

## PRESS RELEASE

A “*Human Health and Ecological Risk Assessment*” for the Cinkarna Celje production site and for the two landfills Bukovzlak and Za Travnikom has been performed between July 2015 and March 2016.

Based on results of previous environmental baseline studies and of current soil and groundwater sampling campaigns conducted between August and December 2015, the current risks deriving from detected impacts on sensitive receptors (environment and human health) were evaluated and classified followed by recommendations for necessary further actions. The evaluation was based on the procedures of the German Soil Protection Law (*Bundesbodenschutzgesetz BBodSchG*) which provides a guideline with threshold values for the most common harmful substances for the risk assessment of different pathways of contaminant exposition in the environment:

- Soil – Human Health;
- Soil – Plants;
- Soil – Groundwater.

This approach was selected as it is planned for Slovenia to establish environmental standards which are comparable to German and Austrian laws under EU environmental and water directives.

In 2014, during previous baseline investigations, samples were analyzed from 70 soil borings and 28 temporary groundwater monitoring wells and additionally, from already existing (permanent) groundwater wells. In total, 128 soil samples and 42 groundwater samples were collected and analyzed. Between August and December 2015, 16 new groundwater wells were installed at the Cinkarna production site and soil and groundwater samples were collected and analyzed for a wide parameter range.

The data from both field campaigns and a comprehensive collection of existing historic data of the production site and the two landfills were combined for the risk assessment. This included e.g. general geological data, investigation and monitoring reports, as well as surface water and sediment sampling data. Furthermore, the location of the three discussed sites was considered with respect to several other adjacent active and abandoned production and landfill sites in the Celje area, partly with known environmental impacts to subsurface and groundwater.

A significant impact on the groundwater within the boundaries of the Cinkarna Celje site was detected due to considerable concentrations of potentially harmful substances, in particular by zinc, lead, arsenic and chlorobenzene exceeding the applicable thresholds (pathway Soil – Groundwater). Elevated values were also detected for copper and cadmium. However, the extent and transport mechanisms of the impact could not be entirely described based on available data and will require further investigation. Other investigated pathways (Soil –

Human Health, Soil – Plant) were classified as minor to not relevant with respect to described site-specific conditions. The pattern of detected substances indicates that the different contamination sources are caused by historic deposits from former production residuals and did not originate from current site operations.

Further investigations for some of the pathways are necessary to finalize the risk assessment at the required level of accuracy. Based on the results of these investigations, corrective action might be deemed necessary, e.g. groundwater treatment or containment and/or hot-spot remediation in soil.

However, any corrective action needs to follow the principles of adequacy and proportionality with respect to the site location in a widely polluted industrial area. In any case, the measures will either eliminate the contamination source (hot-spots), interrupt the relevant pathway or reduce or eliminate the potential exposure of receptors.

At the landfill areas Bukovzlak and Za Travnikom previous investigation and groundwater monitoring activities revealed concentrations above the applicable threshold values of several heavy metals and arsenic in some observation wells located airside of the dam or downgradient in the wider area. Partly, the evaluation of risks to human health and the environment had to be based on assumptions because detailed delineation data and a sufficient monitoring grid is not yet existing.

Based on available data the flow path of the groundwater and the potential extent of pollutants coming from the landfill sites cannot be explained in sufficient detail. In accordance with common practice, the installation of well galleries in groundwater flow direction is recommended to complete the required evaluation of contaminant pathways in the risk assessment. Additional wells would also cover future legal requirements to monitor the wider downgradient area of landfills. Results of recommended additional investigations will reveal if corrective actions for the landfill sites from an environmental point of view have to be undertaken.

The following table summarizes the risk evaluation based on currently available data:

Table 1: Overview on results of Risk Assessment

Site / Location	Primary Pathway <sup>(1)</sup>			Secondary Pathway <sup>(2)</sup>			
	Soil – Human Health via direct contact or pulmonary up-take	Soil – Plants via direct transition from soil	Soil – Groundwater	Soil – Groundwater via surface water / pond overflow	Soil – Human Health via groundwater	Soil – Plants via groundwater	
Cinkarna Celje Production Site	On-site	+/-	++	--	--	--	
	Off-site	--	??	--	??	??	
Bukovzlak Landfill Site	On-site	+/-	++	--	--	--	
	Off-site	--	??	??	??	??	
Za Travnikom Landfill Site	On-site	+/-	++	--	--	--	
	Off-site	--	??	??	??	??	

Dark Grey: ++ : Identified impact

Light Grey: +/- : Identified risk, but of low relevance under adherence of defined measures

Light green: - : Pathway not applicable for formal reasons (work instructions presupposed)

Dark green: - - : Significant risks to human health and environment can be excluded or pathway not relevant

White: ?? : Additional data required as risk cannot be entirely defined based on currently available data

(1): Pathway according to regulatory framework (with thresholds)

(2): Additional pathways; not defined by regulatory framework (no thresholds or reference values)