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Evaluation Of Cilowong Landfill In Serang City

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Abstract
The emergence of environmental pollution around the landfill because unfulfilled technical requirements according with national standards. (Policy and National Strategy for Waste Management Systems, Department of Public Works 2006). Cilowong landfill in Kota Serang has operated since 1995. the beginning system that will do is control landfill, but in fact is done open dumping. Cilowong landfill area of agriculture (rice fields) and the plantation of tree and shrubs located on the edge of a cliff. Waste transported to TPA for 180.34 Cilowong m3/day (TPA UPDT Cilowong, 2010). In 2009 occurred the garbage landslide that covered the land around ± 7 pesawahan Ha and leachate from the waste that has polluted the environment. With these facts it is necessary to evaluate the performance of TPA Cilowong. Methods of research conducted by survey method. Data processed using primary and secondary data. Data were analyzed by descriptive analysis. The research results concluded that: (1) An increase in waste that goes to landfill annually (2) handling the garbage does not fit the criteria for landfill control system planned at the beginning, (3) Facilities support buildings do not meet the criteria for landfill and control landfill drainage systems are not optimally, (4) physically, the region has not been worthy of being the location of final waste processing. Advice can be given, among others. (1) The imposition of waste entering into TPA so it can match the capacity, (2) Optimizing return the existing drainage system at the landfill for leachate distribution (3) rehabilitation remainder of ± 5.3 ha of land which has been covered by the landslides waste by using technologies.

Keywords: Landfill, Leacheate, Rehabilitation

1.INTRODUCTION

The emergence of environmental pollution around the landfill due to lack of landfill site selection process so that adequate existing landfill does not meet the technical requirements in accordance with national standards. In addition landfill facilities are minimal, especially related to the lack of environmental protection facilities (the buffer zone, leachate collection and treatment, gas ventilation and closure of land), and the operation of the landfill is likely to be operated by open dumping. Prohibition of building permits around the landfill is also not done so previously landfill sites far from the settlement and it is surrounded by residential areas (Policy and National Strategy for Waste Management Systems, Department of Public Works 2006).

Similarly happens with the management of landfill in the City of Attacking the landfill is located in the village Cilowong Cilowong of service centers within ± 6 km and the nearest settlement ± 300-500 m with a population of 501 562 inhabitants (City Attack in Figures 2007), the production of waste 1304 m3/day which reached an average of waste that goes to landfill Cilowong of 180.34 m3/day (TPA UPTD Cilowong, 20 010). This landfill has been operating since 1995 in which the waste management system is planned to use the landfill control system, but with different limitations for operating the landfill Cilowong operated by open dumping system.

Based on the results of early studies note that the problems of waste management at the landfill Cilowong is the incompatibility of the landfill to the requirements set by the government where the landfill Cilowong at the moment is a wetland agricultural region (rice) and plantation crops (garden melinjo) and shrubs thickets. In addition Cilowong waste landfill is located on the steep slopes of a hill

extending on the west - east with slopes facing north. Elevation ranges from 100-160 meters above sea level, slope ranges from 15-30%. Current system of garbage disposal at the landfill working Cilowong is a way of dump trucks dumped garbage on the curb and then the operation is driven by a bulldozer around the edge. Such treatment causes the accumulation of rubbish around the edge which has a slope of> 20% so it is particularly vulnerable to landslides. And its impact has been felt at the beginning of 2009 an avalanche occurred landfill waste in the landfill Cilowong pesawahan land covering approximately ± 7 ha under it and leachate from the waste has polluted the environment. With these facts it is necessary to evaluate the performance of TPA Cilowong.

2. MATERIALS AND METHOD

The data used in this study include:

1. Primary data

Primary data obtained through observation of the existing management system by performing the TPA Cilowong directly to the field survey and interviews with agency managers, namely TPA Cilowong Serang City Sanitation Department. Data retrieval is done by:

a. Collecting data include observations in the field area and the use of landfill Cilowong, Cilowong landfill capacity to accommodate waste, landfill waste management system Cilowong.
b. Collect data on operational performance Cilowong current landfill.

2. Secondary data, such as collected: demographic data townspeople attack, accumulation of data collected in the landfill waste cilowong tpa, ground water quality data in wells surrounding population, the data quality of leachate (leachate), data of spatial plans of attack, data hydrogeology, the image contour cilowong tpa, tpa cilowong avalanche event data.

Data processing is done by evaluating the following parameters:

1. Calculate the waste generation resident in the City Attack using the projection approach to the calculation of the total population in town Attack multiply by the rate of waste generation in the city for 10 years.
2. Calculate the volume of landfill waste that goes into landfill long Cilowong.
3. Analyze the physical condition of the landfill area Cilowong of geographical aspects of the method is descriptive analysis. For eligibility of land, using the landfill site selection criteria SNI T-11-1991-03, regarding the procedure for selection of landfill sites.
4. Analyzing secondary data include the data quality of groundwater, leachate quality, the comparative method parameter leachate quality test results with bakumutu applicable.

3. RESULTS AND DISCUSSION

Based on the results of the calculations performed can be generated projections of the number of city dwellers attack shown in Figure 1. Attack on city population in 2008 is projected to increase to 501 423 people and in 2018 to 553 718 inhabitants. The volume of landfill waste in 2009 amounted to 1406.21 m3/day in 2018 and became 1682.04 m3/day. An increase in waste entering the landfill per year so it needs to be done the proper handling of waste in the landfill for waste that goes to landfill in accordance with their capacity.

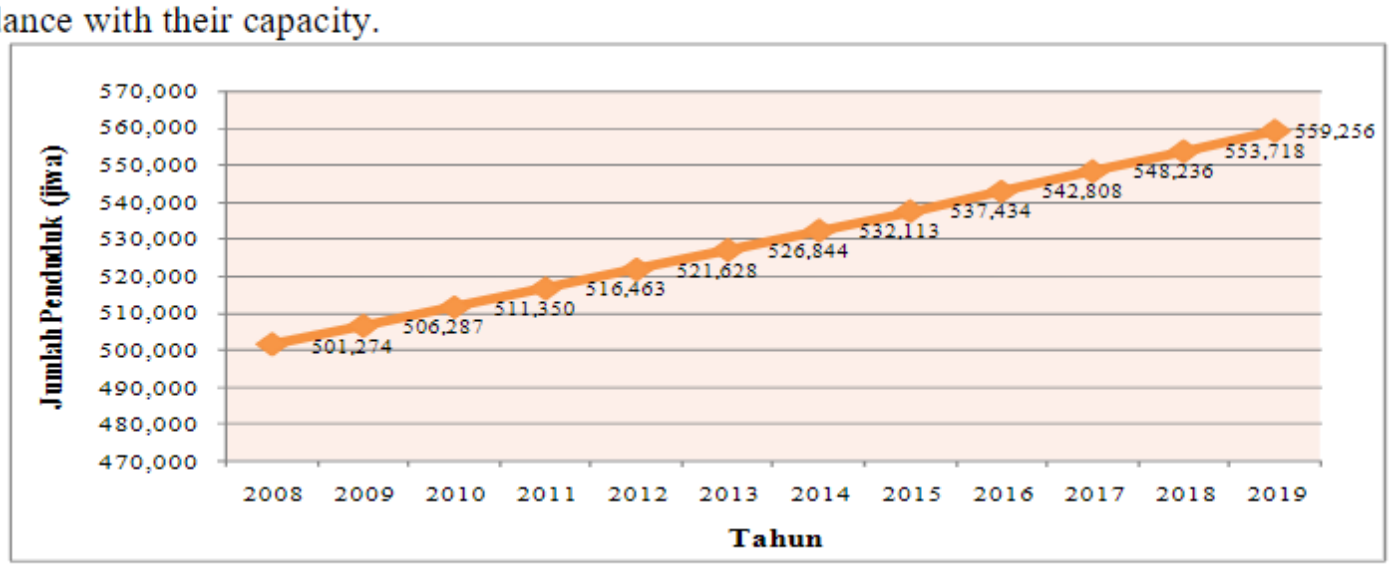

Figure 1. Serang City's population projections in 2008 - 2018

Table 1. The accumulation rate of Garbage Collected in the landfill Cilowong In 1995 - 2008

Year	Domestic waste (m^3)		waste market (m^3)		The number of Ritasi		the volume of waste (m^3)		growth (%)
	Total/year	Rate/day	Total /year	Rate/ day	Trip /year	Rate/ day	Total/ year	Rate/day	
1995	3.920	10,74	720	1,97	4.640	12,71	32.480	88,99	
1996	5.040	13,81	1.080	2,96	6.120	16,77	42.840	117,37	31,9
1997	5.400	14,79	1.440	3,95	6.840	18,74	47.880	131,18	11,8
1998	5.760	15,78	1.800	4,93	7.560	20,71	52.920	144,99	10,5
1999	6.120	16,77	2.160	5,92	8.280	22,68	57.960	158,79	9,5
2000	6.460	17,70	2.160	5,92	8.620	23,62	60.340	165,32	4,1
2001	6.840	18,74	2.220	6,08	9.120	24,99	63.840	174,90	5,8
2002	7.020	19,23	2.390	6,55	9.410	25,78	65.870	180,47	3,2
2003	7.430	20,36	2.450	6,71	9.880	27,07	69.160	189,48	5,0
2004	7.860	21,53	2.620	7,18	10.480	28,71	73.360	200,99	6,1
2005	8.070	22,11	3.420	9,37	11.490	31,48	80.430	220,36	9,6
2006	8.699	23,83	3.917	10,73	12.616	34,56	85.255	233,58	6,0
2007	10.159	27,83	3.395	9,30	13.554	37,13	89.824	246,09	5,4
2008	10.974	30,07	4.379	12,00	15.353	42,06	99.373	272,25	10,6
amount	**99.752**	**273,29**	**34.151**	**93,56**	**133.963**	**367,02**	**921.532**	**2.524,75**	**119,5**
rate	**7.125**	**19,52**	**2.439**	**6,68**	**9.568**	**26,22**	**65.823**	**180,34**	**9,19**

Based on Table 1, the waste that goes to landfill Cilowong average of 180.34 ± m3/day with rubbish the natural growth rate of 9.19% per year as shown on the graph the rate of accumulation of these waste deposits

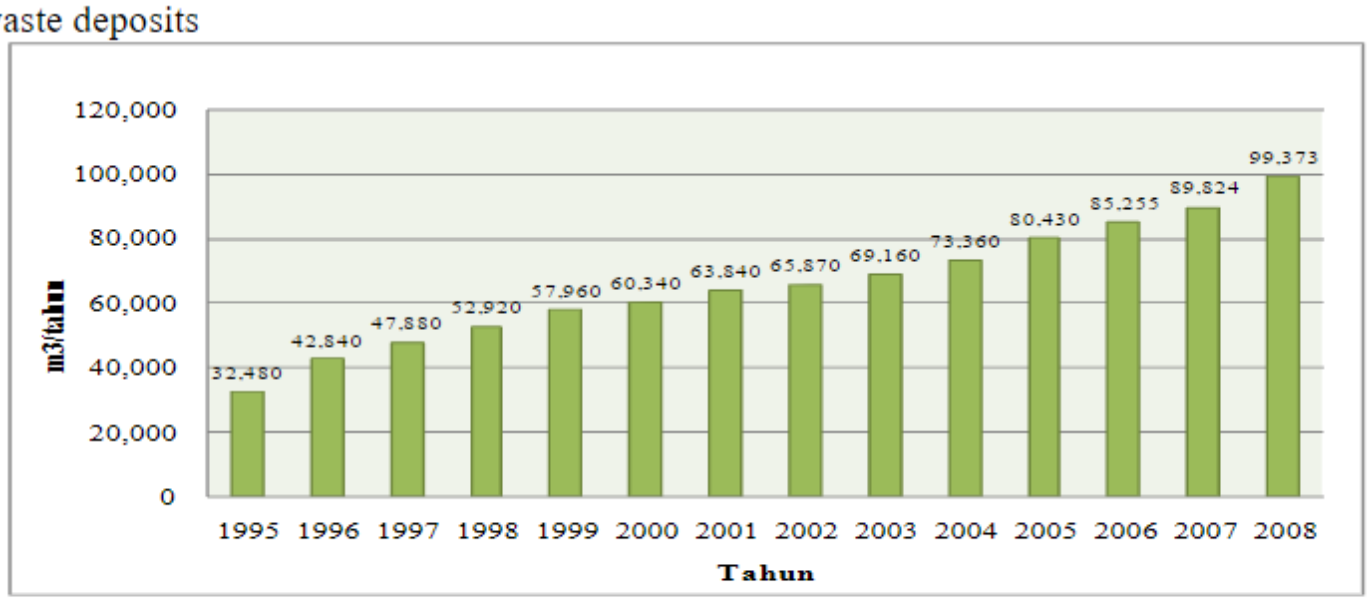

Figure 2. The Accumulation Rate of Garbage in TPA Cilowong Since 1995 – 2008 (source: landfill UPTD Cilowong, 2009)

Through the calculations performed, it is predicted that the age of TPA Cilowong can accommodate only for 10 years that is from 2009 to 2018 with requirements of 38.466 m^2 area by the high plans + 15 meters of landfill waste. The results of the calculation age of TPA are shown in Table 2.

Tabel 2. Proyeksi Timbunan Sampah Yang Masuk ke TPA Cilowong Tahun 2008 – 2018

NO	Uraian	satuan	Tahun									
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
a.	Jumlah Penduduk	Jiwa	501,274	506,287	511,350	516,463	521,628	526,844	532,113	537,434	542,808	548,236	553,718
b.	Jumlah Penduduk Terlayani	Jiwa	104,925	113,236	122,205	131,885	142,331	153,605	165,772	178,902	193,072	208,365	224,870
c.	Laju Timbulan sampah	liter/org/hari	2.75	2.78	2.81	2.83	2.86	2.89	2.92	2.95	2.98	3.01	3.04
d.	Volume Timbunan sampah	liter/hari	1,378,504	1,406,212	1,434,477	1,463,310	1,492,722	1,522,726	1,553,333	1,584,555	1,616,404	1,648,894	1,682,037
		m3/hari	1,378.50	1,406.21	1,434.48	1,463.31	1,492.72	1,522.73	1,553.33	1,584.55	1,616.40	1,648.89	1,682.04
e.	Volume Sampah Terlayani	m3/hari	180.34	196.57	214.26	233.55	254.56	277.48	302.45	329.67	359.34	391.68	426.93
f.	Tingkat Pelayanan	%	21	22	24	26	27	29	31	33	36	38	41
	JUMLAH	**m3/hari**	**180.34**	**196.57**	**214.26**	**233.55**	**254.56**	**277.48**	**302.45**	**329.67**	**359.34**	**391.68**	**426.93**

Sumber: hasil perhitungan, 2010

In order for of TPA Cilowong age can operate longer (more than 10 years), it is necessary to approach waste in of TPA area before the store up in the landfill area. The approach taken can be special processing of organic waste entering to landfill by composting method. If it is assumed that organic waste into the landfill if as many as 30% of the total organic waste entering the of TPA per day Cilowong can accommodate garbage for 12 years.

According to the criteria that should not be used for of TPA waste (SNI 03-3241-1994 on Site Selection Procedure Final waste Disposal), among others:
1) Area of the lake, rivers and sea
2) Urban areas – settlements
3) Areas of potential agricultural
4) industrial area, the area of environmental conservation
5) Special Region of conserved / protected areas and areas by flood return period of 25 years
6) The area away from the airport is less than 1,500 meters

Views from the above criteria, TPA Cilowong included in the criteria in points 5 that is a special area conserved / protected areas. Then the physical area of TPA Cilowong not worthy of being the location of final waste processing. But in case there is no zone that meet the criteria above, then the input must be held technology that can cope with the impact of pollution resulting from the accumulation of waste in TPA (SNI 03-3241-1994 on Site Selection Procedure Final waste Disposal) . In addition to not meet the criteria, until recently landfill TPA Cilowong not use technology that is only to accumulation of open systems or open dumping of waste has an impact on soil erosion. With the above reasons, the handling of TPA Cilowong is to utilize or rehabilitate the rest of ± 3.8 ha area that has been covered by the avalanche of garbage by using technological inputs.

Method of Waste Management. Methods of handling waste in the of TPA should be to control system that is landfill waste is spread and compacted layers perlapis then crushed to steel wheel compactor or dozer, so that the cells become waste. After a certain height is formed, then covered to soil deposits cover a minimum 20 cm thick. If in view of the handling of waste in landfill sites Cilowong been done in open dumping. waste from the truck dumped on the roadside and then the push operation and compacted by bulldozers around the edge. Such treatment causes the waste to accumulate around the edge of a sloped> 20%, and highly susceptible to landslides occur on January 15, 2009 an avalanche occurred Cilowong landfill waste at the landfill that covers most areas of the underlying pesawahan following leachate pond and embankment retaining the waste. Handling of landfill waste is not in accordance to criteria for control system as a system of planned landfill in the early planning so that there are some effects of physical and non physical.

Drainage channels. Based on field observations of the condition of roads and drainage good drainage plots come together in a single drainage channel leading to the water leachate and rain water to flow together into waterways. While the of TPA drainage system, although still quite good and meets the criteria of drainage channels to control landfill but has not functioned. Standards / Criteria

for that is Design of Control Landfill soil drainage channel to a depth of 250 mm, 50 mm width and slope of 1-2%. Rainwater treatment system currently is one of the causes of avalanches garbage where rainwater runoff from the of TPA and the area around the site of operation to flow into the landfill area.

Meanwhile, in terms of leachate treatment, landfill for control systems, leachate management is to create a means of collecting leachate, leachate distributor of channels, ponds leachate and leachate processing (stabilization ponds). Means in a landfill leachate treatment Cilowong just a leachate treatment pond made of masonry that were placed in the north of TPA. Currently leachate treatment ponds are not working because it was buried by the avalanche of garbage in of TPA leachate effluent from Cilowong considered optimal because it has not yet stabilized in the first post-process the avalanche of leachate, leachate streams also flow out of the leachate pond to the rice fields that need to be done rehabilitation of the leachate pond. Judging from the results of laboratory analysis of leachate quality in the capture at of TPA sites around the IPL Cilowong known that there are some pollutant parameter value is high at 4805.66 mg / liter for BOD value, 39 200 mg / liter for COD and TDS> 20 000 mg / liter , 1950mg / l for TSS (Table 4.6.). The high value of TDS showed that leachate water containing heavy metals are expected because of the waste disposed to landfill there Cilowong hazardous and toxic waste (B3). While the magnitude of the TSS are influenced by the content of organic matter in leachate water thus affecting BOD5 values that require a lot of oxygen to break down organic matter. Thus it can be concluded that the leachate water treatment needs to be done before the waste into water bodies so as not to contaminate water bodies and rice fields in the area downstream

Based on RTRW Serang In 2002 - 2012 explains that the land use of TPA site is intended for water catchment area, the annual crop and productive farmland. Physically, the of TPA Cilowong not worthy of being the location of the final processing so that the handling of of TPA waste is to utilize Cilowong or rehabilitate the remaining land area of 5.3 ha ± which has been closed by avalanches waste by using technological inputs. Based on geological conditions, the landfill and surrounding cilowong compiled by rock and soil residual unit consisting of clay and loam lanauan pasiran and northern locations tpa cilowong breccia composed of rock and lava. Based on the criteria (SNI 03-3241-1994 on Site Selection Procedure Final Disposal waste) of TPA areas geologically Cilowong still meet the criteria because it is not located in zones holocent fault / faults and geologic hazard zone

4. CONCLUSIONS AND RECOMMENDATIONS

Cilowong TPA has increased volume of waste entering the of TPA per year, while the handling of landfill waste is not in accordance to criteria for landfill control system as planned at the beginning, which causes landslides and pollution, on the other side of the building supporting facilities do not meet the criteria for landfill control and drainage system of TPA is not running optimally, and not physically feasible region becomes final waste processing sites.

Advice can be given, among others. (1) The imposition of additional waste entering to landfill so it can match the capacity, (2) Optimizing return the existing drainage system at the of TPA for leachate distribution (3) rehabilitation remainder of ± 5.3 ha area which has been covered by the avalanche of waste using input from technology.

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