

Reserves for Waste Dumping in Manufacturing Company

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Abstract: One of the ways how to make successful business is use its available resources efficiently. One of the ways is creation of reserves from activities of the company. The present study analyzes environmental commitments of the company's activities and creation of reserves for waste dumping in manufacturing company. Contribution provides detailed analysis of the hazardous waste dumping. There was made calculations of liabilities and reserves creation for the dump according to Slovak accounting standards versus US GAAP in accordance with IFRS international standards. The calculations have been made for 4 years and at the end results had been compared. The results served for suggestion to place storage of hazardous waste to dumping and to try to recycle hazardous waste. By this way volume of reserve and liabilities can be decreased and influence profit of the company.

Key words: Waste dumping, liabilities from environmental activity, creation of reserves, waste recycling, manufacturing company

INTRODUCTION

Every business entity seeks to use its available resources in the most economic way. In case business entities want to be successful, they must assume their future financial situation and use all available resources to ensuring implementation of its obligations. One of these means is the possibility of creating reserves.

During its production activity company becomes producer of waste. During manipulation with waste it has obligation to protect health of people and living environment. Every business subjects must and tries to use its available sources economically. They need therefore, to use all available means for covering of their liabilities, resulting from production activity which could pollute living environment. One of the possible means is to create reserves. Reserve is conception that can be viewed as a stock with aim to protect company against possible not undesirable situation in the future. It can be monetary reserve or reserve by the way of stocks. But common factor remains expected using in the future. Single company can decide about creation of reserves or it can be given by legislation.

Literature review: In expert public as well as academic community there is long term question to which measure are accounting information relevant for decision of users. This area had been studied in number of studies (Francis and Schipper, 1999; Bisman, 2010; Marquardt and

Wiedman, 2004) while some researchers are dealing in detail with using of accounting information from various views. Hail (2013), Hung (2000), Amir (1996), Hellstrom (2006), Magnan (2009) and Ohlson (2009) are dealing with its relevance for aim of determination of company's value or its property. Abed *et al.* (2012), Shipper (1989), Burgstahler *et al.* (2006) and Dechow *et al.* (1995) are dealing with relevance of accounting information from the view or risk of possible manipulation with economical result. Hitz (2007), Harvey *et al.* (1979) and Swieringa and Weick (1987) dealt with information relevance in context of their using during operative decision. Nikkinen and Sahlstrom (2004) and Lev *et al.* (2010) mentioned possibilities of accounting using at prognosis of future cash flow of the company.

The government itself is one of the parties interested in such information, we have been examining whether the current system of business financial reporting could be relevant also for parties which have not such privileged status.

But in connection with financial crisis there are more and more occurring also critical opinions about accounting information using. Critical opinion about shortages of accounting in literature is not rare. Kothari and Lester (2012), Heaton *et al.* (2010), Pozen (2009) and Valencia *et al.* (2013) mention that one of the main reason of financial crisis is combination of procyclic rules of capital adequacy of financial institutions and using of fair value during evaluation of property in

accounting. Trussel and Rose (2009) and Bengtsson (2011) mention reservations against single principle and extend of property evaluation in fair value in present prescriptions. But justness of such reservations is questioned for example by Barth and Landsman (2010), according which responsibility for financial system stability belongs to bank's regulators not creators of accounting prescriptions. Similar opinion has Laux and Leuz (2010), Veron (2008), Harris and Kutasovic (2010) and Badertscher *et al.* (2011). Accounting is for them only neutral bearer of information with extends and availability determined by broader environment in which accounting is made. Measure of individual factors influencing of such environment is determining mainly by state that act as direct or indirect guarantee of accounting information relevance. Even in traditionally economical liberal country as USA top creator of accounting principle is congress that delegates part of its authorities to independent Financial Accounting Standards Board (FASB) but without considerable loss of its influence as final institution. Brillhoff mentions in his critical study examples of situations when creators of accounting rules in USA (in this time presented by Accounting Principles Board (APB) were subjected to direct legislative pressure of congress. Due to the critique of Brillhoff 2 years later APB terminated and its agency had been taken by FASB.

Present state of problem solving: Multi-lateral Environmental Agreements (MEAs) are the global environmental laws that are being used in governing global environment by taking precautionary measures to control world emissions of pollution (Razman, 2015). Companies have therefore, commitment in broader conceptas present obligation of the entity that arises from past events and whose settlement will lead to the reduction of economic resources, bringing economic benefits to the enterprise, i.e, benefit (Senteney *et al.*, 2014). Liabilities must be settled and paid according agreed payable period (Zamula and Kireitseva, 2013).

Regulators, professional bodies and researchers around the globe expressed their concern about the need for improved accounting and audit pronouncements and compliance for providing better information than previously required for the grounding and demonstration of corporate financial statements (Aminuzzaman *et al.*, 2015). International business demands also neutrality in the frame of international tax system that should not affect economic efficiency. At the same time, it has to be equitable ensuring equal sacrifice by different tax payers. (Sumathisri, 2013).

Reserve means liability of uncertain timing or amount. Each company provides method of creation and use of reserves provides in an internal regulation, whereby reserve can be used only for the purpose for which it was formed. Reserves are made for costs relating to the elimination of environmental pollution, land reclamation, emissions released in to the atmosphere, removing packaging and waste and many other risks and losses associated with the activities of the company. For the whole time of decontamination work it is very important to comply with safety and health protection regulations given by the legislation (Brenek *et al.*, 2014).

Reserves which are bookkeeping in relation to cost are evaluated also from the view of acceptance or rejecting of tax expenses. According § 21, part 2, j from law about income tax, tax expense means not only creation of reserve and provisions. It means except of § 20 of law about income tax where it is mentioned that tax expense means creation of reserve which is bookkeeping as cost in case of closure, reclamation and monitoring of stocks after their closure.

In present time, two basic systems for bookkeeping can be used in companies for reserves from environmental activity. Mainly reserves can be calculated according Generally Accepted Accounting Standards (US GAAP) and International Standards for Reporting (IFRS). Aim of both systems is similar to provide information about activity of any company (Bragg, 2011).

Due to the calculation of reserves for hazardous waste there is necessary to base calculation on the law. According § 22 of Act No. 223/2001 law of waste, subsequently amended, operatoris obliged to create during the operation of the waste dumping financial purposive reserve, herein after FPR which will be used for closure, reclamation and monitoring of the waste dumping after its shutting. Whoever operates more than one waste dumping, must create financial purposive reserve for every waste dumping separately.

Identification of needs to implement IFRS to practical conditions of companies had been made by questionnaire in 114 chosen SMEs in Slovakia, orientated to industrial production, trade and retail, building, transport, accommodation and catering services during 2014. By questionnaire there were obtained opinions and accesses to IFRS in their reporting systems (Table 1).

Figure 1 illustrates results that SMES estimated contributions and positive of IFRS by individual measure. Measure of informing, interest and preparing of SMEs to use IFRS in their reporting is in Slovakia still relatively low.

Table 1: Identification of need to implement IFRS

Question	Yes (%)	No (%)
Are SMEs interesting about IFRS/IAS?	5.80	94.20
Is informing about IFRS sufficient?	35.29	64.71
Consider SMEs about voluntarily implementation?	9.41	90.59
Are SMEs privileged when implementing IFRS for foreign investors?	9.41	90.59
Are SMEs, making financial reports by IFRS more successful at foreign market?	23.52	76.48
Are disproportions during IFRS implementation reason for not interest about reporting according IFRS?	41.17	58.83
Have companies worries from increased cost for IFRS implementation?	53.12	47.88

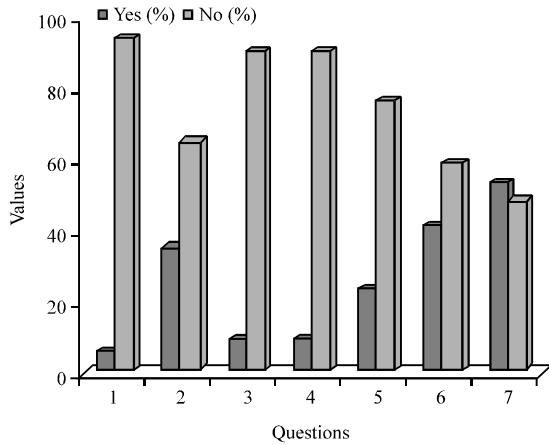


Fig. 1: Interest of SMEs to implement IFRS

MATERIALS AND METHODS

Analysis of base data and information, connecting IFRS implementation in sample of SMEs had been combined with methods of comparing of available documents and information about chosen companies in Slovakia. Methods of synthesis had been applied during consolidation of partial knowledge of principles and base for problem solution. Induction had been used during process of individual steps to complex steps and by this way important information had been obtained for deduction that had been used for processes handling according verified knowledge and according which accuracy of problem solving had been deduced.

When analyzing the development of the reserve for waste dumping there were calculated costson dumping in 2013, due to the closure of the landfill in this year. Closing of dumping is associated with reclamation and monitoring. Estimated date of dumping termination is about 8 years. Estimated time monitoring of the dumping is 10 years.

For the calculation of the reserves creation for hazardous waste in manufacturing company we started froms to red volume of waste in tones at each plant of manufacturing company. During calculation we used Consumer Price Index (CPI), i.e., data submitted by the Slovak statistical office (inflation rate measured by the consumer price index by an average of 1.4%).

Special purposive financial reserve was created annually as expenses in the amount of specified proportion of the total costs of closure, reclamation and monitoring of dumping after its shutting. Sum of created purposive financial reserve had been accounted by charging of account No. 548 and as debit of account No. 451 as long term liability. The annual amount FPR is calculated as follows:

$$R = Q \times H \tag{1}$$

$$H = \frac{IC}{C} \tag{2}$$

Where:

R = Payment for FPR creation in € per year

Q = Volume of stored waste during year in tones

H = Height of payment for unit volume of waste in €, calculated by single application during FPR creation according law about waste

IC = Suggested investment costs for closing, reclamation and other operation costs for waste dumping reclamation in €

C = Free capacity of waste dumping during FPR creation according law about waste during calculation in tones

During calculation according US GAAP and IFRS standard we have used calculation of the present value of money according to the equation:

$$PV = \frac{FV}{1+i.t} \tag{3}$$

where, PV means present value of future value of money during interest rate “I” at time period “t”. The calculation of the present value PV was obtained by discounting. The banks have established activity that interest which leaves the bank in the form of discount is calculated not on the amount of money today but on the amount of money in the future (Saravia, 2014):

$$Do = FV.d.t \tag{4}$$

If “d” is the interest rate used in calculating the discount, trade discount is equal to interest on the amount of money FV (payable value) at a discount rate “d” for period “t” (Liapis *et al.*, 2014).

The calculation and analysis of the development of the reserve was made in company US Steel Kosice, Ltd. which is one of the largest integrated producers of rolled products in Central Europe. The production program consists of a wide range of hot and cold rolled products, coated products including galvanized, plastic-coated, tinplate and isotropic sheet for the electrical and steel industry.

RESULTS AND DISCUSSION

The company in its production activities is becoming a producer of waste. In dealing with them they are required to protect human health and the environment. The company operates two types of devices to protect the environment and waste deposits and tailings.

In the company, there are dumping for non-hazardous waste and hazardous waste. The operation of the first dumping began in August of 2001. The sortable composition of the waste in dumping consists mainly of technological wastes and waste resulting from the maintenance or repair work. Dumping for non-hazardous waste consists of four sections in which it is allowed to store 62 kinds of waste categories of other waste. The largest part consists of waste from the processing of slag, unprocessed slag, mixture of cinder and ash as well as different types of building waste. The average quantity of waste at dumping of non-hazardous waste is 500 thousand tons. Dump with hazardous waste composes of three separate cartridges and allowed them to store 55 kinds of other categories of waste and hazardous waste. A large share of waste creates waste of the sludge. The average quantity of waste dumping of hazardous waste is 50,000 tons (internal sources of company).

Hazardous waste dumping is located in the Kosice region, district Koalice II. The dumping is built in the frame of construction of “ecology of dry heap and waste disposal”. The entire area of the dumping occurs on the existing territory of dump economy in NW part of the site which was founded in 1965.

The dumping is constructed as a dumping for hazardous waste (according to § 25 par. 1 Ministry of Environment Decree No. 283/2001 Coll., implementing certain provisions of the waste act as amended) and it is intended for the disposal of waste disposed: D1 deposit in to the earth or on surface. A dumping can be imposed only permitted waste in accordance with the provisions of the Slovak legislation on waste management and the

decision of the relevant government organs. The dumping was built according project documentation developed by US Steel Kosice, plant ITES, department of projection and according license, issued by the district office Kosice II.

Placing of waste dumping must be carried out with aim to ensure the stability of the deposited waste and associated structures of waste dumping. The method of waste dumping responds to the kind of waste a designated place of waste stocking (internal sources of company).

Monitoring of dumping is based on the results of a detailed engineering survey and assessment of the possible impact of the dumping on the environment. Ground water monitoring system was designed according to the results of the engineering survey and laws of general legal decrees. The network of monitoring wells was designed such that the observation sites are located above the dump body and under dumping body in direction of ground water flow. Monitoring wells are incorporated into the existing monitoring network in the area of waste management USSK. The results of individual monitoring are sent to the district office of environment in Kosice.

Dumping after exhausting of space capacity, determined for the dumping will be closed at the same time technically and biologically reclaimed. For closure, reclamation and monitoring of the dumping after its closure have been processed individual project documentation reflecting the latest legislative and technical requirements of the current legislation (internal sources of company).

Calculation of reserves for waste dumping: The following Table 2 gives an overview of the volume of waste at dumping of hazardous waste in 2013 when it started closing of dumping for individual plants and calculation of special purpose financial reserve for 2013. Table 2 shows the total amount of waste of all plants, representing 44,193.231 tons of hazardous waste. The volume of the waste was 30,690.77 m³. Information on the unit rate of UFR was obtained from the company. Special purpose financial reserve in 2013 without CPI amounts to 166,954.71€ to which we have come so that the volume of stored waste for the year 2013 we multiplied the unit payment rate of UFR. UFR with consumer price index

Table 2: Review of stored waste

Items	Volume	Unit
Total volume of waste	44,193,234	t
Volume of stored waste	30,690.77	m ³
Unit rate of conduction	5,4399	m ³
Index CPI	1,014	-
FPR without CPI	166,954.71	€
FPR with CPI	169,292.08	€

http://www.usske.sk/corpinfo/2012/USSK_AR_2012_sk.pdf

amounted 169,292.08€ to which we come so that we multiply UFR without CPI in 2013. The special purpose financial reserve of CPI is the amount that represents the cost of waste that is illustrating the dump of waste which was recognized as long-term commitment.

Purposive financial reserve, created according law about disposal with waste from mining industry, operator that operates more disposal sites, creates purposive financial reserve for every disposal site individually. Purposive financial reserve is created annually by charging of cost in volume of certain rate from total costs for closure, monitoring of disposal site after its closure and area reclamation. Volume of purposive financial reserve is actualized every 5 years or during every change of plan from disposal with mining waste. Calculation of purposive financial reserve is made according following:

- Probable influence of disposal site for living environment with regard mainly to ranking of disposal site to correspondent category, characteristics of mining waste and future using of area after reclamation
- Assumption that reclamation activity is evaluated and made by independent third entities which have expert competence

Costs that have been estimated are associated with the closure and monitoring of dumping. They were calculated as follows: the estimated total closure costs are 528,660.00€, the estimated total costs for monitoring 9.510.00€. To determine the fair market value of the liability, we estimated the cost of closing and monitoring by discounting and using of interest rate and we take into account inflation in 2013:

- Inflation according forecasts of National Bank of Slovakia: 1.3%
- Annual interest rate: 6.2%

Taking into account inflation, we received the sum of 598,832.43€. By discounting of this amount we created new (i.e., present) value of assets and liabilities

which is 366,306.59€. This amount represents the estimated cost after taking into consideration inflation and interest rates. The results of calculations are given in Table 3.

Table 3 shows the development of costs of discount rates change. After initial commitment it recognizes the effects of the time flowing to the amount of the commitment because of the displacing of assets. In this case, the initial commitment in 2013 is 417,405.54€. This commitment we have increased by interest rate that existed at the time of the initial commitment. The gain is 25,879.14€. Final balance of the reserve amounts to 443,284.69€.

Reserves can be calculated according Generally Accepted Accounting Standards (US GAAP) and International Standards for Reporting (IFRS). Development and comparing of reserves provides Table 4.

Figure 2 illustrates the comparison of the final balance of the reserve during given years. The numerical values in it were taken from a previous calculation. In it there is shown the interest rate for each year, increase in EUR and final state reserves. All values are displayed for 4 years while 2010 is the 1st year of calculation under US GAAP which is the same with IFRS. Next, follow the values of IFRS for the years 2011-2013. In the calculations, we used discounting and thus, the accounting value of reserve increased in each period, showing the time flowing.

During the analysis of the environmental commitments of the company's activities and the way of creation of waste dumping reserves in US Steel Kosice, Ltd., we reached certain results and conclusions. We found that the liabilities of environmental activities are as follows:

- Reserverelated to elimination of air pollution and the damage caused by basic emissions in agricultural crops
- Reserve for released CO₂ emissions
- Reserve for closure, reclamation and monitoring of dumping

Table 3: Calculation of reserve during 2010-2018

Years	Liability from dump	Interest rate	Change in EUR	Final state	Quarterly	Monthly
1	366,306.39	0.06200	3,785.17	370,091.56	-	1,892.58
2	370,091.56	0.06200	22,945.68	393,037.24	5,736.42	1,912.14
3	393,037.24	0.06200	24,368.31	417,405.54	6,092.08	2,030.69
4	417,405.54	0.06200	25,879.14	443,284.69	6,469.79	2,156.60
5	443,284.69	0.06200	27,483.65	470,768.34	6,870.91	2,290.30
6	470,768.34	0.06200	29,187.64	499,955.98	7,296.91	2,432.30
7	499,955.98	0.06200	30,997.27	530,953.25	7,749.32	2,583.11
8	530,953.25	0.06200	32,919.10	563,872.35	8,229.78	2,743.26
9	563,872.35	0.06200	34,960.09	598,832.43	8,740.02	2,913.34

Own processing according internal sources

Table 4: Determination of reserves volume through various standards

Determination	Interest rate	Change EUR	Final state of reserve
US GAAP a	0.068	4,852.12	432,980.06
IFRS 2010			
IFRS 2011	0.054	23,979.51	468,044.49
IFRS 2012	0.059	25,657.02	460,521.75
IFRS 2013	0.062	25,879.14	443,284.69

Own processing according internal sources

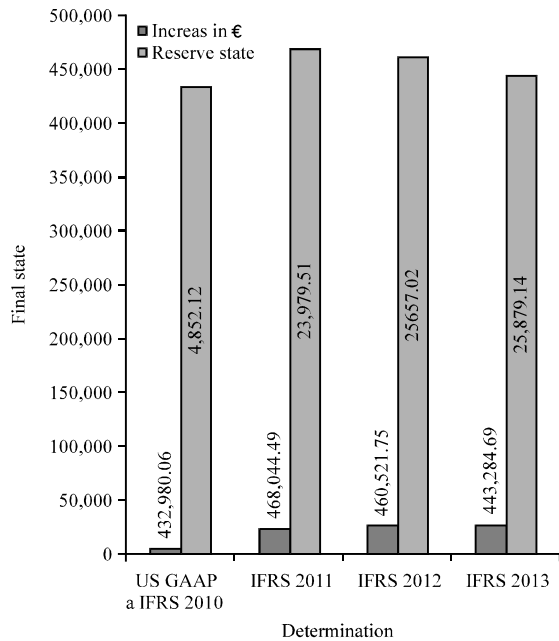


Fig. 2: Final state of reserves for waste dumping

The most significant commitments in terms of environmental performance present reserve for closure, reclamation and monitoring of dumping after its conclusion. This reserve is created by company to dump of hazardous waste and non-hazardous waste. Company creates and reports reserves by three ways, mainly according to Slovak accounting standards, according to US GAAP and IFRS standards. In the case of Slovak accounting calculations we made calculation in year of closure starting where according the volume of stored waste we calculated for the given year financial surplus of reserve after taking into account the consumer price index which shows the cost of waste that is exported to the dump and were recognized as a long-term liability.

Liquidation of main mining workings, quarries and waste from mining activity or activity, made by mining way and reclamation of areas, influenced by mining activity, made by mining way is book keeping as illustrated in Table 5.

In the case of calculation of USGAAP and IFRS, we determine at the beginning estimated closure costs and estimated cost of dumping monitoring. As mentioned

Table 5: Bookkeeping of reserves from mining activity

Activity	Debit (€)	Credit (€)
Creation of reserve	548	451
Derive of reserve	451	321
Cancel of reserve	451	548

earlier, these costs include closing work, ground cover and planting of vegetation. Here belong also activities such as drainage, engineering and demolition. Furthermore, there is maintenance of the dumping and monitoring activities. All these costs are estimated during rising of commitment which means during dumps opening. In USGAAP, there is not required reconsideration from the view of changes in the discount rate, so we realized the calculation of there serves only in 2010. In IFRS, we calculated the reserve for 2011-2013, since this standard requires re-evaluation of assets and liabilities at the discount rate. Due to the mentioned calculations under this standard are more sophisticated and can bring to the company reliable information on the state of the liabilities. Our proposal for company lies in the fact that instead of storing hazardous waste at a dumping it would try to recycle hazardous waste. From the list of hazardous waste, we chose certain types of waste to which we have proposed concrete ways of recycling (Campos, 2014).

The following three types of hazardous waste can be recycled in hazardous waste incinerator, mainly there are types:

- The 0801 11 waste paint and varnish containing organic solvents or other hazardous materials
- The 08 0113 sludge from paint or varnish containing organic solvents or other hazardous materials
- The 08 0117 wastes from removing of paint or varnish containing organic solvents or other dangerous substances

Combustion plant is located in the hazardous waste incinerator which is called the boiler room with built-in eco-boilers incinerator with rotary kiln and the after burning chamber with off set gas burners and it is designed for the direct oxidation two-stage continuous combustion of liquid waste. The combustion takes place in two combustion stages, first in a rotary kiln at temperatures above 500°C, the other at reburning chamber at above 900°C. Hazardous waste that we exchanged has liquid nature and it can be incinerated through the mixer of waste by mixing with together with wooden sawdust. The advantage of this method of hazardous waste removing which we have mentioned is reducing of its volume to 80-90%, producing non-reactive internal ash which is then deposited in dumping of hazardous waste.

Currently, there are two basic accounting systems that are recognized worldwide. They are the Generally Accepted Accounting Principles (USGAAP) and International Financial Reporting Standards (IFRS). According to these two standards we have pointed to the creation of reserves for waste dumping in manufacturing plant. Importance of reserves rests largely in providing us with the possibility of meeting future obligations of the company. Due to the mentioned reason reserves are created also for waste dumping, because in the future it will be necessary to close reclaim and monitor dumping and there is necessary also to consider associated costs which could arise in the future.

CONCLUSION

Company creates reserves for these costs. In presented study, we calculated the amount of such reserves while we analyzed the environmental and economic area of the company, we described the general principles for the creation, use and release of reserves in company, we have designated all reserves that the company has formed a we dealt with waste dumping, mainly dumping of hazardous waste for which we calculated consequently reserve by Slovak accounting, USGAAP and IFRS.

The best and most accurate calculation of the reserves is the IFRS because it shall take into account inflation, reviewing and commitment to change of discount rate and by this way we get a new, so called present value of the assets, i.e., dumping during given period. Calculations with considering of inflation and interest rates were transferred for four periods and in the end we made a comparison from which results there is difference in reporting of economical result of the company.

In terms of environmental we then made the suggestion that the company could consider and review the method of hazardous waste management to consider the possibility of recycling at least some types of hazardous waste and reduced the volume of waste dumping in terms of both cost and environmental protection. By this way volume of reserve and liability can be decreased during recycling and influence to the creation of reserve.

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