

DTSC Official Policy Cover Page

**GUIDELINES FOR CALCULATING THE ECONOMIC
BENEFIT OF NONCOMPLIANCE**

DTSC-OP-0004

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Gale Filter, Deputy Director

Name and Title of Approving Authority

Original Signed by Gale Filter

January 30, 2009

Signature

Date Signed

Health and Safety Code, Division 20, Chapter 6.5 and its implementing
regulations

Statutory Reference

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I. PURPOSE

This policy provides staff of the Department of Toxic Substances Control (DTSC) with examples of how to calculate the economic benefit realized by a person or facility violating the Hazardous Waste Control Law or any associated California Code of Regulations, title 22, requirements. This policy sets forth a simple approach that, in most instances, may be used for calculating economic benefit. In specific cases, more complex calculations may be required.

II. BACKGROUND

This policy supersedes EO-02-001-GD.

III. POLICY STATEMENT

California Code of Regulations, title 22, section 66272.63, requires that a violator should not benefit economically from noncompliance, either by avoiding or delaying costs or gaining a competitive advantage. Thus, administrative penalties include the amount of any economic benefit gained or cost of compliance avoided by the violator as a result of noncompliance, up to the statutory maximum for each violation. Economic benefit includes, but is not limited to, avoided costs, increased profits, and avoided interest. Economic benefit also includes the use of capital from delayed or avoided costs.

In certain instances, the economic benefit of noncompliance may be insignificant, as with the failure to submit a required report on time. In the interest of expediting an enforcement action, DTSC staff may forego calculating the economic benefit component of a penalty where it appears that the amount of the benefit is likely to be less than five hundred dollars (\$500) for a particular violation. In situations like this, professional judgment should be used to determine if any economic benefit should be calculated. This decision should be documented in the file.

The cost factors that appear in the attachments to this guidance document are based on inquiries to industry and DTSC staff experience. During the negotiation stages of an enforcement action, the facility may be able to provide more specific cost information. DTSC staff should keep in mind that the figures in this document are for guidance only and should be modified as indicated for each case.

The calculation of economic benefit for any violation is a case-by-case determination dependent on the facts of the case.

IV. RELATIONSHIP TO OTHER DOCUMENTS

This policy is to be used in conjunction with California Code of Regulations, title 22, division 4.5, chapter 22, article 3 (penalty regulations).

V. DELAYED COSTS AND AVOIDED COSTS

A. Benefit From Delayed Costs:

“Delayed costs” are expenditures that have been deferred by failing to comply with legal requirements. The violator eventually will have to spend the money in order to achieve compliance, but has the benefit of having the money prior to that time. For example, by delaying a \$10,000 expenditure for one year, at an interest rate of 5%, the violator has realized a \$500 economic benefit. Examples of violations that result in savings from delayed costs are:

- Failure to install groundwater monitoring equipment as required;
- Failure to install secondary containment where such containment is installed later than required; or
- Failure to develop a waste analysis plan as required.

B. Benefit from Avoided Costs:

“Avoided costs” are expenditures that the violator avoids by failing to comply with legal requirements. For example, avoided costs occur when a facility fails to pay necessary operating and maintenance expenses, which may include periodic expenses (such as leasing monitoring equipment). Examples of violations that result in savings from avoided costs are:

- Failure to perform semiannual or annual groundwater monitoring, sampling, and analysis;
- Failure to use a registered transporter;
- Failure to perform waste analysis before adding waste to tanks, waste piles, or other waste management units; or
- Failure to install secondary containment around a tank, where such containment is never installed because the violator closes the tank rather than continue operation.

C. Benefit from Avoided Fees:

Health and Safety Code section 25205.2(a) requires that the operator of a facility pay facility fees for a permit or grant of interim status. Therefore, a hazardous waste facility that operates without the necessary permit or other grant of authorization from DTSC may have avoided the cost of paying the appropriate fees, both annual operating fees and permit application fees.

Fees should be included as avoided costs only if the facility was regularly operating in the manner of a facility. If the facility committed occasional acts of operation without authorization (such as occasional storage over the allowed time or occasional illegal treatment), fees should not be included as *avoided costs*. On the other hand, if the facility continuously stores hazardous waste longer than the allowed time, or the illegal treatment activity is a regular part of business operations, annual operating and permit application fees should be included as avoided costs. If the facility applies for the required permit, the annual operating fee would still be an avoided cost, and the permit application fee would be a delayed cost.

VI. CALCULATION OF ECONOMIC BENEFIT

Although delayed and avoided costs are calculated somewhat differently, both calculations involve accounting for the economic benefit of having the use of funds that should have been spent on compliance.

The violator benefits in several ways:

- The violator may earn interest on the funds that should have been spent on compliance;
- The violator may increase profits by investing the funds back into the business; or
- The violator may avoid the expense of interest, if the business would have had to obtain a loan to pay the cost of compliance.

To account for these benefits, a factor called the "interest factor" or "interest rate" is included in the economic benefit calculation. The interest factor may be a consolidation of multiple interest rates where the interest rate changed during the period of violation. The examples in this policy use an interest factor of 5%. However, when calculating economic benefit, DTSC staff should contact DTSC's Audits and Special Investigations Unit to obtain the current interest factors. For liability and financial

responsibility violations, someone who is familiar with financial assurance should be calculating these economic benefits as part of the penalty calculations. The time period used in the examples is generally stated in years to simplify the examples (1 year, 2 years, etc.). In actual cases, the time periods would be calculated in months to give precise costs (9 months, 18 months, etc.).

For *avoided costs*, the economic benefit equals the cost of meeting compliance requirements, together with the interest factor.

For *delayed costs*, because the violator will eventually have to pay the costs of meeting compliance requirements, the economic benefit is limited to the interest factor.

If DTSC obtains, at any time, actual cost data that differ from the figures used in a calculation, the computation should be revised accordingly. The costs used, whether estimated or actual, should be the costs at the time they should have been incurred, not at the date of the economic benefit calculation.

Additionally, there is information available in the U.S. EPA manual, "Estimating Costs For the Economic Benefit of RCRA Noncompliance (December 1997)," explaining how to determine costs for some hazardous waste activities.

Examples of calculations for common violations are included as Attachments A through N. Before calculating the economic benefit, it is recommended that contact be made with at least three sources in the general area of the facility in question to obtain up-to-date cost figures. It should be noted that all costs listed in this policy are *representative costs* only and are *average costs* over specified time periods listed in the sample calculations. Actual cost data should be obtained and used for determinations in actual cases.

For the purposes of many economic benefit calculations, current and historic Hazardous Waste Facility Fees for treatment, storage, and disposal are necessary. Facility fees are adjusted annually to reflect increases or decreases in the cost of living measured by the Consumer Price Index. Fees due to the Board of Equalization for the year in which the violation occurred should be used when calculating the economic benefit of noncompliance. These current and historic Hazardous Waste Facility Fees, as well as other fees such as Standardized Permit Fee, Post-Closure Permit Fee, Hazardous Waste Disposal, Generator, or Activity Fees, may be found at: <http://www.boe.ca.gov/pdf/boe835.pdf>

The least expensive method of compliance should generally be used as the basis for economic benefit calculations.

VII. ROLES AND RESPONSIBILITIES

Inspector – Drafts an economic benefit calculation, in coordination with DTSC’s Audits and Special Investigations Unit.

Supervisor – Reviews and approves the draft economic benefit calculation, in coordination with DTSC’s Office of Legal Affairs.

CONTACT:

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This policy is intended to provide guidance only. The policy does not replace or supersede relevant statutes and regulations. The information contained in this policy is based upon the statutes and regulations in effect as of the date the policy was signed. Interested parties are advised to keep apprised of subsequent changes to relevant statutes and regulations.

This policy expires five years from the date of signature.

Attachment A Storage of Containers of Hazardous Waste Beyond 90 Days

This is a *delayed cost*. Factors:

- Number of containers;
- Cost to treat or dispose waste at offsite facility;
- Cost of transportation;
- Cost of waste profile(s);
- Period of noncompliance; and
- Interest rate.

Example:

XYZ Corporation (XYZ) stored spent acetone and benzene solvents in one hundred 55-gallon drums for one year beyond the standard 90-day accumulation period. The cost to treat the waste is \$275 per drum at an off-site facility. The transporter costs average \$65 per hour for eight hours using a registered hauler. XYZ had to perform two waste profiles.

- Number of Drums: 100;
- Treatment/disposal costs: 100 drums x \$275/drum = \$27,500;
- Transportation Costs: \$65/hr x 8 hr = \$520;
- Cost of Waste Profiles: \$500/profile x 2 profiles = \$1,000;
- Period of noncompliance: 1 year; and
- Interest Rate: 5%.

Economic Benefit: (\$27,500 + \$520 + \$1,000) x 5% x 1 year = \$1,451.

Attachment B Failure to Prepare Closure Plan

This is a *delayed cost*. Factors:

- Cost to prepare the closure plan;
- Period of noncompliance; and
- Interest rate.

Example:

ABC Corporation (ABC) is a mini-facility and was required to have a closure plan in January 2007, but did not have one until October 2008. The required plan is a mini plan.

- Cost to prepare a closure plan: \$30,000;
- Period of noncompliance: 21 months (1.75 years); and
- Interest Rate: 5%.

Economic Benefit: \$30,000 x 1.75 years x 5% = \$2,625

Typically, if a facility has not prepared a closure plan, there will also be a lack of an established closure fund as required by the regulations. Not having an adequate closure fund may result in substantial economic benefit. For further information, see Attachment L.

Attachment C Failure to Prepare Training Plan

This is a *delayed cost*. Factors:

- Size of facility (based on number and type of job classifications that need training);
- Cost to prepare the training plan;
- Period of noncompliance; and
- Interest rate.

The cost of writing a training plan will vary with the size of the facility but is generally not expensive. The typical cost is between \$1,000 and \$2,500.

Example:

ABC has approximately 100 employees who require varying degrees of training. ABC was required to have a training plan in January but did not have one until October of the following year, 21 months later.

- Cost to prepare the training plan: \$1,750 (mid-range);
- Period of noncompliance: 21 months (1.75 years); and
- Interest rate: 5%.

Economic Benefit: \$1,750 x 1.75 years x 5% = \$153.

This amount of economic benefit is considered insignificant and need not be included in the penalty calculation. However, this does not address avoided costs of training employees (see Attachment D).

Attachment D Failure to Train Employees

This is an *avoided cost* for annual refresher training, and a *delayed cost* for initial training. Factors:

- Review training plan (if available) to determine number and job classification of employees needing training;
- Type(s) of training required per job classification;
- Training cost per employee;
- Number of employees;
- Period of noncompliance; and
- Interest rate.

Example:

L&K Plating (L&K) employs one environmental technician and two environmental scientists who require HAZWOPER and emergency response training. L&K failed to train these employees for three years.

- Initial cost of training courses, per employee/course: (1) HAZWOPER, \$800; (2) Emergency Response, \$400;
- Cost of refresher training courses, per employee/course: (1) HAZWOPER, \$600; (2) Emergency Response, \$400;
- Number of employees: three;
- Period of noncompliance: three years for initial training; two years for the first year of refresher training, and one year for the second year of refresher training; and
- C Interest rate: 5%.

Economic Benefit of **Delaying** Initial Training:

$$3 \text{ employees} \times (\$800 + \$400) \times 3 \text{ years} \times 5\% = \$540$$

Economic Benefit of **Avoiding** Annual Refresher Training:

Cost of annual refresher: Three employees x (\$600 + \$400) = \$3000

1st year missed:

cost of annual refresher = \$3000, plus

use of money over time \$3000 x 1 years x 5% = \$150

Sub-total = \$3000 + 150 = \$3150

2nd year missed:

cost of annual refresher = \$3000, plus

use of money over time \$3000 x 2 years x 5% = \$300

Sub-total = \$3000 + 300 = \$3300

Economic Benefit: \$540 + \$3150 + \$3300 = \$6990.

(This calculation of avoided training costs should be considered together with the insignificant training costs calculated in Attachment C.)

Attachment E Failure to Prepare Contingency Plan

This is a *delayed cost*. Factors:

- Cost to develop contingency plan;
- Period of noncompliance; and
- Interest rate.

Example:

ABC has 20 generation points and handles several petroleum derivative wastes. ABC was required to have a contingency plan in January but did not have one until October of the following year.

- Cost of contingency plan: \$57,500;
- Period of noncompliance: 21 months (1.75 years); and
- Interest rate: 5%.

Economic Benefit: \$57,500 x 1.75 years x 5% = \$5,031.

Some facilities may have a business plan or an emergency response plan required by a Certified Unified Program Agency (CUPA) or participating agency. Those plans may meet some of the contingency plan requirements in Cal. Code Regs., title 22. Some consideration should be given to the existence of any plan that meets any requirements of a contingency plan. Thus, calculating the economic benefit of not having a contingency plan should take into account the cost of modifying any existing plan to meet hazardous waste requirements.

Attachment F Failure to Perform Inspections of Facility

This is an *avoided cost*. For this example, assume that container storage units are inspected once per week, and tank treatment units are inspected daily, five times per week. Factors:

- Determine type and number of units that were not inspected;
- Estimate inspection time per each unit;
- Estimate average hourly wage for inspector;
- Determine period of noncompliance; and
- Interest rate.

Example:

A permitted storage facility has ten generator container storage units with ten drums each per unit (Area 1), one permitted drum storage unit with 100 drums capacity (Area 2), and three permitted tanks (Area 3).

- Assume ten minutes to inspect each generator container storage unit weekly, 20 minutes to inspect the permitted drum storage unit weekly, and ten minutes to inspect each tank daily;
- Time to inspect the generator container storage units (Area 1): ten minutes/unit x ten units = 100 minutes per week;
- Time to inspect the permitted drum storage unit (Area 2): 20 minutes/unit x one unit = 20 minutes per week;
- Time to inspect the treatment tanks (Area 3): ten minutes/tank x three tanks/day x five days/week = 150 minutes per week;
- Total Time to Inspect: 270 minutes = 4.5 hours/week;
- Period of noncompliance: 50 weeks (0.96 years);
- Hourly Wage: \$15/hour; and
- Interest Rate: 5%.

***Economic Benefit:*(4.5 hrs x 50 wks x \$15/hr)+(4.5 hrs x 50 wks x \$15/hr x 0.96 yr x 5%)= \$3537**

Figure 1 - 2008 ECL Analytical Costs

| Analysis | Cost |
|--|-------------|
| pH | \$18 |
| Metal scan, totals (except Hg & Cr-VI) | \$150 |
| Metals (each) | \$13 |
| Hg | \$42 |
| Cr-VI | \$84 |
| Waste Extraction Test (WET) | \$60 |
| Polychlorinated biphenyls (PCBs) | \$240 |
| Volatile organic analyses (VOAs) - GC method aromatics | \$132 |
| halogenated | |
| nonhalogenated | \$132 |
| Volatile organic analyses (VOAs) - GC/MS method | \$132 |
| Polycyclic aromatic hydrocarbons (PAHs) | \$210 |
| Phenols | \$72 |
| Bulk asbestos | \$25 |
| Total petroleum hydrocarbons | \$240 |
| Oil & grease | \$90 |
| Organochlorine pesticide | \$240 |
| Organophosphorus pesticide | \$162 |
| Fish bioassay | \$350 |
| Ignitability | \$60 |
| Corrosivity | \$24 |
| Reactivity | \$120 |

Attachment H Failure to Close Unit

This is a *delayed cost*, which includes the cost for closure plan preparation and implementation. There may also be fee issues. Closure may relieve the facility of its obligation to pay fees, which may offset economic benefit derived from failure to close the unit. Alternatively, the facility may have been operating as a storage or treatment facility without paying annual facility fees. Factors:

- Closure cost estimate for unit;
- Facility fees;
- Period of noncompliance; and
- Interest rate.

Example:

XYZ has two underground storage tanks that contain solvents and wash water, and that should have been closed one year ago. No additional wastes are being accepted. XYZ paid the annual facility fee (\$23,526) for a small storage facility for the last year. Factors:

- Closing two underground tanks;
- Period of noncompliance: one year; and
- Interest rate: 5%.

Tank closure costs include the following:

| Tank Closure Items | Cost |
|---|------------------|
| Remove contents and clean | \$6,155 |
| Decontamination and demolition of concrete | \$20,610 |
| Remove and dispose of tank(s) | \$11,120 |
| Excavation and disposal of contaminated soils | \$45,786 |
| Backfill and repave | \$5,000 |
| Closure plan preparation | \$15,000 |
| Total | \$103,671 |

Economic Benefit: \$103,671 x 5% = \$5184.

The cost of the facility paying the facility fees (\$23,526) far exceeds what was gained by not closing the storage units. Therefore, there is no economic benefit.

Attachment I Unauthorized Treatment/Disposal

Unauthorized treatment is generally an *avoided cost*. Unauthorized disposal is generally a *delayed cost* where proper disposal will occur, but would be an *avoided cost* if wastes will not be properly disposed. Factors:

- Cost for treatment per wastestream;
- Cost of transportation;
- Cost of profiles (incineration/landfill/treatment);
- Cost of disposal;
- Quantity of waste;
- Size of containers;
- Period of noncompliance; and
- Interest rate.

For purposes of these examples, typical costs for commercial treatment and/or disposal are listed below. Before calculating economic benefit of noncompliance, use appropriate methods to obtain up-to-date cost figures.

Treatment Costs:

- Liquids for treatment (acids, bases, inorganics): \$275/55-gallon drum (\$5/gallon);
- Incinerable waste: \$4.50/gallon (pumpable liquids; RCRA used oil); \$14.55/pound (solids, non-pumpable liquids, rags);
- Supplemental fuels: \$5/gallon (price includes BTU and viscosity surcharge averages);
- Oxidizers: \$12/gallon; and
- Explosives, pyrotechnics, pyrophorics, hypergolics, and peroxides: \$400/55-gallon drum.

Surcharges (averages):

- \$1,000/incineration profile; and
- \$500/landfill or treatment profile.

Disposal Costs (solids for landfill):

- \$280/55-gallon drum (non-soils);
- \$250/ton (non-soils);
- \$100/55-gallon drum (soils); and
- \$125/ton (soils).

Example #1:

ABC transported for treatment 100 55-gallon drums of hazardous waste (acids) to an unauthorized treatment facility during the course of one year.

- Quantity of waste: 100 55-gallon drums;
- Treatment costs (acids): \$275/55-gallon drum;
- Transportation costs: \$65/hour plus driver per diem;
- Cost/number of profiles: \$500/profile, 10% of load;
- Period of noncompliance: one year; and
- Interest rate: 5% per year.

Treatment costs: \$275/drum x 100 drums = \$27,500

Transportation costs: \$65/hour x eight hours + \$85 per diem = \$605

Profile costs: \$500/profile x ten profiles = \$5000

***Economic Benefit:* (\$27,500 + \$605 + \$5000) x 5% = \$1655**

This figure may need to be adjusted by subtracting the actual cost of the original transportation and treatment, despite the fact that such treatment was unauthorized.

Example #2:

ABC illegally disposed of 100 55-gallon drums of hazardous waste (explosives) over a two-day period. This unauthorized disposal occurred one year before ABC began legal disposal, and cost ABC \$1,510.

- Quantity of waste: 100 55-gallon drums;
- Cost of disposal: \$280/55-gallon drum;
- Treatment costs (explosives): \$400/55-gallon drum;
- Transportation costs: \$65/hour plus driver per diem;
- Cost/number of profiles: \$1000/profile, 10% of load;
- Actual cost of illegal disposal: \$1,510;
- Period of noncompliance: one year; and
- Interest rate: 5%.

Disposal costs: \$280/drum x 100 drums = \$28,000

Treatment costs: \$400/drum x 100 drums = \$40,000

Transportation costs: \$65/hour x 16 hours (two eight-hour trips) + \$170 (two per diems) = \$1210

Profile costs: \$1000/profile x ten profiles = \$10,000

Total: \$28,000 + \$40,000 + \$1210 + \$10,000 = \$79,210

Total less cost of illegal disposal: \$79,210 - \$1,510 = \$77,700

Economic Benefit: \$77,700 x 5% = \$3,885.

Attachment J Unauthorized Transportation

This is an *avoided cost*. Factors:

- Quantity of waste;
- Waste type;
- Cost for transportation;
- Difference between calculated and actual cost of transportation;
- Period of noncompliance; and
- Interest rate.

For this example, typical costs for commercial transportation are listed below. Before calculating economic benefit of noncompliance, use appropriate methods to obtain up-to date cost figures.

Transportation Costs:

- \$65/hour for vacuum truck or 18-wheel flatbed truck;
- \$85/day per diem for driver; and
- \$2/gallon (transportation & disposal) for non-RCRA oily water.

Example:

XYZ transported 10,000 gallons of non-RCRA oily water using an unregistered transporter.

- Quantity of waste: 10,000 gallons;
- Waste type: non-RCRA oily water
- Transportation/disposal costs: \$2/gallon;
- Actual transportation costs: \$7,000;
- Period of noncompliance: one year; and

- Interest rate: 5%.

10,000 gallons x \$2/gallon - \$7,000 = \$13,000

Economic Benefit: \$13,000 + (\$13,000 x 5%) = \$13,650.

Attachment K Lack of Liability Coverage

This is an *avoided cost*. Both permitted and interim status TSDFs are required to have this insurance coverage for bodily injury and/or property damage to third parties, with a minimum of \$1M per occurrence/\$2M annual aggregate sudden liability coverage. Further, disposal facilities (which includes surface impoundments, land treatment, and miscellaneous disposal units) are required to have an additional \$3M per occurrence/\$6M annual non-sudden liability coverage. This coverage is required upon receiving or handling any hazardous waste. For these examples, the following industry averages were used: (1) \$24,000/year or \$2,000/month for sudden liability coverage; and (2) \$60,000/year or \$5,000/month for non-sudden liability coverage. For actual cases, use appropriate methods to obtain up-to-date cost figures. Factors:

- Type of coverage needed;
- Period of noncompliance; and
- Interest rate.

Example #1:

ABC operated a treatment facility from July 1, 1998 to March 1, 2000 without any liability coverage.

- Type of coverage needed: Sudden;
- Period of noncompliance: 20 months; and

Interest rate: 5%.

***Economic Benefit: 20 months x \$2,000 = \$40,000.
\$40,000 + (\$40,000 x 1.67 years x 5%) = \$43,340.***

Example #2:

- DEF Corporation operates a disposal facility and did so from January 1, 1996 to May 1, 2000 with no liability coverage.
- Type of coverage needed: Sudden and Non-Sudden;
- Period of noncompliance: 52 months; and

- Interest rate: 5%.

Economic Benefit: $52 \times \$2,000 + 52 \times \$5,000 = \$364,000$. $\$364,000 + (\$364,000 \times 4.33 \text{ years} \times 5\%) = \$442,806$.

Attachment L

Lack of Financial Responsibility for Closure/Post-Closure

This attachment will address both the "trust fund" and "letter of credit" methods for achieving regulatory compliance. For actual cases, the calculated amounts for closure and post-closure would need to be adjusted for inflation annually, but will not be included in the examples. This adjustment would be considered when calculating economic benefit, especially if the noncompliance occurs for more than one year. Factors:

- Is the facility permitted or interim status? If permitted, date and length of time of permit; if interim status, date facility received ISD;
- Date facility first received waste;
- Financial mechanism (trust fund or letter of credit);
- Closure and/or post-closure cost estimate(s);
- Period of noncompliance; and
- Interest rate.

I. Trust Fund and Post-Closure Method:

This is a *delayed cost*. Trust funds must be fully funded by the end of the operating life of the facility, or within ten years, whichever is shorter. Thus, if a facility must close in five years, the trust would need to be fully funded at the end of five years.

Last, it is important to know what the balance was in the trust fund on each anniversary date of the establishment of the trust so DTSC can track compliance with trust fund requirements.

Example #1:

ABC was permitted on March 1, 2004 and first received wastes April 1, 2004. The facility is scheduled to close in 2009. This trust fund would have required a 20% deposit the first year waste was received and annual deposits each year thereafter for the five-year life of the facility.

- Closure cost estimate: \$150,000;
- Current balance in trust fund: \$0;

- Period of noncompliance: three years, or four payments; and
- Interest rate: 5%.

To calculate the yearly payment that is required in the trust, subtract the current value of the trust from the closure cost estimate and divide by the number of years remaining in the pay-in period. Payment required in the trust:

| Date Trust Payment Due | Closure Cost Estimate | Years Remaining | Required Yearly Payment to Trust | Required Balance in Trust |
|-------------------------------|------------------------------|------------------------|---|----------------------------------|
| April 1, 2004 | \$150,000-0 | 5 | \$30,000 | \$30,000 |
| April 1, 2005 | \$150,000-30 | 4 | \$30,000 | \$60,000 |
| April 1, 2006 | \$150,000-60 | 3 | \$30,000 | \$90,000 |
| April 1, 2007 | \$150,000-90 | 2 | \$30,000 | \$120,000 |

To calculate the economic benefit of not funding the trust, subtract the actual trust balance from the required trust balance and multiply that result by the yearly interest rate. Thus, the economic benefit should be calculated as follows:

| Date Trust Payment Due | Required Trust Balance Less Actual Trust Balance | Yearly Interest Rate | Economic Benefit |
|-------------------------------|---|-------------------------------|-------------------------|
| April 1, 2004 | \$30,000 - 0 | 5% | \$1,500 |
| April 1, 2005 | \$60,000 - 0 | 5% | \$3,000 |
| April 1, 2006 | \$90,000 - 0 | 5% | \$4,500 |
| April 1, 2007 | \$120,000 - 0 | 5% | \$6,000 |
| | | Total Economic Benefit | \$15,000 |

Example #2:

ABC was permitted on April 1, 2005, and first received waste May 1, 2005. The facility is scheduled to close in 2010. As in example #1, the rate at which funds should have been deposited is 20% of the closure cost estimate per year.

- Closure cost estimate: \$450,000;
- Historical balance(s) in trust: (1) May 1, 2005, \$5,000; (2) May 1, 2006, \$7,000; (3) May 1, 2007, \$8,150; (4) May 1, 2008, \$9,200;
- Current balance in trust fund: \$9,200;

- Period of noncompliance: three years, or four payments; and
- Interest rate: 5%.

| Date Trust Payment Due | Closure Cost Estimate | Years Remaining | Required Yearly Payment to Trust | Required Balance in Trust |
|-------------------------------|------------------------------|------------------------|---|----------------------------------|
| May 1, 2005 | \$450,000-0 | 5 | \$90,000 | \$90,000 |
| May 1, 2006 | \$450,000-90 | 4 | \$90,000 | \$180,000 |
| May 1, 2007 | \$450,000-180 | 3 | \$90,000 | \$270,000 |
| May 1, 2008 | \$450,000-270 | 2 | \$90,000 | \$360,000 |

The economic benefit would be calculated as follows:

| Date Trust Payment Due | Required Trust Balance Less Actual Trust Balance | Yearly Interest Rate | Economic Benefit |
|-------------------------------|---|-------------------------------|-------------------------|
| May 1, 2005 | \$90,000 - \$5,000 | 5% | \$4,250 |
| May 1, 2006 | \$180,000 - \$7,000 | 5% | \$8,650 |
| May 1, 2007 | \$270,000 - \$8,150 | 5% | \$13,092 |
| May 1, 2008 | \$360,000 - \$9,200 | 5% | \$17,540 |
| | | Total Economic Benefit | \$43,532 |

Example #3:

ABC first received waste June 1, 2005. No financial document is in place. This trust fund required a 10% deposit in the first year that waste was received.

- Closure cost estimate: \$200,000;
- Balance in trust: \$0;
- Period of noncompliance: four years, or five payments; and
- Interest rate: 5%.

Payment required in trust, as of:

| Date Trust Payment | Closure Cost | Required Yearly | Required Amount in |
|--------------------|--------------|-----------------|--------------------|
| June 1, 2005 | \$200,000 | \$20,000 | \$20,000 |
| June 1, 2006 | \$200,000-20 | \$20,000 | \$40,000 |
| June 1, 2007 | \$200,000-40 | \$20,000 | \$60,000 |
| June 1, 2008 | \$200,000-60 | \$20,000 | \$80,000 |
| June 1, 2009 | \$200,000-80 | \$20,000 | \$100,000 |

The economic benefit would be calculated as follows:

| Date Trust Payment Due | Required Trust Balance Less Actual Trust Balance | Yearly Interest Rate | Economic Benefit |
|------------------------|--|-------------------------------|------------------|
| June 1, 2005 | \$20,000 - 0 | 5% | \$1,000 |
| June 1, 2006 | \$40,000 - 0 | 5% | \$2,000 |
| June 1, 2007 | \$60,000 - 0 | 5% | \$3,000 |
| June 1, 2008 | \$80,000 - 0 | 5% | \$4,000 |
| June 1, 2009 | \$100,000 - 0 | 5% | \$5,000 |
| | | Total Economic Benefit | \$15,000 |

Letter of Credit

This is an *avoided cost*. Financial institutions require an annual fee for maintaining a letter of credit. That fee is generally two percent (2%) of the letter amount, although the actual fee depends on the financial institution. Using a letter of credit further requires a standby trust, which allows DTSC to draw on the letter of credit. Any fee charged by a financial institution on a standby trust is usually nominal. Factors:

- Closure and/or Post-Closure Cost Estimate;
- Period of noncompliance; and
- Interest rate.

Example:

ABC's closure cost estimate of \$500,000 was established and approved three years ago. At that time, DTSC was informed ABC intended to use a letter of credit to meet the financial responsibility requirement, but to date ABC has made no attempt to achieve compliance.

- Closure cost estimate: \$500,000;
- Annual letter of credit fee: 5%;
- Period of noncompliance: three years; and
- Interest rate: 5%.

For this example, we have three separate periods of noncompliance: one, two, and three years. Thus, we must determine the economic benefit for each separate time period, then add them together to get the total economic benefit. A step-by-step explanation is discussed below.

- **Step 1:** Multiply the closure cost estimate by the annual letter of credit fee;
- **Step 2:** Multiply the product of **Step 1** by the period of noncompliance;
- **Step 3:** Multiply the product of **Step 2** by the interest rate;
- **Step 4:** Add the products of **Steps 2** and **3** to get the economic benefit for that period of noncompliance; and
- **Step 5:** Add all **Step 4s** to get a total economic benefit.

First time period of noncompliance (one year)

- **Step 1:** $\$500,000 \times 5\% \text{ fee} = \$25,000$;
- **Step 2:** $\$25,000 \times 1 \text{ year} = \$25,000$;
- **Step 3:** $\$25,000 \times 5\% \text{ interest} = \$1,250$; and
- **Step 4:** $\$25,000 + \$1,250 = \$26,250$.

Second time period of noncompliance (two years):

- **Step 1:** $\$500,000 \times 5\% \text{ fee} = \$25,000$;

- **Step 2:** $\$25,000 \times 2 \text{ years} = \$50,000$;
- **Step 3:** $\$50,000 \times 5\% \text{ interest} = \$2,500$; and
- **Step 4:** $\$50,000 + \$2,500 = \$52,500$.

Third time period of noncompliance (three years):

- **Step 1:** $\$500,000 \times 5\% \text{ fee} = \$25,000$;
- **Step 2:** $\$25,000 \times 3 \text{ years} = \$75,000$;
- **Step 3:** $\$75,000 \times 5\% \text{ interest} = \$3,750$; and
- **Step 4:** $\$75,000 + \$3,750 = \$78,750$.

Total Economic Benefit: $\$26,250 + \$52,500 + \$78,750 = \$157,500$.

Attachment M

Failure to Install Groundwater Monitoring/Sampling and Analysis

This is both a *delayed cost* (failure to install groundwater monitoring wells) and an *avoided cost* (failure to conduct sampling and analysis). The determination of whether to use one or both cost considerations is largely case-specific.

A significant number of factors are necessary to calculate the cost for installation and operation and maintenance of a groundwater monitoring system. Thus, the determination can be complex. Site-specific information that may affect the cost of well installation includes: (a) depth of the well, (b) well diameter, (c) geologic material at the well site, and (d) casing and screen material.

Sampling and analytical costs depend largely on the number of samples that need to be taken and type of samples, and on the frequency of sampling events. Those factors, in turn, are influenced by whether contamination or any change in groundwater flow is detected.

A good resource for information in determining the above stated factors is DTSC's staff geologists. It is recommended that the DTSC geologist assigned to the project be consulted when calculating this type of economic benefit. Contact the Geological Services supervisor for assistance with identifying the assigned geologist.

The U.S. EPA has issued a manual entitled, "Estimating Costs ForThe Economic Benefit of RCRA Noncompliance (December, 1997)." That document addresses the estimated unit costs for compliance with the groundwater monitoring requirements for both permitted facilities (40 CFR, Part 264; 22 Cal. Code Regs., Section 66264) and interim status facilities (40 CFR, Part 265; 22 Cal. Code Regs., Section 66265). The costs can be categorized into three major areas:

1. *Capital Costs*: Include drilling, well installation (each well is a dedicated sampling point), groundwater monitoring equipment for the entire facility, and labor (facility representative or facility contractor).
2. *Administrative Costs*: Include all geologic and engineering studies and development of all plans and reports pertaining to these studies.
3. *Annual Costs*: Include required analyses, operation and maintenance, water-level measurement, monitoring system inspections, labor (facility representative or facility contractor) for field activities, and monitoring reports.

Additionally, all costs assume a two-inch diameter well and a stainless steel casing.

For determining economic benefit, capital and administrative costs would be *delayed costs*, while annual costs would be *avoided costs*. Factors:

- Permit status of facility (permitted or interim status);
- Number of groundwater monitoring wells needed;
- Frequency of sampling events and number of samples;
- Analytical parameters;
- Period of noncompliance; and
- Interest rate.

I. Interim Status Facilities

Interim status requirements include a minimum of four wells, one upgradient and three downgradient. Typical well depth (for interim status facilities), based upon past regulatory experience, is 50 feet. Sample analyses (for interim status facilities) usually include general water quality and indicator parameters.

Thus, the typical costs that can be expected at an interim status facility with a minimum number of monitoring wells are as follows:

| Well Installation Item | Cost^{1,2} |
|-------------------------------|---------------------------|
| Capital costs | \$43,212 |
| Administrative costs | \$95,388 |
| Annual costs | \$13,357 |

¹ Data Source: U.S. EPA manual "Estimating Costs for the Economic Benefit of RCRA Noncompliance, December 1997," Chapter 4, Table 4-9 through Table 4-16.

² These costs are provided as guidance. If sufficient information is available, unit quantities presented in the detailed cost functions can be adjusted as needed to derive facility-specific cost estimates.

Example:

XYZ was required to meet basic interim status groundwater monitoring requirements in June. XYZ did not, however, install the system until November of the following year.

To determine the total economic benefit, add the "delayed costs" and the "avoided costs."

Delayed Costs:

(capital costs + administrative costs) x period of noncompliance x yearly interest rate

$$(\$43,212 + \$95,388) \times 1.5 \text{ years} \times 5\% = \$10,395$$

Avoided Costs:

Annual costs for one year (system installed in less than two years) + (Annual costs x interest rate)

$$\$13,357 + (\$13,357 \times 5\%) = \$14,025$$

Total Economic Benefit: \$10,395 + \$14,025 = \$24,420.

II. Permitted Facilities

Groundwater monitoring for permitted facilities differs from interim status facilities in requirements for more wells, different well depths, and more elaborate sampling. Sampling and analytical requirements are dependent upon the contaminants that are or may be generated or handled by the facility.

A typical groundwater monitoring system for a permitted facility will include: (a) a minimum of six upgradient wells (three shallow wells at the same depth, and one cluster of three wells at different depths); and (b) nine downgradient wells consisting of three 3-well clusters with each cluster at different depths.

Thus, the typical costs that can be expected at permitted facilities with a minimum number of monitoring wells are as follows:

| Well Installation Item | Cost^{1,2} |
|-------------------------------|---------------------------|
| Capital costs | \$121,009 |
| Administrative costs | \$191,525 |
| Annual costs | \$67,377 |

¹ Data Source: U.S. EPA manual "Estimating Costs for the Economic Benefit of RCRA Noncompliance, December 1997," Chapter 4, Table 4-1 through Table 4-8.

² These costs are provided as guidance. If sufficient information is available, unit quantities presented in the detailed cost functions can be adjusted as needed to derive facility-specific cost estimates.

Example:

XYZ, an interim status facility, was required to have only the minimum four wells to achieve compliance. On January 1, 2004, XYZ received a permit that required installation of 15 new wells to be installed by January 1, 2005. XYZ did not install the other wells as required. The date of DTSC action is January 1, 2008.

To determine the economic benefit, add the "delayed costs" and the "avoided costs."

Delayed Costs:

(capital costs + administrative costs) x (period of noncompliance) x (interest rate)

$$(\$121,009 + \$191,525) \times 3 \text{ years} \times 5\% = \$46,880$$

Avoided Costs:

(annual costs for one year x period of noncompliance) + (annual costs for one year x interest rate)

$$(\$67,377 \times 3 \text{ years}) + (\$67,377 \times 5\%) = \$205,500$$

Total Economic Benefit: \$46,880 + \$205,500 = \$252,380