

**Cost Analysis
Proposed Tanks Risk-Based Corrective Action Rules
January 27, 2009**

The Association of State and Territorial Solid Waste Management Officials (ASTSWMO) compiled data from the states regarding state tank insurance funds. The survey data is available on-line at http://www.astswmo.org/publications_tanks_1997-2006-statefinancialassurancefunds.htm. The ASTSWMO survey data originated with state tank fund administrators, in Missouri's case the Petroleum Storage Tank Insurance Fund (PSTIF). The department used the ASTSWMO data to analyze costs associated with the cleanup of UST sites in Missouri before and after implementing risk-based corrective action.

In 2004, the department implemented risk-based corrective action (RBCA) for tank sites using a guidance document developed by the department with the assistance of a stakeholder group. While rules pertaining to the RBCA process were not in place, the department, PSTIF, and the regulated community agreed to use the process to evaluate and cleanup tank release sites. The 2004 guidance was applied until March 2005 at which point it was revised to incorporate soil type-specific risk-based target levels (and is referred to herein as the 2004/2005 guidance). The 2004/2005 guidance has been applied since and will remain in effect until the proposed RBCA rules – based on a 2008 revision of the guidance document – are effective.

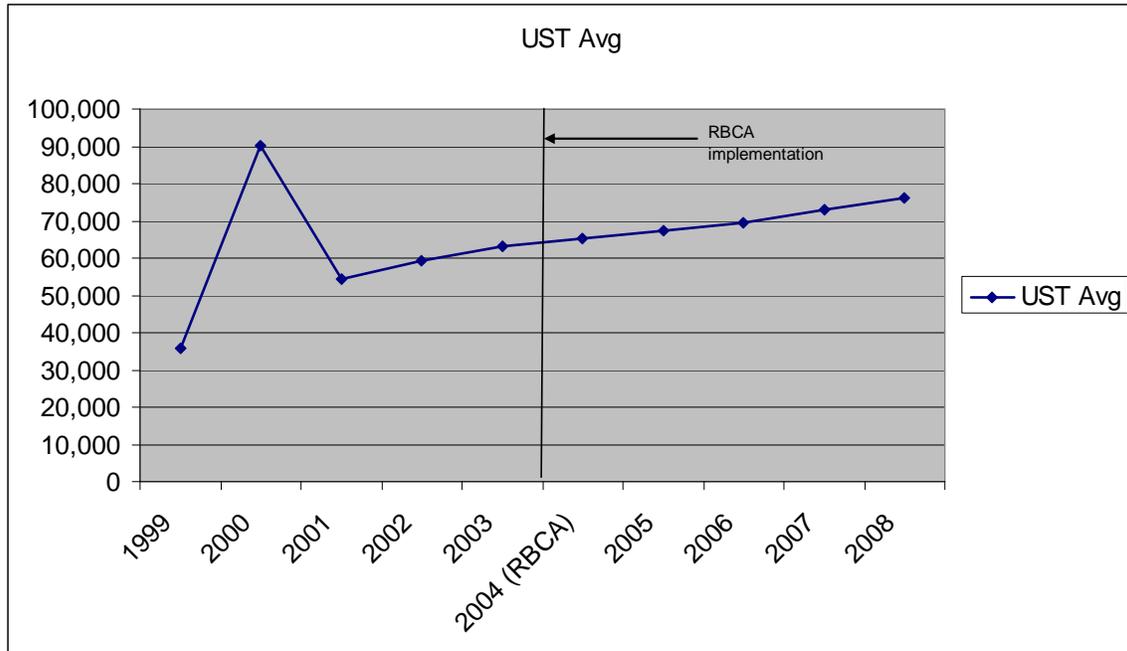
The ASTSWMO survey data includes data from 1997 through 2008 and therefore was useful in identifying average UST costs before and after Missouri implemented RBCA. The analysis below shows the average UST site cost for the 5 years prior to RBCA and the average cost for the 5 years post-RBCA.

Pre-RBCA			Post-RBCA		
Year	Average UST Site Cost/Percent Change	Inflation rate*	Year	Average UST Site Cost/Percent Change	Inflation rate
1999	\$35,888	2.43%	2004	\$65,430/+3.4%	2.68%
2000	\$90,048/+151%	3.38%	2005	\$67,385/+3%	3.39%
2001	\$54,425/ - 40%	2.83%	2006	\$69,596/+3.3%	3.24%
2002	\$59,155/+9%	1.59%	2007	\$72,833/+4.7%	2.85%
2003	\$63,309/+7%	2.27%	2008	\$76,057/+4.4%	3.27%
Avg.	\$60,565		Avg.	\$70,260	
Percent change 1999-2003 Avg. vs. 2004-2008 Avg. = 16%					
Cumulative inflation 1999 – 2008 = 27.95%*					

*Inflation data from InflationData.com accessed on 1/13/09
(http://inflationdata.com/inflation/Inflation_Rate/HistoricalInflation.aspx)

The data above indicates the cost to close a UST release site has increased with the application of the RBCA process, but that rate at which the average cost increased is comparable to the annual rate of inflation.

The graph below shows changes in the average cost to close a UST release site between 1999 and 2008.



As the graph shows, the rate of cost increase after implementation of RBCA is similar to the rate of increase for the three years (2001, 2002, and 2003) immediately prior to the implementation of RBCA. Therefore, while the data clearly shows costs have increased since the implementation of RBCA, the data suggests the increase might be due to factors other than RBCA or just RBCA.

Based on the ASTSWMO data from 2004 – 2008, without the proposed RBCA rules, we would expect the cost to close a UST site to increase by approximately 3.76% or \$2,860. However, in order to gauge the effect of RBCA on costs to close a UST release site, we have compared the average cost of closure for the year immediately preceding implementation of RBCA (2003) with the average cost for the two years during which RBCA was implemented (2004 and 2005; both years are included to account for the learning curve experienced in 2004 and revisions to the guidance in 2005). To determine the cost increase attributable to RBCA, the 2004 and 2005 costs have been adjusted for inflation as follows:

Avg. cost for 2003 = \$63,309
 Avg. cost for 2004 & 2005 = \$66,408

The inflation rate for 2004 was 2.68% and for 2005 it was 3.39%.

avg. cost x inflation rate = increase due to inflation
avg. cost – increase due to inflation = increase due to RBCA

\$65,430 (2004 avg. cost) x .0268 (2004 inflation rate) = \$1,754
\$65,430 - \$1,754 = \$63,676
\$63,676 avg. cost to cleanup a UST site in 2004 adjusted for inflation

\$67,385 (2005 avg. cost) x .0339 (2005 inflation rate) = \$2,284
\$67,385 - \$2,284 = \$65,101
\$65,101 avg. cost to cleanup a UST site in 2005 adjusted for inflation

Average cost for 2004 and 2005: $(\$63,676 + \$65,101) / 2 = \$64,389$

Increase in cost attributable to 2004/2005 RBCA:
\$64,389 (2004/2005 avg. cost) - \$63,309 (2003 avg. cost) = \$1,080
\$1,080 / \$63,309 = 1.7%

The data indicates average costs increased by approximately \$1,080 or 1.7% due to implementation of RBCA in 2004. In 2003, the department applied the process set forth in the March 1996 Closure Guidance Document (CGD) in closing UST release sites. Therefore, transitioning from the CGD to the RBCA process resulted in an increase in the average cost to close a UST site of \$1,080 or 1.7%.

In 2008, the department revised the 2004/2005 RBCA guidance and the proposed RBCA rules are based on the 2008 revised guidance. In revising the guidance, the department added requirements to the 2004/2005 guidance. Some of these new requirements will increase costs associated with the evaluation and cleanup of a UST release site. To account for the cost of applying the proposed RBCA rules relative to the cost of applying the CGD, the department has added the cost of the new requirements to the \$1,080 or 1.7% increase calculated above.

The new requirements of the 2008 revised guidance and the approximate cost of each are listed below.

1. The proposed rules require that contamination be delineated to the Default Target Levels or, with department approval, other residential, soil type one Risk-Based Target Levels (RBTLs). This is a change from the 2004/2005 guidance under which, with department approval, delineation to non-residential, soil type specific RBTLs was allowed. The cost of this change is estimated below.

Assume average area of contamination is 150 feet x 150 feet, or 22,500 square feet.
Assume one sample point per 900 square feet and two samples per point:
 $22,500/900=25$ sample points on average per site x 2 samples per point = 50 samples per site
Assume \$500 per sample (includes collection and analysis)
\$500 x 50 samples = \$25,000 for site characterization under 2004/2005 guidance

Assume delineation per proposed rules increases area to be investigated by 25%:
 22,500 sq. ft. x 0.25 = 5,625 sq. ft.
 5,625 sq. ft / 900 sq. ft. per sample point = 6.25 round to 7 additional sampling points
 2 samples per point x 7 = 14 additional samples under new requirement
 14 x \$500 per sample = \$7,000

Cost to meet new delineation requirement = \$7,000 per site

Assume 250 sites per year gives **annual aggregate increase of \$1,750,000**

PSTIF data (State UST Fund Soundness Data Form completed Dec. 15, 2008 by Pat Eriksen and submitted to EPA) indicates the fund is responsible for 1,254 sites.

Therefore, for all 1,254 sites, the aggregate cost of this requirement is \$8,778,000.

2. The proposed rules require long-term stewardship for any site not cleaned up to residential or unrestricted use target levels. The cost of this requirement is estimated below.

Assume 250 sites closed per year (this exceeds the 2004 – 2008 average of 143 sites)
 Assume 50% (125) of these will close without meeting residential targets
 Assume 50% (63) of those will use a deed notice as a long-term stewardship measure and the other 50% (63) will use a restrictive covenant as a long-term stewardship measure
 Assume cost to prepare deed notice is \$250 (2 hours at \$125/hr)
 Assume cost to record deed notice with recorder's office is \$200
 Assume cost to document recording and prepare and submit report to DNR is \$250 (2 hours at \$125/hr)

Total per site cost if deed notice used: \$250 + \$200 + \$250 = \$700

Annual aggregate cost for deed notice 63 x \$700 = \$44,100

PSTIF responsible for 1,254 sites, aggregate cost of requirement is

$1,254/2 = 627/2 = 314 \times \$700 = \$219,800$

Assume 63 sites annually will use a restrictive covenant as a long-term stewardship measure

Assume cost to prepare restrictive covenant is \$375 (3 hrs at \$125/hr)

Assume cost to record covenant is \$200

Assume cost to document recording and prepare and submit report to DNR is \$250 (2 hrs. at \$125/hr)

Total per site cost if restrictive covenant used: \$375 + \$200 + \$250 = \$825

Total average cost = (\$700 + \$825) / 2 = \$762.50

Annual aggregate cost for restrictive covenant is 63 x \$825 = \$51,975

Total aggregate cost for LTS = \$44,100 + \$51,975 = \$96,075

PSTIF responsible for 1,254 sites, aggregate cost of requirement is

$1,254/2 = 627/2 = 314 \times \$825 = \$259,050$

Total for all sites for which PSTIF responsible = \$219,800 + \$259,050 = \$478,850

3. The proposed rules require that sites where light non-aqueous phase liquid (LNAPL) is present, a work plan for the removal of the LNAPL must be developed and submitted to the department. The work plan is required to

demonstrate how the LNAPL will be recovered and why the proposed removal method is appropriate given site conditions. The 2004/2005 guidance did not include this requirement. However, under the 2004/2005 guidance, field work to define the extent of the LNAPL and determine how the LNAPL could be efficiently removed was required and, therefore, costs related to characterization are not included in this cost estimate (rather, that cost is included in the 1.7% increase discussed above).

Assume 250 sites per year

Assume 10%, or 25, will have LNAPL

Assume 40 hours at \$80/hr for data analysis in preparation for work plan development = \$3,200

Assume 20 hours at \$80/hr for work plan development = \$1,600

Cost to meet new work plan requirement: \$3,200 + \$1,600 = \$4,800 per site

\$4,800 x 25 = \$120,000 annual aggregate cost

PSTIF responsible for 1,254 sites x 10% with LNAPL = 125 sites

125 x \$4,800 = \$600,000 aggregate total for all sites

4. The proposed rules require owners and operators to obtain the permission of adjacent landowners prior to conducting corrective action on the adjacent property. The 2004/2005 guidance did not clearly require such permission, though the department believes owners and operators obtained such permission, as property owners generally do not permit actions that disturb their property without first granting permission. Regardless, the cost to approach a landowner to request such permission is estimated below. Only direct costs are considered.

Assume 250 sites per year

Assume 50%, or 125, have contamination that has migrated onto an adjacent property

Assume 25%, or 32, of the adjacent properties require corrective action

Assume 4 hours are required for a consultant to contact an adjacent owner, discuss the situation, and obtain permission

Assume \$80/hr for consultant

\$80 x 4 = \$320 total per site cost to meet requirement

\$320 x 32 = \$10,240 annual aggregate cost

PSTIF responsible for (1,254 sites x 0.5) x 0.25 = 157

157 x \$320 = \$50,240 aggregate total for all sites

Increased cost to meet the proposed RBCA rule requirements rather than the process set forth in the March 1996 Closure Guidance Document and the requirements in 10 CSR 20-10 currently in place:

Per site cost (assumes LTS required, LNAPL present, and contamination requiring corrective action has migrated onto an adjacent property):

\$7,000 – delineation requirements

\$762.50 – LTS

\$4,800 – LNAPL work plan
\$320 – adjacent owner permission
\$1,080 – 1.7% increase (as explained above)

**Total per site average cost increase to meet proposed rule requirements =
\$13,962.50**

**Inflation adjusted per site average cost to meet RBCA requirements:
\$64,389 (avg. 2004/2005 inflation adjusted UST cost) + \$13,962.50 = \$78,351.50 or
3% (increase over average 2008 cost of \$76,057)**

To meet proposed RBCA rule requirements (those in the 2004/2005 guidance and those in the proposed rules) will cost approximately 24% more than to meet the process provided in the CGD and current 10 CSR 20-10 rules. However, due to inflation, the actual average cost to meet the proposed rules is:

\$76,057 (actual avg. 2008 UST cost) + \$13,962.50 = \$90,019.50 or 42% above the cost to meet the process provided for in the CGD and current 10 CSR 20-10 rules.

Summary: The proposed RBCA rules increase average cost to close a UST 42% over the cost using the CGD.

Annual aggregate cost
\$1,750,000 – delineation
\$96,075 – LTS
\$120,000 – LNAPL work plan
\$10,240 – adjacent owner permission
\$270,000 – \$1,080 cost increase related to 2004/2005 RBCA x 250 sites/yr

**Total annual aggregate cost increase to meet proposed rule requirements =
\$2,246,315**

Aggregate PSTIF cost for 1,254 sites
\$8,778,000 – delineation
\$478,850 – LTS
\$600,000 – LNAPL work plan
\$50,240 – adjacent owner permission
\$1,354,320 - \$1,080 increase attributable to 2004/2005 RBCA
**Total aggregate cost increase for all 1,254 sites for which PSTIF is responsible =
\$11,261,410**

UST Closure

1. The closure of an underground storage tank is not part of the RBCA process. Rather, UST closure precedes application of the RBCA process. Regulatory requirements dictate that soil and, as warranted, groundwater samples be collected to determine whether a release has occurred from the tank system and, if so, to quantify the contamination. The department has amended the rules applicable to closure, in particular 10 CSR 20-10.072 (proposed as 10 CSR 26-2.062), to require comparison of soil and groundwater data collected at closure to the Default Target Levels (DTLs) or, if certain conditions are met, the residential soil type one risk-based target levels. Under the 2004/2005 guidance, owners and operators were allowed to apply soil type two and three target levels and non-residential target levels conditionally. This comparison was found to be inconsistent with the RBCA process and, therefore, the amended closure rule limits comparison to the DTLs or, conditionally, the residential soil type one risk-based target levels.

From 2004 to 2008, on average, owners and operators closed 270 USTs per year. The following assumptions have been made to determine the approximate number of facilities that would be affected by the subject change:

270 USTs closed

2 USTs per facility for a total of 135 facilities

Assume 50% (68) do not meet DTLs upon UST removal

Assume 50% (34) would have applied soil type two or three or non-residential standards and under the proposed rules must now apply the RBCA process instead

Conclusion: Annually, the new requirement will affect 34 facilities.

Average UST closure cost data are not available to attempt to quantify the cost of the proposed rule amendment. In addition, in general, some degree of site characterization and source removal occurs when a UST is closed. The degree of both is site-specific. The department is unable, based on available data, to determine the average extent to which information collected at UST closure is or could be used to comply with some of the proposed rule requirements. Therefore, we have not attempted to quantify the cost associated with the proposed amendment of 10 CSR 20-10.072.

Conclusion: The department is unable to quantify costs associated with this proposed rule amendment.