals Rich Earth Onyx

Clay Mask contains 0.058 µg of inorganic mercury, daily accidental or intentional ingestion of as much as 2.29 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) per kg of body weight for over 1 year will not exceed the estimated approximate chronic duration of exposure MRL for the ingestion of inorganic mercury (0.133 µg/kg/day).

Acute Ingestion of Inorganic Mercury in Dry Midnight Minerals Rich Earth Onyx Clay Mask Powder. The efficiency of the gastrointestinal absorption of ingested inorganic mercury (in soil) is not known to be different from the efficiency of the gastrointestinal absorption of inorganic mercury (dissolved in water).

Given the acute duration of exposure MRL for ingested inorganic mercury (dissolved in water) of 7 µg Hg/kg/day, the amount of inorganic mercury (in soil) that can be ingested daily without exceeding the acute duration of exposure MRL for ingested inorganic mercury (dissolved in water) of 7 µg iHg/kg/day can be calculated for individuals with different body weights:

1 kg bw: (1 kg)(7 µg iHg/kg/day) = 7 µg of iHg/day
10 kg bw: (10 kg)(7 µg iHg/kg/day) = 70 µg of iHg/day
20 kg bw: (20 kg)(7 µg iHg/kg/day) = 140 µg of iHg/day
30 kg bw: (30 kg)(7 µg iHg/kg/day) = 210 µg of iHg/day
40 kg bw: (40 kg)(7 µg iHg/kg/day) = 280 µg of iHg/day
50 kg bw: (50 kg)(7 µg iHg/kg/day) = 350 µg of iHg/day
60 kg bw: (60 kg)(7 µg iHg/kg/day) = 420 µg of iHg/day
70 kg bw: (70 kg)(7 µg iHg/kg/day) = 490 µg of iHg/day
80 kg bw: (80 kg)(7 µg iHg/kg/day) = 560 µg of iHg/day
90 kg bw: (90 kg)(7 µg iHg/kg/day) = 630 µg of iHg/day
100 kg bw: (100 kg)(7 µg iHg/kg/day) = 700 µg of iHg/day

Assuming that the bioavailability of the inorganic mercury in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic mercury (in soil) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.058 µg of inorganic mercury, the amount of dry Midnight Minerals Rich Earth Onyx Clay Mask that can be ingested daily without exceeding the acute duration of exposure MRL for ingested inorganic mercury (dissolved in water) of 7 µg iHg/kg/day can be calculated for individuals with different body weights:

1 kg bw: (7 µg of iHg/day)/(0.058 µg iHg/g) = 121 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
10 kg bw: (70 µg of iHg/day)/(0.058 µg iHg/g) = 1,207 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
20 kg bw: (140 µg of iHg/day)/(0.058 µg iHg/g) = 2,414 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
30 kg bw: (210 µg of iHg/day)/(0.058 µg iHg/g) = 3,621 g of Midnight Minerals Rich Earth Onyx Clay Mask/day

40 kg bw: $(280 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 4,828 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

50 kg bw: $(350 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 6,035 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

60 kg bw: $(420 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 7,241 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

70 kg bw: $(490 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 8,448 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

80 kg bw: $(560 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 9,655 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

90 kg bw: $(630 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 10,862 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

100 kg bw: $(700 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 12,069 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the bioavailability of the inorganic mercury in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic mercury (dissolved in water), it can be concluded that daily accidental or intentional ingestion of either 2.5 g, 12.5 g, or 125 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) for 14 days or less by individuals with any body weight will not exceed the acute duration of exposure MRL for the ingestion of inorganic mercury (dissolved in water) and is likely to be without an appreciable risk of adverse health effects.

Assuming that the bioavailability of the inorganic mercury in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic mercury (dissolved in water) and because 1g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.058 μg of inorganic mercury, daily accidental or intentional ingestion of as much as 121 g of Midnight Minerals Rich Earth Onyx Clay Mask (dissolved in water) per kg of body weight for 14 days or less will not exceed the acute duration of exposure MRL for the ingestion of inorganic mercury (7 $\mu\text{g/kg/day}$).

Assuming that the bioavailability of the inorganic mercury in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic mercury (dissolved in water) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.058 μg of mercury, the amount of dry Midnight Minerals Rich Earth Onyx Clay Mask that can be ingested at one time without exceeding the minimum lethal dose of ingested inorganic mercury (dissolved in water) of 10,000 $\mu\text{g iHg}$ is $(10,000 \mu\text{g iHg}) / (0.058 \mu\text{g iHg/g}) = 172,414 \text{ g}$ Midnight Minerals Rich Earth Onyx Clay Mask.

Chronic Ingestion of Inorganic Mercury in Dry Midnight Minerals Rich Earth Onyx Clay Mask Powder. A chronic duration of exposure (daily for over 1 year) MRL for ingested inorganic mercury (dissolved in water) has not been established. However, an intermediate duration MRL for ingested inorganic mercury (dissolved in water) has been determined (2 $\mu\text{g iHg/kg/day}$) and from this an approximate chronic duration of exposure MRL for ingested inorganic mercury (dissolved in water) can be estimated. Using as analogies the ratios of the intermediate

duration of exposure MRLs to the chronic duration of exposure MRLs for ingested inorganic cadmium [(0.5 µg Cd/kg/day):(0.1 µg Cd/kg/day)] and ingested inorganic chromium(IV) [(5 µg Cr/kg/day):(0.9 µg Cr/kg/day)],²¹ dividing the intermediate duration of exposure MRL for ingested inorganic mercury (2 µg iHg/kg/day) by the common factor of 5 yields a reasonable approximation of a chronic duration of exposure MRL for ingested inorganic mercury of 0.4 µg iHg/kg/day (2 µg iHg/kg/day)/5).

Further diving by an uncertainty factor of 3 for human variability⁶⁹ results in an approximate chronic duration of exposure MRL for ingested inorganic mercury of 0.133 µg iHg/kg/day. Given that the estimated approximate chronic duration of exposure MRL for ingested inorganic mercury (dissolved in water) is 0.133 µg iHg/kg/day, the amount of inorganic mercury (dissolved in water) that can be ingested daily for over 1 year without exceeding the estimated approximate chronic duration of exposure MRL for ingested inorganic mercury (dissolved in water) of 0.133 µg iHg/kg/day can be calculated for individuals with different body weights:

1 kg bw: (1 kg)(0.133 µg iHg/kg/day) = 0.133 µg of iHg/day
10 kg bw: (10 kg)(0.133 µg iHg/kg/day) = 1.330 µg of iHg/day
20 kg bw: (20 kg)(0.133 µg iHg/kg/day) = 2.660 µg of iHg/day
30 kg bw: (30 kg)(0.133 µg iHg/kg/day) = 3.990 µg of iHg/day
40 kg bw: (40 kg)(0.133 µg iHg/kg/day) = 5.320 µg of iHg/day
50 kg bw: (50 kg)(0.133 µg iHg/kg/day) = 6.650 µg of iHg/day
60 kg bw: (60 kg)(0.133 µg iHg/kg/day) = 7.980 µg of iHg/day
70 kg bw: (70 kg)(0.133 µg iHg/kg/day) = 9.310 µg of iHg/day
80 kg bw: (80 kg)(0.133 µg iHg/kg/day) = 10.640 µg of iHg/day
90 kg bw: (90 kg)(0.133 µg iHg/kg/day) = 11.970 µg of iHg/day
100 kg bw: (100 kg)(0.133 µg iHg/kg/day) = 13.300 µg of iHg/day

The efficiency of the gastrointestinal absorption of ingested inorganic mercury (in soil) is not known to be different from the efficiency of the gastrointestinal absorption of inorganic mercury (dissolved in water). Assuming that the bioavailability of the inorganic mercury in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic mercury (in soil) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.058 µg of inorganic mercury, the amount of dry Midnight Minerals Rich Earth Onyx Clay Mask that can be ingested daily before exceeding the estimated approximate chronic duration of exposure MRL for ingested inorganic mercury (dissolved in water) of 0.133 µg iHg/kg/day can be calculated for individuals with different body weights:

1 kg bw: (0.133 µg of iHg/day)/(0.0528 µg iHg/g) = 2.3 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
10 kg bw: (1.330 µg of iHg/day)/(0.0528 µg iHg/g) = 22.9 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
20 kg bw: (2.660 µg of iHg/day)/(0.0528 µg iHg/g) = 45.9 g of Midnight Minerals Rich Earth Onyx Clay Mask/day

30 kg bw: $(3.990 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 68.8 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

40 kg bw: $(5.320 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 91.7 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

50 kg bw: $(6.650 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 114.7 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

60 kg bw: $(7.980 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 137.6 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

70 kg bw: $(9.310 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 160.5 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

80 kg bw: $(10.640 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 183.4 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

90 kg bw: $(11.970 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 206.4 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

100 kg bw: $(13.300 \mu\text{g of iHg/day}) / (0.0528 \mu\text{g iHg/g}) = 229.3 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the bioavailability of the inorganic mercury in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic mercury (in soil), it can be concluded that 1) daily accidental or intentional ingestion of 2.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with any body weight will not exceed the estimated approximate chronic duration of exposure MRL for the ingestion of inorganic mercury (in soil) and is likely to be without an appreciable risk of adverse health effects in those individuals; 2) daily accidental or intentional ingestion of 12.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with body weights greater than about 5 kg will not exceed the estimated approximate chronic duration of exposure MRL for the ingestion of inorganic mercury (in soil) and is likely to be without an appreciable risk of adverse health effects in those individuals; and 3) daily accidental or intentional ingestion of 125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with body weights greater than about 55 kg will not exceed the estimated approximate chronic duration of exposure MRL for the ingestion of inorganic mercury (in soil) and is likely to be without an appreciable risk of adverse health effects in those individuals.

Acute Topical Application of Inorganic Mercury in Midnight Minerals Rich Earth Onyx Clay Mask Powder

Although MRLs for topically applied inorganic mercury have not been determined, useful approximations can be made. Assuming that the efficiency of the transdermal absorption of ingested inorganic mercury (in soil) is the same as the efficiency of the gastrointestinal absorption of inorganic mercury (dissolved in water), the daily amount of inorganic mercury (in soil) that can be applied topically for 14 days or less without exceeding the acute duration of exposure MRL for ingested inorganic mercury (dissolved in water) of $7 \mu\text{g iHg/kg/day}$ can be calculated for individuals with different body weights:

1 kg bw: $(1 \text{ kg})(7 \mu\text{g iHg/kg/day}) = 7 \mu\text{g of iHg/day}$
10 kg bw: $(10 \text{ kg})(7 \mu\text{g iHg/kg/day}) = 70 \mu\text{g of iHg/day}$
20 kg bw: $(20 \text{ kg})(7 \mu\text{g iHg/kg/day}) = 140 \mu\text{g of iHg/day}$
30 kg bw: $(30 \text{ kg})(7 \mu\text{g iHg/kg/day}) = 210 \mu\text{g of iHg/day}$
40 kg bw: $(40 \text{ kg})(7 \mu\text{g iHg/kg/day}) = 280 \mu\text{g of iHg/day}$
50 kg bw: $(50 \text{ kg})(7 \mu\text{g iHg/kg/day}) = 350 \mu\text{g of iHg/day}$
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60 kg bw: $(60 \text{ kg})(7 \mu\text{g iHg/kg/day}) = 420 \mu\text{g of iHg/day}$
70 kg bw: $(70 \text{ kg})(7 \mu\text{g iHg/kg/day}) = 490 \mu\text{g of iHg/day}$
80 kg bw: $(80 \text{ kg})(7 \mu\text{g iHg/kg/day}) = 560 \mu\text{g of iHg/day}$
90 kg bw: $(90 \text{ kg})(7 \mu\text{g iHg/kg/day}) = 630 \mu\text{g of iHg/day}$
100 kg bw: $(100 \text{ kg})(7 \mu\text{g iHg/kg/day}) = 700 \mu\text{g of iHg/day}$

Assuming that the bioavailability of the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic mercury (dissolved in water) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.058 μg of inorganic mercury, the daily amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically for 14 days or less without exceeding the acute duration of exposure MRL for ingested inorganic mercury (dissolved in water) of 7 $\mu\text{g iHg/kg/day}$ can be calculated for individuals with different body weights:

1 kg bw: $(7 \mu\text{g of iHg/day})/(0.058 \mu\text{g iHg/g}) = 121 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
10 kg bw: $(70 \mu\text{g of iHg/day})/(0.058 \mu\text{g iHg/g}) = 1,207 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
20 kg bw: $(140 \mu\text{g of iHg/day})/(0.058 \mu\text{g iHg/g}) = 2,414 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
30 kg bw: $(210 \mu\text{g of iHg/day})/(0.058 \mu\text{g iHg/g}) = 3,621 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
40 kg bw: $(280 \mu\text{g of iHg/day})/(0.058 \mu\text{g iHg/g}) = 4,828 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
50 kg bw: $(350 \mu\text{g of iHg/day})/(0.058 \mu\text{g iHg/g}) = 6,035 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
60 kg bw: $(420 \mu\text{g of iHg/day})/(0.058 \mu\text{g iHg/g}) = 7,241 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
70 kg bw: $(490 \mu\text{g of iHg/day})/(0.058 \mu\text{g iHg/g}) = 8,448 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
80 kg bw: $(560 \mu\text{g of iHg/day})/(0.058 \mu\text{g iHg/g}) = 9,655 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
90 kg bw: $(630 \mu\text{g of iHg/day})/(0.058 \mu\text{g iHg/g}) = 10,862 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$
100 kg bw: $(700 \mu\text{g of iHg/day})/(0.058 \mu\text{g iHg/g}) = 12,069 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the relative bioavailability of the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic mercury (dissolved in water), it can be concluded that the daily topical application of either 2.5 g, 12.5 g, or 125 g of Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less will not exceed the acute duration of exposure MRL for the ingestion of inorganic mercury (in soil) for any body weight and is likely to be without an appreciable risk of adverse health effects.

Assuming that the bioavailability of the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic mercury (dissolved in water) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.058 µg of inorganic mercury, the amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically at one time without exceeding the minimum lethal dose of ingested inorganic mercury (dissolved in water) of 10,000 µg iHg is $(10,000 \mu\text{g iHg}) / (0.058 \mu\text{g iHg/g}) = 172,414 \text{ g}$ Midnight Minerals Rich Earth Onyx Clay Mask.

However, because MRLs for the ingestion of a substance reflect a dose-response relationship that is independent of the efficiency of the transfer into the blood of a substance but are based on clinical outcomes or biomarkers of clinical outcomes that presume relative constancy in that efficiency, a decrease in the efficiency of the transdermal absorption of topically applied inorganic mercury (in soil), compared to the efficiency of the gastrointestinal absorption of ingested inorganic mercury (dissolved in water), will increase the amount of inorganic mercury that can be applied topically before those referent outcomes will appear.

In effect, the exposure duration-dependent MRL for topically applied inorganic mercury (in soil) will be increased in proportion to the relative decrease in the bioavailability of topically applied inorganic mercury (in soil) compared to the bioavailability of ingested inorganic mercury (dissolved in water). A relative bioavailability-adjusted MRL for the topical application of inorganic mercury can be estimated.

Assuming that the efficiency of the transdermal transfer of topically applied inorganic mercury (in soil) into human blood may be about 1%, and the efficiency of gastrointestinal absorption of ingested inorganic mercury (dissolved in water) into human blood may be 20%, correcting the acute duration of exposure MRL for ingested inorganic mercury (dissolved in water) of 7 µg iHg/kg/day for the less efficient transfer of topically applied inorganic mercury (in soil) into the blood (1%) compared to the efficiency of the transfer of ingested inorganic mercury (dissolved in water) into the blood (20%), a relative transdermal transfer efficiency (transdermal relative bioavailability; RBA) of 5% (1%/20%) for topically applied inorganic mercury (in soil) can be estimated. After adjusting the acute duration of exposure MRL for ingested inorganic mercury (dissolved in water) to account for the RBA of 5% for topically applied inorganic mercury (in soil), a relative bioavailability-adjusted acute duration of exposure MRL for topically applied inorganic mercury (in soil) can be estimated: $[(7 \mu\text{g iHg/kg/day}) / (0.05)] = 140 \mu\text{g iHg/kg/day}$.

Assuming that the bioavailability of the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic mercury (in soil) and that the relative bioavailability-adjusted acute duration of exposure MRL for topically applied inorganic mercury (in soil) is 140 µg iHg/kg/day, the daily amount of inorganic mercury in Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically for 14 days or less without exceeding the relative bioavailability-adjusted acute duration of exposure MRL for topically applied inorganic mercury (in soil) of 140 µg iHg/kg/day can be calculated for individuals with different body weights:

1 kg bw: (1 kg)(140 µg iHg/kg/day) = 140 µg of iHg/day
10 kg bw: (10 kg)(140 µg iHg/kg/day) = 1,400 µg of iHg/day
20 kg bw: (20 kg)(140 µg iHg/kg/day) = 2,800 µg of iHg/day
30 kg bw: (30 kg)(140 µg iHg/kg/day) = 4,200 µg of iHg/day
40 kg bw: (40 kg)(140 µg iHg/kg/day) = 5,600 µg of iHg/day
50 kg bw: (50 kg)(140 µg iHg/kg/day) = 7,000 µg of iHg/day
60 kg bw: (60 kg)(140 µg iHg/kg/day) = 8,400 µg of iHg/day
70 kg bw: (70 kg)(140 µg iHg/kg/day) = 9,800 µg of iHg/day
80 kg bw: (80 kg)(140 µg iHg/kg/day) = 11,200 µg of iHg/day
90 kg bw: (90 kg)(140 µg iHg/kg/day) = 12,600 µg of iHg/day
100 kg bw: (100 kg)(140 µg iHg/kg/day) = 14,000 µg of iHg/day

Assuming that the bioavailability of the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic mercury (in soil) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.058 µg of inorganic mercury, the daily amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically for 14 days or less without exceeding the relative bioavailability-adjusted acute duration of exposure MRL for topically applied inorganic mercury (in soil) of 140 µg iHg/kg/day can be calculated for individuals with different body weights:

1 kg bw: (140 µg of iHg/day)/(0.058 µg iHg/g) = 2,414 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
10 kg bw: (1,400 µg of iHg/day)/(0.058 µg iHg/g) = 24,138 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
20 kg bw: (2,800 µg of iHg/day)/(0.058 µg iHg/g) = 48,276 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
30 kg bw: (4,200 µg of iHg/day)/(0.058 µg iHg/g) = 72,414 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
40 kg bw: (5,600 µg of iHg/day)/(0.058 µg iHg/g) = 96,552 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
50 kg bw: (7,000 µg of iHg/day)/(0.058 µg iHg/g) = 120,690 g of Midnight Minerals Rich Earth Onyx Clay Mask/day
60 kg bw: (8,400 µg of iHg/day)/(0.058 µg iHg/g) = 144,828 g of Midnight Minerals Rich Earth Onyx Clay Mask/day

70 kg bw: $(9,800 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 168,966 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

80 kg bw: $(11,200 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 193,103 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

90 kg bw: $(12,600 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 217,241 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

100 kg bw: $(14,000 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 241,379 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the relative bioavailability of the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability of topically applied inorganic mercury in soil, it can be concluded that the daily topical application of either 2.5 g, 12.5 g, or 125 g of Midnight Minerals Rich Earth Onyx Clay Mask for 14 days or less by individuals with any body weight will not exceed the relative bioavailability-adjusted acute duration of exposure MRL for topically applied inorganic mercury (in soil) ($140 \mu\text{g iHg/kg/day}$) and is likely to be without an appreciable risk of adverse health effects.

Assuming that the relative bioavailability of the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability of ingested inorganic mercury (in soil) and that the relative bioavailability of the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is 3.125% of the bioavailability of the inorganic arsenic in dissolved ingested Midnight Minerals Rich Earth Onyx Clay Mask, given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains $0.058 \mu\text{g}$ of inorganic mercury, daily topical application of as much as 2,759 g of dry Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for 14 days or less will not exceed the relative bioavailability-adjusted acute duration of exposure MRL for the ingestion of inorganic mercury (in soil) ($160 \mu\text{g/kg/day}$).

Assuming that the relative bioavailability of the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability of ingested inorganic mercury (in soil) and that the relative bioavailability of the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is 5% of the bioavailability of the inorganic mercury in dissolved ingested Midnight Minerals Rich Earth Onyx Clay Mask, given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains $0.058 \mu\text{g}$ of inorganic mercury, the amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically at one time without exceeding the minimum lethal dose of ingested inorganic mercury (dissolved in water) of $10,000 \mu\text{g iHg}$ is $[(10,000 \mu\text{g iHg}) / (0.058 \mu\text{g iHg/g})] / 0.05 = 3,448,276 \text{ g Midnight Minerals Rich Earth Onyx Clay Mask}$.

Chronic Topical Application of Inorganic Mercury in Midnight Minerals Rich Earth Onyx Clay Mask Powder. A chronic duration of exposure (daily for over 1 year) MRL for topically applied

inorganic mercury has not been established. A chronic duration of exposure (daily for over 1 year) MRL for topically applied inorganic mercury should be approximately the same as the chronic duration of exposure MRL for ingested inorganic mercury, corrected for the less efficient transfer of topically applied inorganic mercury into the blood (1%) compared to the efficiency of the absorption of ingested inorganic mercury into the blood (20%). Using as analogies the ratios of the intermediate duration of exposure MRLs to the chronic duration of exposure MRLs for ingested inorganic cadmium [(0.5 µg Cd/kg/day):(0.1 µg Cd/kg/day)] and ingested inorganic chromium(IV) [(5 µg Cr/kg/day):(0.9 µg Cr/kg/day)],²¹ dividing the intermediate duration of exposure MRL for ingested inorganic mercury (2 µg iHg/kg/day) by the common factor of 5 yields a reasonable approximation of a chronic duration of exposure MRL for ingested inorganic mercury of 0.4 µg iHg/kg/day (2 µg iHg/kg/day)/5). Further dividing by an uncertainty factor of 3 for human variability⁶⁹ results in an approximate chronic duration of exposure MRL for ingested inorganic mercury of 0.133 µg iHg/kg/day.

Assuming that the bioavailability of topically applied inorganic mercury (in soil) is the same as the bioavailability of inorganic mercury (dissolved in water) and given the estimated chronic duration of exposure MRL for ingested inorganic mercury (dissolved in water) of 0.133 µg iHg/kg/day, the daily amount of inorganic mercury (in soil) that can be applied topically for over 1 year without exceeding the estimated chronic duration of exposure MRL for ingested inorganic mercury (dissolved in water) of 0.133 µg iHg/kg/day can be calculated for individuals with different body weights:

1 kg bw: (1 kg)(0.133 µg iHg/kg/day) = 0.13 µg of iHg/day
10 kg bw: (10 kg)(0.133 µg iHg/kg/day) = 1.33 µg of iHg/day
20 kg bw: (20 kg)(0.133 µg iHg/kg/day) = 2.66 µg of iHg/day
30 kg bw: (30 kg)(0.133 µg iHg/kg/day) = 3.99 µg of iHg/day
40 kg bw: (40 kg)(0.133 µg iHg/kg/day) = 5.32 µg of iHg/day
50 kg bw: (50 kg)(0.133 µg iHg/kg/day) = 6.65 µg of iHg/day
60 kg bw: (60 kg)(0.133 µg iHg/kg/day) = 7.98 µg of iHg/day
70 kg bw: (70 kg)(0.133 µg iHg/kg/day) = 9.31 µg of iHg/day
80 kg bw: (80 kg)(0.133 µg iHg/kg/day) = 10.64 µg of iHg/day
90 kg bw: (90 kg)(0.133 µg iHg/kg/day) = 11.97 µg of iHg/day
100 kg bw: (100 kg)(0.133 µg iHg/kg/day) = 13.30 µg of iHg/day

Assuming that the bioavailability of topically applied inorganic mercury (in soil) is the same as the bioavailability of ingested inorganic mercury (dissolved in water) and that the bioavailability of the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic mercury (in soil), and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.058 µg of inorganic mercury, the daily amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically for over 1 year without exceeding the estimated chronic duration of exposure MRL for topically applied inorganic mercury (dissolved in water) of 0.133 µg iHg/kg/day can be calculated for individuals with different body weights:

1 kg bw: $(0.13 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 2.3 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

10 kg bw: $(1.33 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 23.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

20 kg bw: $(2.66 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 46.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

30 kg bw: $(3.99 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 69.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

40 kg bw: $(5.32 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 92.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

50 kg bw: $(6.65 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 115.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

60 kg bw: $(7.98 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 138.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

70 kg bw: $(9.31 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 161.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

60

80 kg bw: $(10.64 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 183.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

90 kg bw: $(11.97 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 206.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

100 kg bw: $(13.30 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 229.0 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the bioavailability of topically applied inorganic mercury (in soil) is the same as the bioavailability of ingested organic mercury (dissolved in water) and that the bioavailability of the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of ingested inorganic mercury (in soil), it can be concluded that 1) daily topical application of 2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with any body weight will not exceed the estimated chronic duration of exposure MRL for topically applied inorganic mercury (in soil) and is likely to be without an appreciable risk of adverse health effects; 2) daily topical application of 12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask daily for over 1 year by individuals with body weights greater than about 4 kg will not exceed the estimated chronic duration of exposure MRL for topically applied inorganic mercury (in soil) and is likely to be without an appreciable risk of adverse health effects in those individuals; and 3) daily topical application of 125 g of Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year by individuals with body weights greater than about 55 kg will not exceed the estimated chronic duration of exposure MRL for topically applied inorganic mercury (in soil) and is likely to be without an appreciable risk of adverse health effects in those individuals.

Assuming that the bioavailability of topically applied inorganic mercury (in soil) is the same as the bioavailability of ingested inorganic mercury (dissolved in water) and that the bioavailability

of the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic mercury (in soil), and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.058 µg of inorganic mercury, daily topical application of as much as 2.29 g of Midnight Minerals Rich Earth Onyx Clay Mask per kg of body weight for over 1 year will not exceed the estimated chronic duration of exposure MRL for the ingestion of inorganic mercury (0.133 µg/kg/day).

However, the estimated relative efficiency of transdermal transfer of inorganic mercury (in soil) into the blood (TRBA) is only 5% of the efficiency of the gastrointestinal absorption of inorganic mercury (dissolved in water). Therefore, an approximate relative bioavailability-adjusted chronic duration of exposure estimated MRL for topically applied inorganic mercury (in soil) can be calculated: $[(0.133 \mu\text{g iHg/kg/day})/(0.05)] = 2.66 \mu\text{g iHg/kg/day}$.

Assuming that the relative bioavailability-adjusted estimated chronic duration of exposure MRL for the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability-adjusted estimated chronic duration of exposure MRL for topically applied inorganic mercury (in soil), the daily amount of inorganic mercury in Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically for over 1 year without exceeding the chronic duration of exposure relative bioavailability-adjusted estimated chronic duration of exposure MRL for topically applied inorganic mercury (in soil) of 2.66 µg iHg/kg/day can be calculated for individuals with different body weights:

1 kg bw: (1 kg)(2.66 µg iHg/kg/day) = 2.7 µg of iHg/day
10 kg bw: (10 kg)(2.66 µg iHg/kg/day) = 26.6 µg of iHg/day
20 kg bw: (20 kg)(2.66 µg iHg/kg/day) = 53.2 µg of iHg/day
30 kg bw: (30 kg)(2.66 µg iHg/kg/day) = 79.8 µg of iHg/day
40 kg bw: (40 kg)(2.66 µg iHg/kg/day) = 106.4 µg of iHg/day
50 kg bw: (50 kg)(2.66 µg iHg/kg/day) = 133.0 µg of iHg/day
60 kg bw: (60 kg)(2.66 µg iHg/kg/day) = 159.6 µg of iHg/day
70 kg bw: (70 kg)(2.66 µg iHg/kg/day) = 186.2 µg of iHg/day
80 kg bw: (80 kg)(2.66 µg iHg/kg/day) = 212.8 µg of iHg/day
90 kg bw: (90 kg)(2.66 µg iHg/kg/day) = 239.4 µg of iHg/day
100 kg bw: (100 kg)(2.66 µg iHg/kg/day) = 266.0 µg of iHg/day

Assuming that the relative bioavailability-adjusted estimated chronic duration of exposure MRL for the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability-adjusted estimated chronic duration of exposure MRL for topically applied inorganic mercury (in soil) and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 0.058 µg of inorganic mercury, the daily amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be applied topically for over 1 year without exceeding the relative bioavailability-adjusted estimated chronic duration of exposure MRL for topically applied inorganic mercury (in soil) of 2.66 µg iHg/kg/day can be calculated for individuals with different body weights:

1 kg bw: $(2.7 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 46 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

10 kg bw: $(26.6 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 459 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

20 kg bw: $(53.2 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 917 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

30 kg bw: $(79.8 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 1,376 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

40 kg bw: $(106.4 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 1,834 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

50 kg bw: $(133.0 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 2,293 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

60 kg bw: $(159.6 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 2,752 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

70 kg bw: $(186.2 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 3,210 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

80 kg bw: $(212.8 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 3,669 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

90 kg bw: $(239.4 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 4,128 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

100 kg bw: $(266.0 \mu\text{g of iHg/day}) / (0.058 \mu\text{g iHg/g}) = 4,586 \text{ g of Midnight Minerals Rich Earth Onyx Clay Mask/day}$

From these data and calculations, assuming that the relative bioavailability of the inorganic mercury in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the relative bioavailability of inorganic mercury (in soil) and that the relative bioavailability of inorganic mercury (in soil) is 5% of the bioavailability of inorganic mercury (dissolved in water), it can be concluded that 1) daily topical application of either 2.5 g or 12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year will not exceed the relative bioavailability-adjusted estimated chronic duration of exposure MRL for ingested inorganic mercury (in soil) for individuals with any body weight and is likely to be without an appreciable risk of adverse health effects; and 2) daily topical application of 125 g of Midnight Minerals Rich Earth Onyx Clay Mask for over 1 year will not exceed the relative bioavailability-adjusted estimated chronic duration of exposure MRL for ingested inorganic mercury (in soil) for individuals with body weights greater than about 4 kg and is likely to be without an appreciable risk of adverse health effects in those individuals.

Midnight Minerals Rich Earth Onyx Clay Mask contains 0.058 ppm inorganic mercury, well below the FDA-mandated limit of 1 ppm inorganic mercury for topically applied creams and ointments.¹⁰⁴

The Safety of the Inorganic Lead (Pb) in Midnight Minerals Rich Earth Onyx Clay Mask Powder

Children were reported to absorb 42% to 53% of an oral dose of inorganic lead dissolved in water¹²⁰ compared to up to 50% by adults.¹²¹⁻¹²⁵ The US Agency for Toxic Substances and Disease Registry of the Centers for Disease Control and Prevention (ATSDR) has relied on estimates of 50% for children and 10% for adults.¹²⁶

The efficiency of the gastrointestinal absorption of inorganic lead in food has averaged 3% to 10% in adults.^{124,125,127,128} The efficiency of the gastrointestinal absorption of inorganic lead in soil has not been reported. The efficiency of transdermal transfer of inorganic lead into the blood is 0.3% or less in humans.^{129,130}

Exposure to inorganic lead does not necessarily mean that adverse health effects will result. Health effects of exposure to inorganic lead depend upon the amount of exposure, the form of lead, and the route of exposure. Each form and route leads to different effects.

There have been no reports of adverse reactions to the topical application inorganic lead. Exposure to inorganic lead does not necessarily mean that adverse health effects will result; toxicity of exposure to inorganic lead depends on dose and duration of oral exposure. A Minimal Risk Level (MRL) is defined as an estimate of daily human exposure to a substance that is likely to be without an appreciable risk of adverse health effects over a specified duration of exposure and is determined by the US Agency for Toxic Substances and Disease Registry of the Centers for Disease Control and Prevention (ATSDR).¹⁸ Although the term, MRL, may seem to imply a slight level of risk, MRLs are, in fact, considered to represent safe levels of exposure for all populations, including sensitive subgroups. MRLs are derived when reliable and sufficient data exist to identify the target organ(s) of effect or the most sensitive health effect(s) for a specific duration within a given route of exposure. MRLs are based on noncancerous health effects only and do not consider carcinogenic effects. MRLs can be derived for acute (daily for 14 days or less), intermediate (daily for 15 days to 365 days), and chronic (daily for over 1 year) duration exposures for inhalation and oral routes of exposure. Appropriate methodology does not exist to develop MRLs for dermal exposure. An MRL is set below a level of exposure that might cause adverse health effects in the people most sensitive to such substance-induced effects and is neither a threshold for toxicity nor a level beyond which toxicity is likely to occur. Nonetheless, MRLs are the current standard against which to evaluate exposures to lead. Because of uncertainties regarding the potential adverse effects of low-level inorganic lead exposure, acute, intermediate, and chronic MRLs for ingested and dermally-encountered inorganic lead have not been established.¹²⁶

However, the US Centers for Disease Control and Prevention (CDC) has recommended maintaining blood inorganic lead (iPb) concentrations at or below 3.5 µg iPb/dL of blood.¹³¹ The US Food and Drug Administration (FDA) has determined an “interim reference level” for inorganic lead ingested in food or drink (including water) of 3 µg of inorganic lead per day for children and an “interim reference level” for inorganic lead ingested in food or drink (including water) of 12.5 µg of inorganic lead per day for adults (including pregnant and lactating women).^{132,133}

The FDA and the International Cooperation on Cosmetics Regulation Traces Working Group (ICCR) have determined that a maximum of 10 ppm for the inorganic lead content in topically applied creams and ointments will not pose a health risk.^{134,135}

In the absence of any other US standards, the FDA “interim reference level” for inorganic lead ingested in food or drink (including water) of 3 µg of inorganic lead per day for children and an “interim reference level” for inorganic lead ingested in food or drink (including water) of 12.5 µg of inorganic lead per day for adults (including pregnant and lactating women^{132,133} and the CDC identified maximum increase in the blood inorganic lead concentration of 1 µg iPb/dL of blood beyond which the risk for developing adverse health effects associated with inorganic lead intake will increase¹³² will serve as the referents for evaluating the exposure to the inorganic lead in Midnight Minerals Rich Earth Onyx Clay Mask.

Midnight Minerals Rich Earth Onyx Clay Mask

Midnight Minerals Rich Earth Onyx Clay Mask contains 3.101 ppm inorganic lead (iPb).⁶²

3.101 ppm = 3.101 µg/g; therefore:

1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains $(3.101 \mu\text{g iPb/g})(1 \text{ g}) = 3.101 \mu\text{g iPb}$

2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask contains $(3.101 \mu\text{g iPb/g})(2.5 \text{ g}) = 7.7525 \mu\text{g iPb}$

12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask contains $(3.101 \mu\text{g iPb/g})(12.5 \text{ g}) = 38.7625 \mu\text{g iPb}$

125 g of Midnight Minerals Rich Earth Onyx Clay Mask contains $(3.101 \mu\text{g iPb/g})(125 \text{ g}) = 387.625 \mu\text{g iPb}$

Ingestion of Inorganic Lead in Midnight Minerals Rich Earth Onyx Clay Mask Powder (completely dissolved in water).

Assuming that the bioavailability of the inorganic lead in ingested dissolved Midnight Minerals Rich Earth Onyx Clay Mask in children is the same as the bioavailability of ingested inorganic lead (dissolved in water) in children and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 3.101 µg of inorganic lead, the amount of dissolved Midnight Minerals Rich Earth Onyx Clay Mask that can be accidentally or intentionally ingested without exceeding the “interim reference level” for the ingestion of inorganic lead (dissolved in water) by children with any body weight (3 µg iPb/day) is 0.967 g/day. Similarly, assuming that the bioavailability of the inorganic lead in ingested dissolved Midnight Minerals Rich Earth Onyx Clay Mask in adults is the same as the bioavailability of ingested inorganic lead (dissolved in water) in adults and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 3.101 µg of inorganic lead, the amount of dissolved Midnight Minerals Rich Earth Onyx Clay Mask that can be accidentally or intentionally ingested without exceeding the “interim reference level” for the ingestion of inorganic lead (iPb) dissolved in water by adults (including pregnant and lactating women) with any body weight (12.5 µg iPb/day) is 4.031g/day.

From these calculations it can be concluded that accidental or intentional ingestion of either 2.5

g, 12.5 g, or 125 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by children may exceed the “interim reference level” for the ingestion of inorganic lead (dissolved in water) by children with any body weight (3 µg iPb/day). In addition, accidental or intentional ingestion of either 12.5 g or 125 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by adults may exceed the “interim reference level” for the ingestion of inorganic lead (dissolved in water) by adults (including pregnant and lactating women) with any body weight (12.5 µg iPb/day). However, accidental or intentional ingestion of 2.5 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by adults will not exceed the “interim reference level” for the ingestion of inorganic lead (dissolved in water) by adults (including pregnant and lactating women) with any body weight (12.5 µg iPb/day).

Using the accepted ratio that 1 µg of ingested inorganic lead acutely raises the blood inorganic lead concentration by 0.166 µg Pb/dL of blood in children¹³⁶ and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 3.101 µg of inorganic lead, the accidental or intentional ingestion of up to 1.94g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by children will not increase the blood inorganic lead concentration by more than the 1 µg Pb/dL of blood that is considered to increase the risk of experiencing adverse effects.

Using the accepted ratio that 1 µg of ingested inorganic lead acutely raises the blood inorganic lead concentration by 0.166 µg iPb/dL of blood in children,¹³⁶ the acute ingestion of 1 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask (containing 3.101 µg of inorganic lead) will, on average, acutely increase the blood inorganic lead concentration in children by 0.516 µg iPb/dL of blood. The acute ingestion of 2.5 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask will, on average, acutely increase the blood inorganic lead concentration in children by 1.29 µg iPb/dL of blood, an increase greater than the increase of 1 µg iPb/dL of blood that is considered to increase the risk of experiencing adverse effects.¹³² Using the same ratio, the acute ingestion of 12.5 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask will, on average, acutely increase the blood inorganic lead concentration in children by 6.45 µg iPb/dL of blood and the acute ingestion of 125 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask will, on average, acutely increase the blood inorganic lead concentration in children by 64.5 µg iPb/dL of blood, increases that are greater than the increase of 1 µg iPb/dL of blood that is considered to increase the risk of experiencing adverse effects.¹³²

Using the accepted ratio that 1 µg of ingested inorganic lead acutely raises the blood inorganic lead concentration by 0.04 µg Pb/dL of blood in adults¹³⁶ and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 3.101 µg of inorganic lead, the accidental or intentional ingestion of up to 8.06 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask by adults will not increase the blood inorganic lead concentration by more than the 1 µg Pb/dL of blood that is considered to increase the risk of experiencing adverse effects.

Using the accepted ratio that 1 µg of ingested inorganic lead raises the blood inorganic lead concentration by 0.04 µg iPb/dL of blood in adults,¹³⁶ the acute ingestion of 1 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask (containing 3.101 µg of inorganic lead) will, on average, acutely increase the blood inorganic lead concentration in adults by 0.124 µg iPb/dL of

blood. The ingestion of 2.5 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask will, on average, acutely increase the blood inorganic lead concentration in adults by 0.31 µg iPb/dL of blood, an increase smaller than the increase of 1 µg iPb/dL of blood that is considered to increase the risk of experiencing adverse effects.¹³²

Using the same ratio, the acute ingestion of 12.5 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask will, on average, acutely increase the blood inorganic lead concentration in adults by 1.55 µg iPb/dL of blood and the acute ingestion of 125 g of dissolved Midnight Minerals Rich Earth Onyx Clay Mask will, on average, acutely increase the blood inorganic lead concentration in adults by 15.5 µg iPb/dL of blood, increases that are greater than the increase of 1 µg iPb/dL of blood that is considered to increase the risk of experiencing adverse effects.¹³² These estimates, calculations, and conclusions also apply to pregnant and lactating women.^{132,133}

Ingestion of Inorganic Lead in Dry Midnight Minerals Rich Earth Onyx Clay Mask Powder. Assuming that the bioavailability of ingested inorganic lead (in soil) in children is the same as the bioavailability of ingested inorganic lead (dissolved in water) in children and assuming that the bioavailability of the inorganic lead in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask in children is the same as the bioavailability of ingested inorganic lead (in soil) in children, and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 3.101 µg of inorganic lead, the amount of dry Midnight Minerals Rich Earth Onyx Clay Mask that can be accidentally or intentionally ingested by children without exceeding the “interim reference level” for the ingestion of inorganic lead (dissolved in water) by children with any body weight (3 µg iPb/day) is 0.967 g/day. Similarly, assuming that the bioavailability of ingested inorganic lead (in soil) in adults is the same as the bioavailability of ingested inorganic lead (dissolved in water) in adults and assuming that the bioavailability of the inorganic lead in ingested dry Midnight Minerals Rich Earth Onyx Clay Mask in adults is the same as the bioavailability of ingested inorganic lead (in soil) in adults, and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 3.101 µg of inorganic lead, the amount of dry Midnight Minerals Rich Earth Onyx Clay Mask

that can be accidentally or intentionally ingested without exceeding the “interim reference level” for the ingestion of inorganic lead (dissolved in water) by adults (including pregnant and lactating women) with any body weight (12.5 µg iPb/day) is 4.031g/day.

From these calculations it can be concluded that accidental or intentional ingestion of either 2.5 g, 12.5 g, or 125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by children will exceed the “interim reference level” for the ingestion of inorganic lead (dissolved in water) by children with any body weight (3 µg iPb/day). In addition, accidental or intentional ingestion of either 12.5 g or 125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by adults will exceed the “interim reference level” for the ingestion of inorganic lead (dissolved in water) by adults (including pregnant and lactating women) with any body weight (12.5 µg iPb/day). However, accidental or intentional ingestion of 2.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by adults will not exceed the “interim reference level” for the ingestion of inorganic lead

(dissolved in water) by adults (including pregnant and lactating women) with any body weight (12.5 µg iPb/day).

Using the accepted ratio that 1 µg of ingested inorganic lead acutely raises the blood inorganic lead concentration by 0.166 µg Pb/dL of blood in children¹³⁶ and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 3.101 µg of inorganic lead, the accidental or intentional ingestion of up to 1.94 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by children will not increase the blood inorganic lead concentration by more than the 1 µg Pb/dL of blood that is considered to increase the risk of experiencing adverse effects.

Using the accepted ratio that 1 µg of ingested inorganic lead acutely raises the blood inorganic lead concentration by 0.166 µg iPb/dL of blood in children,¹³⁶ the acute ingestion of 1 g of dry Midnight Minerals Rich Earth Onyx Clay Mask (containing 3.101 µg of inorganic lead) will, on average, acutely increase the blood inorganic lead concentration in children by 0.516 µg iPb/dL of blood. The acute ingestion of 2.5 g dry Midnight Minerals Rich Earth Onyx Clay Mask will, on average, acutely increase the blood inorganic lead concentration in children by 1.29 µg iPb/dL of blood, an increase greater than the increase of 1 µg iPb/dL of blood that is considered to increase the risk of experiencing adverse effects.¹³²

Using the same ratio, the acute ingestion of 12.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask will, on average, acutely increase the blood inorganic lead concentration in children by 6.45 µg iPb/dL of blood and the acute ingestion of 125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask will, on average, acutely increase the blood inorganic lead concentration in children by 64.5 µg iPb/dL of blood, increases that are greater than the increase of 1 µg iPb/dL of blood that is considered to increase the risk of experiencing adverse effects.¹³²

Using the accepted ratio that 1 µg of ingested inorganic lead acutely raises the blood inorganic lead concentration by 0.04 µg Pb/dL of blood in adults¹³⁶ and given that 1 g of Midnight Minerals Rich Earth Onyx Clay Mask contains 3.101 µg of inorganic lead, the accidental or intentional ingestion of up to 8.06 g of dry Midnight Minerals Rich Earth Onyx Clay Mask by adults will not increase the blood inorganic lead concentration by more than the 1 µg Pb/dL of blood that is considered to increase the risk of experiencing adverse effects.¹³²

Using the accepted ratio that 1 µg of ingested inorganic lead raises the blood inorganic lead concentration by 0.04 µg iPb/dL of blood in adults,¹³⁶ the acute ingestion of 1 g of dry Midnight Minerals Rich Earth Onyx Clay Mask (containing 3.101 µg of inorganic lead) will, on average, acutely increase the blood inorganic lead concentration in adults by 0.124 µg iPb/dL of blood. The ingestion of 2.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask will, on average, acutely increase the blood inorganic lead concentration in adults by 0.31 µg iPb/dL of blood, an increase smaller the increase of 1 µg iPb/dL of blood that is considered to increase the risk of experiencing adverse effects.¹³²

Using the same ratio, the acute ingestion of 12.5 g of dry Midnight Minerals Rich Earth Onyx Clay Mask will, on average, acutely increase the blood inorganic lead concentration in adults by

1.55 µg iPb/dL of blood and the acute ingestion of 125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask will, on average, acutely increase the blood inorganic lead concentration in adults by 15.5 µg iPb/dL of blood, increases that are greater than the increase of 1 µg iPb/dL of blood that is considered to increase the risk of experiencing adverse effects.¹³² These estimates calculations, and conclusions also apply to pregnant and lactating women.^{132,133}

Topical Application of Inorganic Lead in Midnight Minerals Rich Earth Onyx Clay Mask Powder. Because “interim reference levels” for the ingestion of a substance reflect a dose-response relationship that is independent of the efficiency of the transfer into the blood of a substance but are based on clinical outcomes or biomarkers of clinical outcomes that presume relative constancy in that efficiency, a significant relative decrease in the efficiency of the transfer into the blood of a substance will increase the amount of a substance that can be ingested before those referent outcomes will appear. In effect, the “interim reference level” for a substance will be effectively increased in proportion to the decrease in the efficiency of the transfer into the blood of a substance.

Assuming that the average efficiency of gastrointestinal absorption of inorganic lead (dissolved in water) is 50% in children¹²⁶ and that the efficiency of transdermal transfer of inorganic lead (dissolved in water) into the blood is 0.3% in humans,^{129,130} the relative bioavailability of topically applied inorganic lead (dissolved in water) can be estimated to be about 0.6% (0.3%/50%) of the bioavailability of ingested inorganic lead (dissolved in water) in children. In effect, an approximate “topical interim reference level” for the chronic daily topical application of inorganic lead (dissolved in water) to children with any body weights can be estimated: (3 µg iPb/day)/0.006 = 500 µg iPb/day. Using this estimate, and assuming that the bioavailability of the inorganic lead in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic lead (dissolved in water), the amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be repeatedly applied topically without exceeding the approximate “topical interim reference level” (500 µg iPb/day) for the repeated topical application of inorganic lead (dissolved in water) to children with any body weight is 161 g.

From these calculations it can be concluded that repeated topical application of either 2.5 g, 12.5 g, or 125 g of Midnight Minerals Rich Earth Onyx Clay Mask will not exceed the “topical interim reference level” for the repeated topical application of inorganic lead (dissolved in water) to children with any body weight (500 µg iPb/day).

Adjusting for the estimated relative bioavailability of topically applied inorganic lead in children (0.6%), it can be estimated that 1 µg of topically applied inorganic lead raises the blood inorganic lead concentration by (0.166 µg iPb/dL of blood)(0.006) = 0.001 µg iPb/dL of blood in children. Using these estimates, the acute topical application of 1 g of Midnight Minerals Rich Earth Onyx Clay Mask (containing 3.101 µg of inorganic lead) will, on average, acutely increase the blood inorganic lead concentration in children by 0.003 µg iPb/dL of blood. The acute topical application of 2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask will, on average,

acutely increase the blood inorganic lead concentration in children by 0.008 µg iPb/dL of blood, an increase smaller than the increase of 1 µg iPb/dL of blood that is considered to increase the risk of experiencing adverse effects.¹³²

Using the same estimates, the acute topical application of 12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask will, on average, acutely increase the blood inorganic lead concentration in children by 0.04 µg iPb/dL of blood, an increase smaller than the increase of 1 µg iPb/dL of blood that is considered to increase the risk of experiencing adverse effects.¹³² The acute topical application of 125 g of Midnight Minerals Rich Earth Onyx Clay Mask will, on average, acutely increase the blood inorganic lead concentration in children by 0.4 µg iPb/dL of blood, an increase smaller than the increase of 1 µg iPb/dL of blood that is considered to increase the risk of experiencing adverse effects.¹³²

From these calculations it can be concluded that repeated topical application of either 2.5 g, 12.5 g, or 125 g of Midnight Minerals Rich Earth Onyx Clay Mask will not produce increases in the blood inorganic lead concentration in children in excess of the increase of 1 µg iPb/dL of blood that is considered to increase the risk of experiencing adverse effects.¹³²

Assuming that the efficiency of gastrointestinal absorption of inorganic lead (dissolved in water) is 10% in adults¹²⁶ and that the efficiency of transdermal transfer of inorganic lead into the blood is 0.3% in humans,^{129,130} the relative bioavailability of topically applied inorganic lead can be estimated to be about 3% (0.3%/10%) of the bioavailability of ingested inorganic lead (dissolved in water) in adults. In effect, an approximate “topical interim reference level” for the repeated topical application of inorganic lead (dissolved in water) to adults with any body weight can be estimated: $(12.5 \text{ µg iPb/day}) / 0.03 = 417 \text{ µg iPb/day}$. Using this estimate, and assuming that the bioavailability of the inorganic lead in topically applied Midnight Minerals Rich Earth Onyx Clay Mask is the same as the bioavailability of topically applied inorganic lead (dissolved in water), the amount of Midnight Minerals Rich Earth Onyx Clay Mask that can be repeatedly applied topically without exceeding the approximate “interim reference level” (417 µg iPb/day) for the repeated topical application of inorganic lead (dissolved in water) to adults (including pregnant and lactating women) with any body weight is 134.5 g.

From these calculations it can be concluded that repeated daily topical application of either 2.5 g, 12.5 g, or 125 g of dry Midnight Minerals Rich Earth Onyx Clay Mask will not exceed the “topical interim reference level” for the repeated daily topical application of inorganic lead (dissolved in water) to adults (including pregnant and lactating women) with any body weight (417 µg iPb/day).

Adjusting for the estimated relative bioavailability of topically applied inorganic lead in adults (3%), it can be estimated that 1 µg of topically applied inorganic lead raises the blood inorganic lead concentration by $(0.04 \text{ µg iPb/dL of blood})(0.03) = 0.0012 \text{ µg iPb/dL of blood}$ in adults. Using these estimates, the acute topical application of 1 g of Midnight Minerals Rich Earth Onyx Clay Mask (containing 3.101 µg of inorganic lead) will, on average, acutely increase the blood inorganic lead concentration in adults by 0.0037 µg iPb/dL of blood. The acute topical application of 2.5 g of Midnight Minerals Rich Earth Onyx Clay Mask will, on average, acutely

increase the blood inorganic lead concentration in adults by 0.0093 µg iPb/dL of blood, an increase smaller than the increase of 1 µg iPb/dL of blood that is considered to increase the risk of experiencing adverse effects.¹³²

Using the same estimates, the acute topical application of 12.5 g of Midnight Minerals Rich Earth Onyx Clay Mask will, on average, acutely increase the blood inorganic lead concentration in adults by 0.0465 µg iPb/dL of blood, an increase smaller than the increase of 1 µg iPb/dL of blood that is considered to increase the risk of experiencing adverse effects.¹³² The acute topical application of 125 g of Midnight Minerals Rich Earth Onyx Clay Mask will, on average, acutely increase the blood inorganic lead concentration in adults by 0.465 µg iPb/dL of blood, an increase smaller than the increase of 1 µg iPb/dL of blood that is considered to increase the risk of experiencing adverse effects.¹³² These estimates calculations, and conclusions also apply to pregnant and lactating women.^{132,133}

From these calculations it can be concluded that repeated topical application of either 2.5 g, 12.5 g, or 125 g of Midnight Minerals Rich Earth Onyx Clay Mask will not produce increases in the blood inorganic lead concentration in adults (including pregnant and lactating women) with any body weight in excess of the increase of 1 µg iPb/dL of blood that is considered to increase the risk of experiencing adverse effects.¹³² Midnight Minerals Rich Earth Onyx Clay Mask contains 3.101 ppm inorganic lead, well below the FDA- and ICC Rmandated limit of 10 ppm inorganic lead for topically applied creams and ointments.^{104,135}

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