STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

September 27, 2005

Peter W. Szymanski
Installation Manager
Stratford Army Engine Plant
550 S Main St.
Stratford, CT 06615

RE: Final Remedial Investigation Report, Stratford Army Engine Plant, Stratford, Connecticut

Dear Mr. Szymanski:

DEP has completed review of the Final Remedial Investigation Report, Stratford Army Engine Plant, Stratford Connecticut, dated September 2004. Overall, the document is a significant improvement over previous versions in communicating an understanding of the environmental issues at the SAEP. As noted within the RI and as identified below in comments, there are a few remaining uncertainties in the characterization of the site and interpretation of the data. DEP believes that, especially for soil pollution, these remaining uncertainties will not substantially affect the remedial decision process and can be resolved through focused evaluations in conjunction with remedial design.

Significant environmental releases exist to environmental media at the site, and DEP expects that these will be addressed through development of one or more Remedial Action Plans to achieve the standards of Connecticut's Remediation Standard Regulations (RSRs). DEP has received in August 2005 a draft Feasibility Study dated May 2005, and will be reviewing this FS to evaluate its adequacy. Note that many of the comments below are most appropriately addressed in the FS or in subsequently developed remedial pre-design investigations.

Given the complex nature of the site and the RI, the transition from description of the site condition (RI) to development of an action plan (FS/Proposed Plan/Remedial Design) should be better defined to provide continuity for reviewers and the public. It would be helpful to provide an addendum to the RI summarizing the areas of the site identified as requiring further environmental activity for any reason. In complement to the process/function based AOC analysis in the RI this should include a geographic synthesis to define generalized remediation target areas, using as a starting point the areas discussed in chapter 10, which may address multiple co-located environmental concerns. Such areas should include AOCs with insufficient data or identified releases; areas with soil pollution above comparison criteria, regardless of AOC status; and areas with groundwater pollution, especially where it may be closely affiliated with an AOC soil release or soil pollution. DEP expects that the boundaries of such areas will be drawn to incorporate the remaining uncertainty of extent for many identified and potential releases, and allow a focused supplemental characterization as a preliminary part of remedial design to address all releases within the area in a cost effective manner. Also include in the supplement a specific identification of those areas of remaining environmental concern that are not within such identified remediation target areas, and describe how these will be resolved. DEP expects that many of these AOCs may most effectively be addressed in conjunction with site redevelopment.

The CTDEP is preparing detailed comments regarding the human and ecological risk assessments included in the final RI document. However, there has been a sufficient review of the human health risk assessment to conclude that certain exposure assumptions and data gaps exist that underestimate potential risks to human populations. Additionally, the Department does not concur with the Army's position that

existing risks to ecological receptors are acceptable at the site. Comments will also be provided on the February 9, 2005 letter and attached proposed biomonitoring plan submitted by Ms. Elaine Anderegg of the National Capital Field Office to Ms. Traci Iott of CT DEP.

The DEP has review comments, below, that deal with specific aspects of the data interpretation or remaining uncertainties, and DEP expects that these will be resolved either in a supplement to the RI or, if additional characterization is required, during the remedial design phase, rather than as a continuation of the RI.

Regulatory Framework

There is extensive discussion of CERCLA section 121 (d) (1) as a trigger mechanism for remediation. As a facility subject to RCRA Corrective Action pursuant to Section 22a-449(c)-105 (h) of the Regulations of Connecticut State Agencies the entire SAEP must be remediated in accordance with all sections of Connecticut's Remediation Standard Regulations. Most notably, this requires evaluation of the groundwater under the site with respect to compliance with the provisions of RCSA 22a-133k-3(a) et seq.

Note also that the reference to establishment of an industrial commercial ELUR must include state acceptance of the wording and adoption process under the RSR framework. Be aware that under the state ELUR framework any future owner may take additional remedial action and petition to modify the ELUR restriction accordingly.

Identification and evaluation of all substances that are part of a release, including those that do not have adopted RSR criteria, is required by the RSRs. The RSRs provide for development and approval of criteria for additional polluting substances (those without adopted criteria) or for determination of background concentrations. The baseline values identified in the RI would not meet the definition of background concentrations pursuant to the RSRs. At SAEP the RI indicates that cobalt, nine volatile organic compounds, and additional semi-volatile organic compounds do not have adopted RSR criteria for comparison, therefore no comparison was made. Note that DEP has adopted additional criteria since the RSRs were published and many of the compounds in the RI now have available criteria for comparison. Please incorporate the adopted additional criteria in any RI evaluation update, and where criteria are not available, explicitly propose criteria for approval in lieu of remediation to background.

Release Identification:

Describe how "indeterminate" and "no data" areas will be resolved, focusing especially on those AOCs that are not in a remediation target area due to proximity to another release. Alternatively, assume that these areas have releases requiring evaluation for remediation.

Some areas (refer to specific comments below) have been identified as having no release of pollution above RSR criteria, yet the number of samples is limited. For each area, describe how these have sufficient characterization to ensure that the worst case sample concentration and full extent of the release have been identified to form the basis for determining the criteria are not exceeded. Alternatively, assume that these areas have releases requiring further evaluation for remediation.

The following comments are specific to AOC types:

- The data sets for evaluation of plating areas other than the chrome room are limited, further evaluation of soil and groundwater pollution at the plating areas in B-6, B-3, and historically in

the northern part of B-2 appear necessary to reach supportable conclusions regarding the nature and extent of associated pollution.

- Additional tank locations and other potential sources were identified during the historic review, but it is unclear if these have all been incorporated within the listing of potential release areas, as they were not explicitly identified as AOCs and assigned numbers. Please ensure all potential source areas are carried through all appropriate listings.
- Samples evaluating underground and above-ground tanks included BTEX but not always TPH, which is a specific target analysis required by the RSRs. Furthermore, surface samples may have been acquired for TPH but the water table samples more critical for determination of a release do not include TPH. In addition, one or two borings at a tank location do not fully evaluate the adequacy of a historic tank removal because the potential for residual sidewall pollution to be present is not fully determined. For most tanks further evaluation by test pit investigation during site remediation and redevelopment should be considered to supplement the data set and validate conclusions.

The following comments are specific to individual AOCs, listed in the order presented in the RI:

- SAEP has verbally indicated to DEP that AOC 3 is identified as a release having occurred.
- AOC 16 should be classed as "indeterminate" since the sample location is not proximate to and downgradient from the sump, and thus may not have encountered pollution that could be present.
- AOC 9 should be identified as "pollutants are present but not associated" with the specific AOC; note that it is in the location of an earlier tank containing metal sludge.
- AOC 10 cannot be characterized as having had no release until the settling tanks are decommissioned and the underlying soils evaluated for potential tank or line leakage.
- AOC 14 should have a pad inspection and selected sampling during demolition before any conclusion there is no release.
- AOC 49 should include as an additional release consideration the historic disposal of solvents and oils to manufacturing area floor drains.
- Does AOC 40 include all B6 associated tanks?
- AOC 4 should describe specific evaluations made for mercury in the B-16 floor drain system.
- AOC 6 sumps require reevaluation for potential releases in conjunction with any future decommissioning.
- AOC 17 discussion should note that placement of this soil was authorized by DEP however such authorization was prior to development of the RSRs and the soil was reevaluated for direct exposure in the RI. In addition, detected leachable cadmium in this area does not appear to be associated with the soils that were authorized for placement and must be addressed separately.
- AOC 21 area should be expanded, and testing should evaluate all sides of the B-65 area to determine the lateral extent of polluted soil beyond the B-65 excavation footprint where polluted soils were removed. Testing should ensure that the potentially polluted soils, rather than clean backfill associated with B-65 construction, are sampled. The identification of a release should also include metals and semivolatile organics documented as present in the already removed soils.
- AOC 27 data summary (oozing oil during pile driving) suggests it is associated with AOC 21 area.
- AOC 54 should indicate a release has occurred because stained soils noted in 1988 were not removed and fuel related constituents are present. Is this a source for the BTEX contamination in front of B-6?

<u>Baseline Soil Contamination Concept</u>

DEP can, at this site, accept the concept that an individual release is not identified by elevated analytical data if the site soil baseline criteria are not exceeded. However, this baseline value reflects a nonspecific site-wide combined impact of potentially polluted fill and seventy years of industrial activity, in addition to natural conditions. In order for the public to clearly understand that the RSR requirements are met, DEP expects that the data not specific to an individual release but potentially attributable to the site history will be evaluated with respect to RSR criteria as a generic sitewide "release", and that any identified conditions over RSR criteria will be included in the site's risk-management decision process.

Explicitly discuss all pollutants that have screening levels, identified as a result of the baseline evaluation, that exceed any RSR criteria. Identify the chemicals, sample locations considered part of the baseline but above the criteria, and analytical results, and note whether these are in an area expected to undergo remediation for some other environmental issue. Chemicals include vinyl chloride for residential DEC and 10 volatile organic chemicals with GB pollutant mobility criteria below the screening baseline.

For TPH, those individual pollutants noted above, and metals that may remain on-site, determine the 95% upper confidence of the mean of the entire data set (including breakpoint exceedances) that is not explicitly identified as associated with a specific release, and apply the RSR criteria for comparison. When pollutants are shown to be associated with fill, if the confidence limit on the mean meets the criteria DEP does not additionally impose the specific RSR requirement that no individual sample exceed 2x the criteria.

Chemical Characterization of Soils

Metals other than those specifically associated with B-2 plating operations may also be constituents of concern at SAEP and could be identified as a release. They may be present as contaminants in heat treat oils or cutting oils, used in other coating processes, or associated with fill. Evaluate in more detail such metals where several are present and/or there are nearby AOCs that are possible sources. (Consider all locations where the baseline is significantly exceeded or RSR residential DEC criteria are not met, and especially the vicinity of B-7 and adjacent buildings, B-42, and B-3.)

Lead may be associated with WWII lead oxide dip; the spatial distribution should be evaluated relative to documented historic lead usage. Also, the potential for lead as a contaminant associated with older aviation gasoline should be considered.

Site Hydrogeologic Characterization

The RI contains some discrepancies in the description of the groundwater flow direction between the qualitative description and the hydrogeologic model, especially regarding the extrapolated potential for deep flow to the northeast. Consider in future modeling how results and conclusions might be different if a different boundary condition is used for deeper sediment at the river.

Do measured and/or grain-size-calculated permeability values provide a separate line of evidence for the spatially variable high and low permeability zones as incorporated in the calibrated model. A plausible geologic explanation for the low permeability zone at the shoreline is presented; can a geologic rationale be provided for the high permeability zone over the bedrock ridge?

Page 6-23 references a hypothetical tidal-fluctuation-based dilution mechanism for groundwater at the shoreline without any supporting data for the hypothesis from the site. Identify the site data that support the applicability of this hypothetical attenuation mechanism at the site.

Bedrock investigation results were not yet available when the RI was prepared. Include in any supplement a discussion of the bedrock hydrogeology, including the two different rock types, the yield and water quality, potentiometric head in comparison to the overburden, and the implications for migration potential of pollution into the bedrock.

Page 8-12 indicates the point of compliance for the RSR surface water protection criteria is the Housatonic River. However, the RI identifies most of the discharge from SAEP is to the tidal flats associated with the river, rather than the river itself. The discharge is not directly to the river but to the associated wetland, and the RSRs require a conservative evaluation of the groundwater in comparison to the chronic (saltwater) toxicity values developed for surface water be made.

Baseline Approach for Groundwater

The baseline approach for groundwater evaluation may be used at this site to clearly identify specific pollution releases but is not capable of discriminating between naturally occurring conditions and those associated with the long term general industrial use and filling history of the site. As a result, the reported groundwater quality, although not explicitly associated with a defined industrial release, may be attributable to the general site condition, rather than natural background. In order for the public to clearly understand that the RSR requirements are met, DEP expects that the SAEP will evaluate these potentially site related inorganic constituents that are not explicitly associated with the plating room plume or the impaired groundwater associated with the former lagoons for compliance with the surface water protection requirements of the RSRs. Given the slow flow of groundwater at the site, the evaluation principally addresses the potential future impact of the identified baseline inorganic site groundwater quality, that may not yet have reached receptors, and is complementary to the ecological evaluation of current conditions affecting receptors. The RSRs provide for an averaging approach, wherein, if the entire "release" (i.e. the site baseline condition exclusive of plumes) averages less than the comparison criteria, the surface water protection goal is met.

The inorganic data fall in three categories regarding the details of how DEP expects this comparison to be made:

- The selected deflection point is greater than the applicable criterion, and chemicals are detected above the deflection point in areas outside the defined groundwater plumes associated with the plating room and the lagoons. For the remaining data set, not associated with a plume, are these conditions stable; and does the remaining data set as a whole average below applicable criteria for chronic toxicity? (copper, nickel)
- The deflection point is below the applicable criterion but there are outliers above the criterion that were not considered associated with any identifiable specific release. Are these groundwater conditions stable; and does the data set average below the applicable criterion? (arsenic, lead, zinc)
- There is a clearly defined deflection point with outliers exceeding its value that were not considered associated with a specific release, but there is no RSR-tabulated criterion. Are these groundwater conditions stable; and does the data set average below the screening values for surface water in chapter 12? (silver, thallium, vanadium, barium, beryllium, total chrome, antimony)

DEP expects that long term monitoring may be necessary to document continued stability of the baseline groundwater conditions given the low groundwater flow rates at the site.

In the event any inorganic constituent averages above the comparison value, further evaluation of this pollutant will be necessary, within the site's risk management decision process.

Groundwater Quality Characterization

Provide an expanded discussion integrating groundwater and soil gas information to document that chlorinated solvent concentrations are stable and pollution above residential volatilization criteria is not migrating offsite east of building 19, near the main front entrance, and on the northwest corners of B2 and the site. DEP expects mitigation of offsite migration above criteria. Unless data support long term stability of groundwater conditions, long-term monitoring to periodically revalidate a "no offsite migration" conclusion is expected if the on-site polluted groundwater is not mitigated.

Some of the apparent solvent pollution in groundwater on the maps (e.g. near the front entrance to B2, in front of B-6, near B-3A, and east of B-19) does not have apparent associated source areas. Evaluate the origin of this pollution: are there stratigraphic complexities affecting pollutant migration; is the distribution an artifact of sample distribution and machine contouring; are there additional AOCs to identify?

Provide discussion of the off-site origin of groundwater pollution documented under the west parking lot. Although it is important to document this environmental condition in characterizing the SAEP, note that DEP policy does not require remediation of pollution from demonstrably off-site up-gradient sources.

Provide an expanded discussion integrating groundwater, soil gas, and indoor air information to further evaluate the proposed public use of B-6 as a museum. Focus on the potential for chlorinated solvents to affect indoor air above residential criteria, since there are some locations near B-6 with groundwater or soil vapor present above residential criteria and one indoor air measurement that is elevated. DEP expects that a program to document compliance of current site conditions through periodic monitoring of soil vapor and/or indoor air will be implemented, with contingencies in the event monitoring exceeds criteria.

When the defined groundwater plumes associated with the plating room and the lagoons are eliminated from the data set, are there any other areas that may be specific definable as inorganic constituent groundwater releases? At a minimum, the RI criteria require identification of groundwater north of B-19 as a groundwater release for nickel, and two locations along the shoreline as releases of cyanide.

It appears that some wells have elevated concentrations (above baseline/comparison criteria) of several metals when compared to other wells, and there may also be elevated soil metals concentrations at some of these locations. Evaluate the hypothesis that some wells have higher concentrations of metals relative to well construction, site stratigraphy, and known industrial activity areas to determine if these are also potentially associated with site activity.

DEP believes that at least some of the elevated lead in groundwater may be generally co-located with elevated lead levels in soil and in the general area of or downgradient of former (1940's) painting/sandblasting/and lead dip operations, thus this should be considered as a possible release.

Other elevated lead levels in groundwater appear to be associated with hydrocarbon fuel releases, as a secondary pollutant.

Explicitly evaluate if there is any correlation between arsenic distribution and organic compound pollution or associated reducing aquifer conditions.

TCE and breakdown products of dechlorination are present in shallow groundwater under the near-shore tidal flats. Discuss separately the apparently localized plume(s) associated with waste handling areas near the shore. Because the attenuation flow path is substantially different from that for the "hot spots" the attenuation rate may be insufficient to mitigate the release, as evidenced by the pollution in the tidal flats.

Describe how groundwater conditions associated with former plating operations in B-6, B-3, and the northern part of B-2 have been fully characterized.

Groundwater Attenuation

SAEP projects that attenuation of significant groundwater releases at the site will occur, and this mechanism will prevent future potential future impacts to surface water and the tidal flats that may occur because the organic constituents and hexavalent chromium in groundwater are migrating, although very slowly. DEP expects that a long term monitoring program will be implemented to provide continued validation that the projected groundwater attenuation is as predicted, and that such a monitoring program will include defined compliance points and concentration values to allow evaluation of the projected attenuation, revisitation of the predictive model when an extended data set becomes available for calibration, and provision for contingent action if actual or projected attenuation is found to be insufficient.

The principle attenuation mechanism for hexavalant chromium is dependant on redox conditions and is unique to the chemical characteristics of hexavalant chromium. Describe any field evidence, such as mineralogical analyses, that this attenuation mechanism is actually occurring. Provide an evaluation of how copper, cadmium, nickel and cyanide that are associated with the plating room plume at elevated levels also attenuate sufficiently.

Does the hexavalant chromium plume negatively affect anaerobic bacterial activity presumed to provide for attenuation of the co-located solvent plume?

Please contact me at 860 424-3770 if you have any questions regarding these comments.

Sincerely,

/S/ KENNETH FEATHERS

Kenneth Feathers
Supervising Sanitary Engineer
Remediation Section
Bureau of Waste Management

Cc. Robin Mills
Wes LaParl
Fred Hyatt
Ernie Waterman