STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF WATER PROTECTION AND LAND REUSE
REMEDIATION DIVISION

GUIDANCE DOCUMENT

ENGINEERED CONTROLS
pursuant to Section 22a-133k-2(f) of the Connecticut Remediation Standard Regulations

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Table of Contents

Application Package for ECs

The application package for ECs consists of the forms listed below. Each of these forms can be found on the DEP website at: www.ct.gov/deep/remediation

- Approval Request or Notice Transmittal Form
- Part 1: Application for Engineered Control Variance
- Part 2: Application for Engineered Control Variance
- Verification of Public Notice for Application for Engineered Control Variance
- Spread sheet for assisting in financial assurance calculations

A standardized checklist and certifications for the LEP and Applicant are included in each part of the application.

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I. INTRODUCTION

This guidance document has been prepared for the regulated community to outline the Department of Environmental Protection's (DEP) requirements for an Engineered Control (EC) request. This document contains information necessary for the preparation of complete and approvable applications and will minimize the need for pre-application meetings.

An EC is a permanent physical structure designed to safely isolate pollutants which would otherwise not comply with the self-implementing remedial options allowed in sections 22a-133k-1 through -3 of the Remediation Standard Regulations (RSRs). An EC is a "variance" which requires the Commissioner's approval. It generally contains inspection, maintenance and reporting requirements, the recording of an Environmental Land Use Restriction (ELUR), and the posting of financial assurance to ensure such measures will be sustained into the future.

This guidance includes a description of what is eligible to be considered under the EC variance, a step-by-step description of the review and approval process, and appendices which serve as supplemental resources.

The option to apply for a variance to utilize ECs as part of an over-all Remedial Action Plan is available to anyone undertaking an environmental remediation project which is subject to the RSRs. Both DEP- and LEP-lead sites are eligible.

The option to use ECs applies only when conditions specified in section 22a-133k-2(f)(2) RSRs are met. Briefly, an EC is appropriate under section 22a-133k-2(f)(2)(A) RSRs if:

(i) the Commissioner authorized the disposal of solid waste or polluted soil;

(ii) soil remediation is not technically practicable;

(iii) removal of such substance or substances from such release area would create an unacceptable risk to human health (as determined in consultation with DPH); or

(iv) the Commissioner has determined, after public input, that the cost of remediating the polluted soil is significantly greater than the cost of installing and maintaining an EC and outweighs the risk if the EC fails.

(See Appendix A for full text.)

There are three basic types of ECs which are covered under this provision:

- Contaminated soils which exceed Pollutant Mobility Criteria ("PMC") (with or without exceedances of Direct Exposure Criteria) which require a cap with a permeability of less than 10^{-6} cm/sec pursuant to section 22a-133k-2(f)(2)(B) RSRs;
- Contaminated soils which exceed Direct Exposure Criteria only (do not exceed PMC)[1]; and
- Landfilled wastes, closed under a solid waste closure plan approved by the Commissioner, if the Commissioner required compliance with the RSRs.

There are remedial measures that *Are Not Engineered Controls* under the RSRs:

1. The RSRs allow for a variety of remedial measures which allow contaminated soils exceeding RSR criteria to remain on site. Some of these measures are self-implementing for the LEP, only requiring the filing of an Environmental Land Use Restriction (ELUR). Such measures would apply to inaccessible soils exceeding Direct Exposure Criteria (DEC) beneath a building or permanent structure, or at depths greater than 4 feet below the ground surface, or at depths greater than 2 feet beneath pavement. An ELUR's self-implementing variance also applies to environmentally isolated soils exceeding Pollutant Mobility Criteria located beneath an existing building or a permanent structure approved by the Commissioner.

2. Under the RSRs, the term "Engineered Control" does not apply to remedial measures put in place to control the migration of contaminants in groundwater or soil vapor.

    - **Groundwater Remediation Systems:** Groundwater treatment or containment systems such as permeable reactive walls, containment walls, collection systems and interceptor wells are considered to be part of an active remedial system, so are not considered ECs.

    - **Vapor Migration Control Measures:** In cases where volatilization criteria are exceeded in groundwater, or in soil vapor beneath a building, and the remedial approach is to prevent vapor intrusion with a permanent vapor barrier or venting system, such "Control Measures" are NOT EC variances under section 22a-133k-2(f)(2) of the RSRs and are regulated separately from this process.

[1] Since there are often cases where the EC seeks to address only direct exposure to contaminants, and not contaminant leachability (exceedances of Pollutant Mobility Criteria), it is presently DEP policy that approvals of ECs for soils which exceed only Direct Exposure Criteria should be issued under section 22a-133k-2(f)(2) RSRs. Previously, DEP might also have granted these approvals using either "alternative criteria" under section 22a-133k-2(d)(2) RSRs or "inaccessible soil" as defined in section 22a-133k-1(28) RSRs; such approvals will only be approved going forward as an Engineered Control Variance.

II. APPLICATION PACKAGE

Under section 22a-133k-2(f)(2)(B) RSRs, a "request to use an EC shall be submitted to the Commissioner in writing and shall be accompanied by a detailed written report and plan which demonstrates that the proposed EC is designed to physically isolate polluted soil with minimum maintenance, plans for ground-water monitoring and maintenance, an ELUR, and the posting of a surety."

A request for an EC consists of a two-part application package. Part 1 is for conceptual approval. Part 2 is for engineering, design and other details. Each part of the application must include the Remediation ID (Rem. ID) number related to the specific filing for the site (typically associated with a property transfer event) under which the request is being submitted. This is a four or five digit number, unrelated to the EPA ID number and the State ID number for the specific site. The Rem. ID is generally provided on acknowledgement letters from the Remediation Division for an ECAF filing, as well as other correspondence. Questions can be directed to the Remediation Division at 860-424-3705. Please have information concerning the site name, address, and the date of the filing available.

The Remediation Division's "Approval Request or Notice Transmittal Form" must accompany both Part 1 and Part 2 Applications. The Transmittal Form is for data entry and project tracking purposes.

The Transmittal Form includes information on the purpose of the submission, the site it relates to and the DEP staff person (if any) involved with the project. DEP staff will enter the information and begin tracking the application.

If a proposal includes multiple ECs to be used on a single site and the types and purposes of the ECs are sufficiently different, a separate application must be submitted for each EC to allow the review of each to proceed independently.

An approval for an EC will not be issued until the public notice requirements detailed in section 22a-133k-(2)(f)(2)(A)(iv) and 22a-133k-1(d)(2) of the RSRs have been fulfilled, including a 45 day comment period.

A. Part 1 Application

The EC Part 1 Application presents the conceptual EC being proposed along with sufficient supporting information to demonstrate that the approach is environmentally prudent, consistent with proven engineering practices and whether such an approach has been approved by the DEP in the past. The application contains a checklist to be filled out by the LEP and/or the Applicant, supplemented with information on the nature of the release, any potential receptors, and summaries of all relevant site investigations and interim remedial measures related to the area subject to the EC. The application is a stand-alone document that provides enough information regarding the entire site to support the Conceptual Site Model and the appropriateness and effectiveness of the EC.

For LEP lead sites, DEP staff reviewing EC variance requests are not expected to evaluate release areas that are separate from the area subject to the EC, unless a compelling reason makes it necessary.

Regardless of whether the project is being handled as a DEP- or LEP- lead site, the Part 1 Application includes:

- Documentation that characterization of the nature and extent of contamination in the area in question is complete and is consistent with prevailing standards and guidelines;
- Which aspects of the proposed EC request are variances to the RSRs;
- Contaminants related to other release areas on the site will not impact the integrity or operation of the EC and the EC will not prevent the proper remediation of those other releases.

B. Part 2 Application

Following DEP concurrence with the conceptual EC proposed in Part 1, the Certifying Party (or other responsible party) will submit the EC Part 2 Application. Part 2 presents the detailed engineering design including a schedule for implementing the EC, a plan for inspection, maintenance (and monitoring where appropriate) and financial assurance. The Part 2 Application may be submitted concurrent with or sequentially after the Part 1 Application. Draft language for the ELUR is not required as part of the application package, since, depending on the nature of the EC, it may not be fully implemented for several years.

C. Engineered Control Database

This database of previously submitted ECs will be an electronic, public information file which will provide stakeholders and DEP staff with examples of ECs previously approved or disapproved. It will include information regarding ECs' nature and design characteristics, classes of contaminants and the applicable remedial criteria being addressed under the EC. LEPs should review appropriate site-specific information regarding those previous approvals and reference such information in the application to promote consistency and efficiency.

III. REVIEW PROCESS FOR EC REQUESTS

A. Part 1 Application

Task 1: Review of EC Part 1 Application

Upon receipt, each EC application will be identified by its "Approval Request or Notice Transmittal Form" cover sheet. Part 1 of the Application includes a check list to be used for the initial screening of EC applications to confirm there is sufficient information to begin a technical review. In the event that an application does not include the information required to initiate review, a deficiency letter will be issued.

Task 2: Issue Request for Supplemental Information (as needed)

Upon completion of the initial technical review for completeness and appropriateness of the EC request, the DEP may request supplemental information required to complete the review of the Part 1 Application. The response letter will request that the Applicant respond within 120 days . If no response is received, the application will be evaluated as submitted.

Task 3: Review Response to DEP's Request for Supplemental Information (as applicable)

Task 4: Issue a Letter of Concurrence or Denial

As appropriate, a letter of concurrence signed by the DEP District Supervisor will be mailed indicating that, based on the Part 1 Application, the EC would be approvable pending submission of a complete Part 2 Application. That letter will allow a 120-day limit for the applicant to submit Part 2 to keep the application active. Alternatively, the DEP District Supervisor will issue a letter denying approval of the Part 1 Application. The Applicant may request that the DEP grant an extension prior to the expiration of the response period.

B. Part 2 Application

After the DEP concurs that the specific EC proposed in Part 1 is appropriate, the applicant should complete and submit the EC Part 2 Application within the time frame allowed under Task 4 above. This Part includes detailed engineering design plans with a PE stamp. A PE stamp is required as part of the above referenced plans, except for ECs which do not require engineering expertise for their design, such as conventional asphalt pavement or buried warning layer. The applicant must demonstrate that the proposed EC and associated plans for inspection, maintenance, monitoring, reporting and financial assurance are protective of human health and the environment.

Task 5: Review of EC Part 2 Application

As required under section 22a-133k-2(f)(2)(B)(i)(aa) RSRs, the proposed EC will be reviewed to ensure that the design and construction will:

- physically isolate polluted soil;
- minimize migration of liquids through soil (where soils with PMC exceedances are involved);

- function with minimum maintenance;
- promote drainage and minimize erosion of or other damage to such control; and
- accommodate settling and subsidence of the underlying soil so as to maintain the EC's structural integrity and permeability.

Engineering Design - The design for the EC must have a PE stamp on all engineering drawings, except as noted in Item B above. DEP staff are not responsible for determining whether the engineering design of the EC is adequate or acceptable with respect to best engineering practices and local or State building codes, but instead determine whether the concept being proposed is viable and consistent with DEP policy and sound environmental judgment.

Maintenance, Monitoring and Repair - The EC Part 2 Application must contain plans which ensure the continued effectiveness of the remedial measure over time, including:

- Plans for inspection and maintenance of the EC must be adequate to ensure that the structural integrity, design permeability, and effectiveness of the EC will be maintained. The plans must include measures to prevent storm water from damaging the EC and measures to repair the effects of any damage caused by human activities, settling, subsidence or erosion. They may also need to include a PE stamp as noted above. (Summarized from section 22a-133k-2(f)(2)(B)(iii) RSRs).

- Groundwater monitoring may be required as part of the EC to ensure that the operation of the EC is adequate to prevent the migration of contaminants from the EC. This can be deferred to the compliance and post-remedial monitoring under the RSRs. It may also include a focused program to confirm the effectiveness of the EC, as well as periodic long-term monitoring to determine the continued effectiveness of the EC, if the Commissioner determines that it is necessary. (See section 22a-133k-2(f)(2)(B)(ii) RSRs).

  The use of an EC does not exempt a release area from the requirement of "Compliance Monitoring" and "Post-remedial Monitoring" under the RSRs, with or without natural attenuation monitoring. Such monitoring is to be performed as part of the RSR approval process, rather than as part of the EC.

  Also, in some settings where pollutant mobility criteria are being exceeded, an additional long-term monitoring program may also be required where failure of the EC would pose an unacceptable risk to a sensitive groundwater receptor. Determining an appropriate frequency for such additional monitoring would be based on the estimated contaminant travel time between the monitoring point and the receptor.

Financial Assurance - The applicant is required to provide a financial mechanism to allow the integrity of the EC to be maintained by the State should the applicant fail to meet its maintenance and monitoring commitments concerning the EC.

The proposed financial assurance plan (a.k.a. surety) must be consistent with the guidance included as Appendix C of this document. With the exception of sites governed under sections 22a-209-4(i) (for Solid Waste closures) and 22a-449(c)-100 through 110 RCSA (for RCRA closures), financial assurance must also include the following (summarized from section 22a-133k-2(f)(2)(B)(vi) RSRs):

- For the first year after installation of the EC, the amount of the surety shall be equal to the cost of one year's maintenance and monitoring of the EC.
- In each subsequent year the surety shall be increased by the amount of one year's maintenance and monitoring, until the total amount of such surety is equal to the cost of five year's of maintenance and monitoring.
- That amount must be maintained in effect for the next twenty-five years, or as may be required by the Commissioner.

Items to be included as part of "maintenance and monitoring" in regard to the financial assurance are discussed in greater detail in Appendix C of this document.

The approval of the financial assurance is part of the overall approval of the EC, rather than as a separate review item.

Task 6: Request for Supplemental Information (as needed)

Upon completion of the initial technical review of Part 2 of the EC request, the DEP may request supplemental information be submitted within 90 days; the letter should indicate that if the supplemental information is not submitted within 90 days, DEP will make a decision on the EC Part 2 Application based on the application materials previously submitted. The Applicant may request the DEP grant an extension prior to the expiration of the response period.

For the purposes of public notice, any addenda submitted under each Part of the application must be compiled into an individual stand-alone document.

Task 7: If Part 2 is Appropriate, Authorize Applicant to Proceed with Public Notice

EC Part 1 and Part 2 of the application should collectively be suitable for approval as an EC and for public to review.

Public Notice - Once the DEP considers the Part 2 submission approvable, it will inform the applicant that public notice of the EC may proceed, as specified under section 22a-133k-2(f)(2)(A)(iv) RSRs. The notice shall direct questions to a representative of the applicant and formal public comments to the Remediation Division of DEP.

The Public Notice must be detailed enough to allow the public to be aware of the fact that a variance to the RSRs is being considered which will permit some level of contaminants to remain in place, rather than merely stating that a remediation is taking place at the site. Public Notice for the EC may be combined with the notice for Remedial Action Plan and/or the ELUR.

The public notice provision for ECs, section 22a-133k-2(f)(2)(A)(iv) RSRs, requires that "the owner of the subject parcel shall verify to the Commissioner in writing, on a form furnished by the Commissioner, that notice has been given in accordance with this subsection." That form can be found on the DEP website at: www.ct.gov/deep/remediation. It includes a requirement that a log of all public inquiries and comments that were received within 45 days after the dates which each form of notice (newspaper, posting sign, letter to abutters) was implemented, including the date and contact information for all comments received. The LEP must also provide a draft response to those comments for DEP consideration.

The response to public comments is governed by DEP's Rules of Practice, (sections 22a-3a-2 through 22a-3a-6, inclusive RCSA), since a request for variance under the RSRs is an application.

Task 8: Issue Approval, Assuming All Public Comments Are Adequately Addressed

Task 9: Implement EC Before Approval Expires

The approval of the proposed EC typically will be conditional, requiring a timely implementation consistent with the schedule approved in the Part 2 Application, or in any approved Remedial Action Plan for the site, whichever date is later. Implementation of the EC includes: completing construction of the EC and having financial assurance posted and in effect.

C. Subsequent Requirements After DEP Approval of an EC Variance

Task 10: ELUR and "As-Built Plan" are Filed on Land Records

ECs require an ELUR in accordance with section 22a-133q-1 RCSA be filed on the land records by the property owner as specified under section 22a-133k-2(f)(2)(B)(iv) RSRs, which states "an environmental land use restriction is or will be in effect with respect to the parcel at which the subject release area is located, which restriction ensures that such parcel will not be used in a manner that could disturb the EC or the polluted soil."

As a reminder, the ELUR includes an "as-built plan" and language referencing the approved maintenance and monitoring plan on file with the DEP.

Task 11: Documented Posting of Financial Assurance

The specifics of the proposed financial assurance would have been acknowledged under Part 2 of the EC application.

Section 22a-133k-2(f)(2)(B)(vi) RSRs require that "The owner of the subject parcel shall demonstrate that he has posted or will post a surety in a form and amount approved in writing by the Commissioner, which surety during the first year after installation of the engineered control shall be equal to the cost of one year's maintenance and monitoring…" If the party responsible for maintaining the EC is not the property owner, such party may submit documents on behalf of the property owner to make the demonstration that financial assurance has been posted.

Task 12: Long-Term Program for Inspection and Maintenance

The plan for inspection and maintenance approved under Part 2 must be performed as approved. The party responsible for maintaining EC must notify the DEP as soon as they become aware that failure (exposed waste, breached cap, etc.) occurs.

Task 13: Annual Reporting to DEP

For some sites, an annual report on the status of the EC may be required to be submitted to the Remediation Division, accompanied by a cover sheet with a LEP certification identifying whether conditions have changed in relation to the EC. This annual report would include:

1. name and contact information of the party responsible for assuring the integrity of the EC and whether that responsibility has been transferred to another party since the previous status report;
2. a statement ensuring that the approved financial assurance for the EC in the appropriate amount and form has been implemented;
3. documentation that any required inspection of the EC has been performed;
4. any maintenance or repair measures needed since the previous status report;
5. documentation of any failure of the EC which has occurred (exposed waste, breached cap, etc.);
6. documentation of the status of the implementation and successful completion of such maintenance or repair measures;
7. except as noted in Item B above, documentation of any repairs should be signed by the appropriate environmental professional;
8. documentation of notification to DEP as soon as knowledge of the failure occurred;
9. documentation that groundwater monitoring (if required) has been performed and the consistency of those results with those predicted by the conceptual site model; and
10. any changes to the land use at the site which may influence the effectiveness of the EC.

The DEP's approval of the EC as a long-term remedial option is contingent upon the conditions of the approved plan being maintained. If the ELUR is not filed on the land records, if the EC is found to have failed and is not restored in a timely manner, or if financial assurance is not being maintained, the EC ceases to be valid as a remedial option and the site would no longer be in compliance with the RSRs.

APPENDIX A

Engineered Control Variance
Connecticut Remedial Standard Regulations
(adopted 1996)

Section 22a-133k-2(f) Variances.

(2) Engineered Control of Polluted Soils.

(A) Provided that an engineered control of polluted soils is implemented pursuant to subparagraphs (B) and (C) of this subsection, the requirements of subsections (a) through (e) of this section do not apply if:

(i) the Commissioner authorized the disposal of solid waste or polluted soil at the subject release area;

(ii) the soil at such release area is polluted with a substance for which remediation is not technically practicable;

(iii) the Commissioner, in consultation with the Commissioner of Public Health, has determined that the removal of such substance or substances from such release area would create an unacceptable risk to human health; or

(iv) the Commissioner has determined, after providing notice and an opportunity for a public hearing, that a proposal by the owner of the subject parcel to use an engineered control is acceptable because

(aa) the cost of remediating the polluted soil at such release area is significantly greater than the cost of installing and maintaining an engineered control for such soil and conducting ground-water monitoring at such release area in accordance with subsection (g) of section 22a-133k-3, and

(bb) that the significantly greater cost outweighs the risk to the environment and human health if the engineered control fails to prevent the mobilization of a substance in the soil or human exposure to such substance.

The Commissioner may hold a public hearing pursuant to this section if in his discretion the public interest will be best served thereby, and he shall hold a hearing upon receipt of a petition signed by at least twenty-five persons. Notice of the subject proposal shall be provided by the owner of the subject parcel in two of the three following manners:

(i) by publication in a newspaper of substantial circulation in the affected area;

(ii) by placing and maintaining on the subject parcel, for at least thirty days, in a legible condition a sign which shall be not less than six feet by four feet which sign shall be clearly visible from the public highway; or

(iii) by mailing notice to the owner of record of each property abutting the subject parcel at his address on the most recent grand tax list of the municipality or municipalities in which such properties are located.

When notice is published or mailed, it shall include the name and address of owner of the subject parcel; the location address and/or a description of the location such parcel; a brief description of the nature of the pollution on the subject parcel; a brief description of the proposed engineered control; and a brief description of the procedures for requesting a hearing.

When notice is provided by posting a sign, the sign shall include the words "Environmental remediation is proposed for this site. For further information contact..." and shall include the name and telephone number of an individual from whom any interested person may obtain information about the remediation.

The owner of the subject parcel shall verify to the Commissioner in writing on a form furnished by him that notice has been given in accordance with this subsection.

(B) A request to use an engineered control shall be submitted to the Commissioner in writing and shall be accompanied by a detailed written report and plan which demonstrates that:

(i) (aa) the proposed engineered control is designed and will be constructed to physically isolate polluted soil and to minimize migration of liquids through soil, to function with minimum maintenance, to promote drainage and minimize erosion of or other damage to such control, and to accommodate settling and subsidence of the underlying soil so as to maintain the control's structural integrity and permeability; and

(bb) with respect to an engineered cap, such cap has been designed and constructed to have a permeability of less than 10^{-6} cm/sec or, unless otherwise specified by the Commissioner in writing, to have the permeability specified in a closure plan implemented under sections 22a-209-1 et seq of the Regulations of Connecticut State Agencies for a release area which is a lawfully authorized solid waste disposal area;

(ii) plans for ground-water monitoring at the subject release area are adequate to ensure that any substance migrating therefrom will be detected;

(iii) plans for maintenance of the subject release area are adequate to ensure that the structural integrity, design permeability, and effectiveness of the engineered control will be maintained; such plans shall include without limitation measures to prevent run-on and run-off of storm water from eroding or otherwise damaging the engineered control and measures to repair such control to correct the effects of any settling, subsidence, erosion or other damaging events or conditions;

(iv) an environmental land use restriction is or will be in effect with respect to the parcel at which the subject release area is located, which restriction ensures that such parcel will not be used in a manner that could disturb the engineered control or the polluted soil;

(v) any other information that the Commissioner reasonably deems necessary; and

(vi) with respect to any release area subject to any of the requirements of section 22a-209-4(i) or section 22a-449(c)-100 through 110 of the Regulations of Connecticut State Agencies, all such requirements are or will be satisfied. With respect to a release area which is not subject to any such regulations, the owner of the subject parcel shall demonstrate that he has posted or will post a surety in a form and amount approved in writing by the Commissioner, which surety during the first year after installation of the engineered control shall be equal to the cost of one year's maintenance and monitoring of the engineered control, and which in each subsequent year shall be increased in amount by adding an amount equal to the cost of one year's maintenance and monitoring, until the total amount of such surety is equal to the cost of five year's of maintenance and monitoring, which amount shall be maintained in effect for the next twenty-five years or for such other period as may be required by the Commissioner.

(C) When the Commissioner approves a request pursuant to this subsection to use an engineered control he may require that such control incorporate any measures which he deems necessary to protect human health and the environment. Any person implementing an engineered control under this subsection shall perform all actions specified in the approved engineered control proposal including the recordation of the environmental land use restriction and posting of the surety, and any additional measures specified by the Commissioner in his approval of such plan. Nothing in this subdivision shall preclude the Commissioner from taking any action he deems necessary to protect human health or the environment if an approved engineered control fails to prevent the migration of pollutants from the release area or human exposure to such pollutants.

APPENDIX B

Review Process for EC Requests

PART 1 APPLICATION

1) Review of EC Part 1 Application
2) Issue Request for Supplemental Information (as needed)
3) Review Response to DEP's Request for Supplemental Information (as applicable)
4) Issue a Letter of Concurrence or Denial

PART 2 APPLICATION

5) Review EC Part 2 Application
6) Request for Supplemental Information (as needed)
7) If Part 2 is Appropriate, Authorize LEP to Proceed with Public Notice
8) Issue Approval, Assuming Any Public Comments are Adequately Addressed
9) Implement EC Before Approval Expires

SUBSEQUENT REQUIREMENTS AFTER DEP APPROVAL OF EC

10) ELUR and "As-Built Plan" are Filed on Land Records
11) Documented Posting of Financial Assurance
12) Long-Term Program for Inspection and Maintenance
13) Annual Reporting to DEP

APPENDIX C
Financial Assurance Guidance

1. As part of the Part 2 application, the Applicant submits for the Commissioner's review and written approval a proposal for the amount and format of an irrevocable financial assurance instrument equal to the cost of one year's "maintenance and monitoring" per the RSRs. DEP looks for the following items to be included in such a program of "maintenance and monitoring":

    a. Operation of the EC,

    b. Maintenance of any active or passive systems,

    c. Maintenance of any material used to separate the EC from the ground surface,

    d. Monitoring of the engineered control, by inspection and/or by sampling, and associated annual reporting,

    e. The cost of additional potential repairs over a 30 year period as may be deemed applicable by the Commissioner in reviewing the proposal, and so 1/30th of the amount of that additional cost would be included in calculating the "cost of one year's maintenance and monitoring."

    The proposal should include a line-by-line itemized Cost Estimate for the EC Maintenance and Monitoring that will be covered by the financial assurance instrument(s). Such an itemized list would include, as applicable, costs for field labor and equipment conducting groundwater monitoring activities, periodic inspections and repairs, analytical laboratory costs for constituents of concern, erosion and sediment controls, vegetative lawn care and maintenance, periodic and annual reporting plus a 15% contingency for unforeseeable events that may increase the cost.

    For example, if the engineered control is a parking lot that will need resurfacing once during a 30 year period for engineered control financial assurance, at a cost of $300,000, the financial assurance would be calculated as:

    Repair costs (30 years) $300,000 repaving/30years = $10,000/per year

Routine maintenance and monitoring costs annual:	Quarterly 3rd party inspection with completion of checklist Fill cracks, clear drains Annual reporting to DEP $2,000 per year
Size of financial assurance	Year 1 $12,000 Year 2 $24,000 Year 3 $36,000 Year 4 $48,000 Year 5 $60,000 (Maintained for 25 additional years)

(Note: This example is for general illustration. It does not represent actual unit prices and it was not adjusted for 15% contingency and annual inflation. A spread sheet for assisting in financial assurance calculations is provided on the DEP website at: www.ct.gov/deep/remediation)

2. The amount is based on the cost to the Applicant of hiring a third party to conduct such operations, maintenance and monitoring, and cannot incorporate a zero cost or salvage value for such activities.

3. The financial assurance must be in the format of at least one of the well-established instruments derived from section 40 CFR 264.151 of the Resource Conservation Recovery Act as prescribed by the Commissioner, and such instruments are subject to the Commissioner's review and concurrence. The following assurance mechanisms can be used to fulfill the EC requirement for financial assurance in order by preference: Irrevocable Standby Letter of Credit, Performance or Payment Bond, Trust Fund and Insurance. Templates for the Irrevocable Standby Letter of Credit and Performance Bond can be found on the Engineered Control website.

4. In general, departures from the template instrument language prescribed by the Commissioner typically will not be acceptable. The template language must reflect the Commissioner's authority to require the financial assurance obligation.

5. Concurrence of the financial assurance should be performed in parallel with the overall approval of the EC.

6. Note that the beneficiary in any and all financial assurance must be stated as the Commissioner of the Connecticut Department of Environmental Protection.

7. Either a single or multiple assurance instruments can be used to fulfill the financial assurance requirements for the EC.

   The Applicant must post such originally-signed financial assurance with the DEP in accordance with the schedule approved under the EC application or Remedial Action Plan.

8. Prior to the anniversary date of the instrument, in each subsequent year, the financial assurance in amount by adding:

   a) an amount equal to the amount of the first year's financial assurance instrument, until the total amount of such financial assurance is equal to the cost of five years; and

   b) an amount equal to the most recent annual implicit price deflator for gross national product published by the U.S. Department of Commerce in its Survey of Current Business or Bureau of Economic Analysis.

9. There can be no lapse in financial assurance amount or coverage until the Commissioner approves in writing that the need for operating, maintaining and monitoring this EC has ceased, and the Commissioner releases the financial assurance obligation.

10. If the Applicant or its successor fails to perform any of the terms or condition of this EC, the Commissioner may exercise her right as beneficiary to draw on or call up to 100% of the funds and place the funds in a DEP dedicated account, and use such funds to pay for work concerning the EC. The Commissioner may notify the Party of Record in writing of the alleged failure to perform and provide the Party of Record with a reasonable period of not less than 10 days in which to remedy the alleged non-performance.

Annual Inflation Factor Calculation (*Draft)*

Below are two methods used to determine annual cost estimate adjustments for closure and/or post closure maintenance and care using inflation factors derived from the most recent Implicit Price Deflator for Gross National Product as published by the U.S. Department of Commerce. Please note that the inflation factors are updated in March and July of each year.

First, you must go to the U.S. Department of Commerce Bureau of Economic Analysis' web site to find each of the tables referenced below. This web site is http://www.bea.gov/newsreleases/national/gdp/2008/txt/gdp407p.txt.

1) You may look at Table 6 titled "Price Indices for Gross Domestic Product (GDP)" for the current and previous year's price indices for Gross National Product (GNP) under the heading Implicit Price Deflators. Note: Table 6 lists quarterly updates. Please use the latest published annual (year-end) price index instead of the quarterly indices.
   Using the following equation, you can calculate the inflation factor as a percentage: 100 x (current price index / previous year price index) – 1.0.

   The percent change from 2005 to 2006 = 3.15
   Basis: 100*(116.558 / 112.994 –1) = 3.2%

   Using the following equation, you can calculate the inflation factor: (current price index / previous year price index).

   2006 Inflation Factor = 1.032
   Basis: (116.558 / 112.994) = 1.0315

2) You may also look at Table 4 titled "Price Indices for Gross Domestic Product and Related Measures: Percent Change From Preceding Period" for the annual price index in question for Gross National Product (GNP) under the heading Implicit Price Deflators.

   2006 Implicit Price Deflator for GNP = 3.2

The detailed written cost estimate should contain the basis for its calculations. To adjust the cost estimate in current dollars, multiply the cost estimate by the inflation factor (or the reported percent change, then add it to the original cost estimate) pursuant to 40 CFR 264.142, .144 and/or 40 CFR 265.142, .144, as applicable.

Example 2006 Cost Estimate Adjustments
1.032 x $350,000 = $361,200, or
$350,000 x 3.2% = $11,200 + $350,000 = $361,200