



Solid waste disposal in the Environmental Protected Area of the Lagoa Santa Karst, Minas Gerais State, Brazil

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The State of Minas Gerais, Brazil, has approximately 580,000 km². From this total, it's believed that at about 29,000 km² are composed by carbonatic rocks. With a total of 853 municipalities and some noticeable environmental problems, the biggest problem is the proper final waste disposal. This work is intended to demonstrate the potential pollution of karst aquifers due to leachate's percolation from improper waste disposal sites. In Brazil, it was established three categories to designate them. From the most environmentally incorrect sites for waste disposal to the better suitable for these activities it is possible to identify the waste dumps (*lixões*), controlled landfills (*aterros controlados*) and sanitary landfills (*aterros sanitários*). In each Brazilian State, around 80% of their municipalities have less than 20,000 inhabitants and no sufficient financial resources required to construct a sanitary landfill. It is also observed a certain degree of lack of political will from some municipal administrations to execute these projects. Unfortunately, some of these areas are located in karst terrains and therefore it is important to observe that an effective environmental control is not always made. The region of Lagoa Santa, State of Minas Gerais, is developed on metasediments of the Bambui Group, Sete Lagoas Formation (Upper Proterozoic). This rock formation favors the development of expressive superficial and underground karst fea-

tures. Moreover, the region presents great paleontological, archaeological, historical and speleological potential, which must also be protected from quarrying, pressures from population growth and uncontrolled touristic activities. In 1990 this scenario favored the creation of an Environmental Protected Area (Área de Proteção Ambiental - APA) to preserve local fauna and flora as well the physical environment. However, for many years the APA's municipalities and its surroundings had installed waste dumps (*lixões*) since the end of the 70's. With the State Guideline nº 52 (Deliberação Normativa nº 52) from December 2001, the State Government decreed the adequacy of such irregular dumps. The Guidelines clearly states that the waste must be deposit in a site with soil and/or low permeability rocks, with less than 30% steep angles, a minimum distance of 300m from water sources and 500m distant from core population. Furthermore, the standardization requires the municipalities to implement rainwater drainage systems around the site to reduce water percolation. The Document also obligates the municipality to compact and cover the waste cells at least three times a week, isolating the area to avoid human and animal access. In 2005, the state had registered 25 sanitary landfills, 199 controlled landfills and 549 waste dumps. In February 2007 the State Environmental Agency (FEAM) pointed out the same number of landfills, 207 controlled landfills and still a large amount of waste dumps: 519. Sadly, these inappropriate dumps (*lixões*) that were controlled in or near karst areas still poses as a threat to the environment since all the contamination comes from at least 25 years ago.

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