UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

Project Coordinator
Ms. Cathy R. Scheirman
OC-ALC/EMR
7701 Arnold Street
Tinker Air Force Base, OK. 73145

Re: Tinker Air Force Base (EPA ID# OK1571724391)
Five-Year Review for the Soldier Creek/Building 3001 NPL Site

Dear Ms. Scheirman:

This letter documents the U.S. Environmental Protection Agency's (EPA's) concurrence in the protectiveness determinations in the Tinker Air Force Base (Tinker AFB) Five-Year Review Report for the Soldier Creek/Building 3001 National Priorities List (NPL) Site (Parsons Engineering Science Inc., September 1998). This letter also contains some comments regarding the Five-Year Review Report and recommendations for action. This is the first five-year review for the site which was triggered due to the implementation of the remedial action at the site.

This review is required by Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. § 9621(c), and by Section 300.430 (f) (4) (ii) of the National Oil and Hazardous Substance Contingency Plan (NCP), which require that a periodic review be conducted no less often than every five years after the initiation of remedial action at sites where hazardous substances, pollutants, or contaminants will remain onsite above levels that allow for unlimited use and unrestricted exposure. The U.S. Air Force, as lead agency for Tinker Air Force Base, conducted this review. According to EPA's Comprehensive Five-Year Review Guidance (OSWER No. 9355.7-03B-P, June 2001), EPA's role as the final remedy selection authority at an NPL site under the jurisdiction of another Federal agency or department requires that EPA retain final authority to make protectiveness determinations in connection with the site. Accordingly, EPA Regions are to review Federal facility NPL Five-Year Review reports and protectiveness determinations for consistency with EPA's Comprehensive Five-Year Review Guidance and the adequacy of the supporting basis, and should participate or comment throughout the five-year review process, as appropriate the EPA will either concur with any protectiveness determinations to ensure protectiveness of human health and the environment or EPA may provide independent findings. In this case, the Air Force provided EPA with a draft of the Five-Year Review Report for the Soldier Creek/Building 3001 NPL Site at Tinker AFB, and EPA responded with comments and some questions. This is EPA's review of the final Five-Year Review Report for

the Soldier Creek/Building 3001 NPL Site at Tinker AFB prepared by the Air Force.

The Soldier Creek/Building 3001 NPL Site has been divided into four operable units (OUs). The Five-Year Review Report addresses OUs 1 and 2, which have had Records of Decision (RODs) issued. OUs 3 and 4 are discussed as they are contiguous to OUs 1 and 2 and are environmentally related.

OU 1 is also known as the Building 3001 OU. OU 1 is comprised of several components. They are: Ground water associated with Building 3001 activities, the North Tank Area (NTA), and Pit Q-51 contaminants. The following is a brief description of the remedial actions selected in the ROD signed in 1990.

Building 3001:

- Monitoring wells were added in order to monitor the ground water contaminant plume.
- Ground water was extracted from the perched water zone, top of the regional water zone, and the regional water zone by extraction wells.
- A treatment facility was constructed specifically for the treatment of contaminated ground water.
- Volatile contamination was treated using air stripping and carbon adsorption.
- Metals were treated by chemical reduction and precipitation.
- Treated water was reused by Tinker Air Force Base industrial operations.
- Sludge was disposed of at an offsite RCRA-permitted facility approved to receive CERCLA waste.

Pit Q-51:

- Approximately 45 gallons of liquid were removed.
- Pit was steam cleaned; liquid and wash water were analyzed and disposal of wastes took place at a facility approved to receive CERCLA waste.
- Pit was backfilled with sand and then covered with an 8 inch concrete cap.

North Tank Area:

- Floating fuel product removal system was installed in order to recover fuel floating above the ground water table.
- Fuel that was recovered was disposed of at a RCRA approved facility.
- Recovered ground water was treated.
- A vapor extraction system designed to remove fuel vapors from subsurface soils was installed.
- Thermal combustion of recovered fuel vapors was conducted.

- A 750 gallon waste tank was removed and disposed of.
- A 235,000 gallon fuel oil tank was closed.

OU 2 is also known as the Soldier Creek Sediment and Surface Water Operable Unit. OU 2 includes Soldier Creek, its tributaries, and any area underlying or adjacent to the waterway that may be contaminated by the migration of hazardous substances, pollutants or contaminants from Tinker AFB. The ROD signed in 1993 provided for a remedy of limited action at OU 2. The remedial actions selected in the ROD are:

- A program consisting of a five-year monitoring (both on and off base locations) plan for the Soldier Creek sediment and surface water area to determine if contaminant migration has occurred.
- An ecological investigation, both quantitative and qualitative, of the Soldier Creek sediment and the associated surface water to further define/establish potential environmental risk(s).
- Annual Monitoring reports.
- A five year ROD review to ensure that the remedy selected remains protective.

The remedies for OUs 1 and 2 appear to be working as anticipated. At OU 1, the extraction system seems to be effectively controlling the TCE and chromium ground water plume(s); however, some of the areas of the site where there are isolated occurrences of TCE and chromium appear not to be directly related to Building 3001. The ROD predicted that the ground water treatment plant extraction system would remove approximately 72 percent of the TCE and 77 percent of the chromium in the first five years of operation and that 85 percent of both contaminants would be removed within 20 years. These estimates did not take into consideration the addition of contaminants into the flow system as a result of recharge through source zones, the effects of retardation (sorption, desorption chemical reactions), the likely presence of DNAPL or the travel time to the extraction wells. Incorporation of these factors would have resulted in longer estimated cleanup times. Free product in the North Tank Area appears to be relatively immobile. Even though this free product continues to be a source of ground water contamination, the dissolved plume is contained by the extraction well system that is in place at Building 3001. Pit Q-51 has been effectively remediated. The pit contents were removed and the pit was sealed with an eight inch thick concrete cap. Inspection of the site confirmed that the cap is intact. At OU 2, as required by the ROD, a five-year monitoring program has been implemented, and over a three year period covered by the Report, the health based indicators for the water quality were not exceeded for any chemical detected in water. In addition to these results, the quantitative Human Health Risk Assessments (HHRAs) did not show an unacceptable health risk. Results of the HHRAs for the first three years of the monitoring program, as well as results of the Baseline Health Risk Assessment (BHRA), indicate that under current or future stream use conditions there is no unacceptable human health risk (cancer or noncancer risk) for potential on-base or off-base receptors due to sediment and surface water exposures.

There were no significant deficiencies identified for OUs 1 and 2. Regarding OU 1, based on the Upper Saturated Zones' hydraulic gradient in the vicinity of certain extraction wells, it is recommended that the capacity of some of the wells be increased. It is also recommended that some additional wells be placed to confirm or deny the presence of the contaminant beyond a specific portion of the capture zone. The Five-Year Review Report additionally identified areas that are west of the North-South runway of Tinker Air Force Base which require further plume characterization and the identification of the source of the contamination. Concerning the North Tank Area, the conclusion in the Focused Remedial Investigation that natural attenuation is appropriate based on cost and on the presumption that time is not a factor due to the anticipated long-term remediation and monitoring of the Building 3001 ground water plume should be documented in an appropriate decision document. Concerning Pit Q-51, inspection of the cap is recommended to be performed on an annual basis to ensure the cap's structural integrity.

Recommendations pertaining to OU 2 are based on the results of the HHRAs and their comparison to health-based levels of action. The EPA has been notified of the results of the Ecological Risk Assessment (ERA), and efforts are underway to further characterize potential ecological risk in the area. The ERA did indicate a potential for ecological risk in the area. Response actions subsequent to the ERA have been implemented for the purpose of removing or reducing the potential sources of contamination and also the minimization of the potential that sediments from this area could move off-base and pose a human health or ecological threat to downstream receptors. Continued annual monitoring and evaluation will be conducted to determine the need for further response actions.

As part of its review of the Five-Year Review Report, EPA identified several instances where response actions were taken without decision documents or response actions were taken that differed from the response action selected in the relevant decision documents. The EPA brought those instances to the attention of the Air Force in written comments and in a meeting on February 6, 2002. In response, the Air Force has agreed to prepare appropriate decision documents or revisions to decision documents. It is essential that the Air Force act consistent with its agreements as indicated in the enclosed letter and in accordance with the Federal Facility Agreement for the Site. Should you have any questions pertaining to this letter, please contact Ruben Moya (214-665-2755) of my staff.

Sincerely yours,

Pamela Phillips, Acting

Myron O. Knudson, P.E.
Director
Superfund Division

Enclosure

CONCURRENCES

FIVE-YEAR REVIEW

Tinker Air Force Base
EPA ID# OK1571724391

By: _____ Date: 9-24-02
Ruben Moya
Remedial Project Manager

By: _____ Date: 9-24-02
Gustavo T. Chavarria, Chief
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By: _____ Date: 9/24/02
William K. Honker, Chief
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By: _____ Date: 9/24/02
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By: _____ Date: 09/24/02
Mark Peycke, Chief
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By: _____ Date: 9/25/02
Pam Phillips
Superfund Deputy Division Director

9/25

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS OKLAHOMA CITY AIR LOGISTICS CENTER (AFMC)
TINKER AIR FORCE BASE OKLAHOMA

30 January 2002

MEMORANDUM FOR EPA, REGION 6
ATTN: CHRIS VILLARREAL (6H-EO)
1445 ROSS AVENUE
DALLAS TX 75202-2733

FROM: OC-ALC/EMR
7701 Arnold Street, Suite 204
Tinker AFB OK 73145-9100

SUBJECT: Five Year ROD Review, Response to Comments

Attached are responses to EPA's comments concerning the Five-Year ROD Review for the Soldier Creek/Building 3001 site, September 1998, received by email on 14 January 2002. If you have any questions, our point of contact is Keith Buehler at (405) 734-4574.

JOSEPH E. CECRLE
Project Coordinator

Attachment
Response to Comments

Five-Year ROD Review
Response to EPA Comments

1. Section 2.1 Background, Physical Characteristics, page 2-1

Text discusses the boundaries of the Soldier Creek Sediment and Surface Water (SCSSW) Operable Unit (OU) and states that "*these boundaries supercede the boundaries originally established in the Soldier Creek RI (B&V, 1993b).*"

Comment
What is the basis for the change - what is different?

RESPONSE:

The original RI sampled Soldier Creek all the way to Reno Ave. The sampling area was reduced based on results from the RI. The sampling area of both creeks was reduced to about I-40. Contamination levels in the RI indicated that sampling to this area would be sufficient.

2. Section 2.2.5 Human Use of Resources, page 2-4

Text states "*there are no off-base wells that are known to be used for drinking water purposes.*"

Comment
Is this still the case?

RESPONSE:

To the best of our knowledge, yes. The IWTP/Soldier Creek Off-Base Groundwater area is currently being researched for the next phase of the Proposed Plan per comments from ODEQ.

3. Section 4.1.5 Data Review, page 4-5

First paragraph states that "*beginning in 1998, groundwater extracted at the Southwest Tank Area was being pumped to the GWTP.*"

Comment
What is the significance of this?

RESPONSE:
The waters from the Southwest Tank Area (SWTA) contain high concentrations of toluene as well as small amounts of free phase product. A dual phase recovery system was installed

at the site with phase separation and volatile pretreatment. These actions reduced the concentrations of toluene and removed free product prior to discharge to the GWTP collection system.

4. Third paragraph states "*the deeper 'Producing Zone' is not part of the ROD for the Building 3001 OU and was not evaluated.*"

Comment
Protection of the Producing Zone is one of the primary reasons for the ROD. As stated in the ROD,"*actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Record of Decision, may present an imminent and substantial endangerment to public health, welfare, or the environment.*" Since most water-supply wells in the vicinity of the base derive water from the Producing Zone, contamination of the Producing Zone would constitute such an endangerment to public health.

The Record of Decision states the following in the Declaration:

- *ROD addresses the sources of the contamination and any threat posed by migration of contamination to groundwater beneath the building, the principle threats at the site.*

- *Building 3001 Groundwater (Components Include)*
  - *Addition of monitoring wells in order to monitor the groundwater contaminant plume.*

Due to the fact that groundwater contamination has been previous detected in the Producing Zone (i.e., Water Supply Wells WS 15, WS 16, WS 17, WS 18, and WS 19), is monitoring in the Producing Zone in the vicinity of Building 3001 being conducted to ensure that the Producing Zone is not currently being impacted?

RESPONSE:
Yes, included in the basewide sampling program is the annual sampling and analysis of Producing Zone monitor wells in the 3001 area. Previous contouring of the contaminant plume associated with Building 3001 has included maps of the Upper Saturated Zone and the Lower Saturated Zone only. Contours for the year 2000 data set will include a map of the Producing Zone.

5. Section 4.1.5 Data Review, Evaluation of USZ (Layer 1), page 4-6

Text states, "*though well 1-75B is within the capture zone, concentrations have generally continued to rise.*"

Comment
What is the significance of this?

RESPONSE:
The previous sentence explained the rise in concentrations in extraction wells is considered to be because contaminants are mobilizing towards the wells. This is in contrast to well 1-75B, which is a monitor well with increasing concentrations.

6. Section 4.1.5 Data Review, pages 4-9 and 4-10

The North Tank Area discussion states, "*The remedies specified in the ROD were implemented to the extent possible. Deviations from the selected remedies are supported by the results of site specific investigations and tests conducted prior to and subsequent to the ROD and are summarized below.*"

The Free Product removal section states "*the ROD specified dual-fluid methods of product recovery was discontinued at the end of 1994 due to excessive water production.*"

The Soil Vapor Extraction section stated that "*no additional design for soil vapor extraction was performed ... neither vapor extraction nor bioventing were implemented,*" and "*based on results of the focused RI (Parsons ES and Battelle, 1994), remediation through natural attenuation was recommended.*"

Comment
Post-Rod changes require various levels of documentation depending upon the extent of the change. Post-ROD changes fit into one of the three following categories: Nonsignificant or Minor Changes, Significant Changes, and Fundamental Changes. Attached for your information are Chapters 7 - 9 of EPA's *Guide to Preparing Superfund Proposed Plans, Records of Decisions, and Other Remedy Selection Decision Documents* (EPA 540-R-98-031, July 1999). These chapters discuss the level of documentation regarded for various Post-ROD remedy changes.

RESPONSE:
All changes performed at the site were documented through correspondence to EPA Region VI, CERCLA Branch. Currently, dual phase recovery is in progress and has been operational since Feb 99. Free product is separated and collected onsite and waters are pretreated by air stripping prior to discharge to the base Industrial Wastewater collection system. The only ROD directive not performed at the site is soil vapor extraction (SVE). The original design for the SVE system was impractical since it was design for contaminant reduction in the 0-13' soil horizon. The majority of site contamination is located between 22-30 feet bgs. The dual phase system currently in operation is more efficient for reduction of residual formation contaminants. An ESD or ROD amendment, whichever is appropriate, will be done to document this.

7. Section 5.1 Conclusions, Building 3001 OU, page 5-1

Text states that "*increases in concentrations to the north and southeast of the line of recovery*

wells indicates that some contaminant spreading from Building 3001 may be occurring and should be corrected."

Comment
Has any action been taken to address the contaminant spreading?

RESPONSE:
Pumping rates in extraction wells were increased.

8. Section 5.1 Conclusions, North Tank Area, page 5-2

Text states that the free product in this area and is relatively immobile and the dissolved plume is contained by the Building 3001 extraction well system. Text also states that natural attenuation is an appropriate remedial action based on cost and on the presumption that time is not a factor due to the anticipated long-term remediation and monitoring for Building 3001 groundwater plume.

Comment
What is the estimated MNA time frame?
Has the potential for the NTA plume compounds (i.e., diesel, gasoline, and waste oil) to co-metabolize the solvents within the Building 3001 plume been evaluated?
Any ROD change will require the appropriate documentation (i.e., ESD, ROD Amendment).

RESPONSE:
Once the majority of free product has been removed from the site (estimated recovery end date Mar 05), a program for monitoring by natural attenuation (MNA) will be implemented. Previous investigations have indicated that some co-metabolic degradation does exist in the outer fringes of the site based on the dissolved concentrations of methane and ethene. It is understood that changing from free product recovery to MNA will require appropriate documentation.

9. Section 5.5.2 Interpretation of Ecological Significance, page 5-3

Text states "*the conclusions of this limited ERA also indicate that the risk characterization is inflated ... that better understanding of the ingestion-pathway exposures is needed ... and additional sampling may be required.*"

Comment
What has been done or is going to be done to complete the ERA?

RESPONSE:
On-base areas were excavated and removed. Sampling still occurs at the base boundary and off-base to confirm that there is no contamination there. As the contaminants were removed, there is no longer a necessity to address ecological issues beyond what is done in

the annual reports.

10. Section 6.1 Deficiencies - Building 3001 Groundwater, page 6-1

Text states that there were no deficiencies identified for the NTA.

Comment
What about the inability of the fuel product removal system to successfully recover all of the fuel floating on the groundwater table?

RESPONSE:
Free product recovery continues at the site and will continue until the majority of the recoverable product has been removed from the formation.

11. Section 6.2 Deficiencies - Soldier Creek and Surface Water OU, page 6-1

Text states that there were no deficiencies identified for the SCSSW OU.

Comment
What about the fact that the ERA has not been completed? What is the status of the ERA?

RESPONSE:
On-base areas were excavated and removed. Sampling still occurs at the base boundary and off-base to confirm that there is no contamination there. As the contaminants were removed, there is no longer a necessity to address ecological issues beyond what is done in the annual reports.

12. Section 7 Recommendations, page 7-1

What is the status of the following recommendations/plans of action which were presented in this section:

Building 3001 Groundwater

- The USZ hydraulic gradient in the vicinity of extraction well P-1 should be increased to ensure efficient recovery of contaminants near well 1-75b. Therefore, it is recommended that the pumping rate be increased in well P-1.

RESPONSE:
The pumping rate was increased in well P-1 to just below its cycle rate.

- It is recommended that an additional USZ well be placed southwest of P-12 to confirm or deny the presence of TCE beyond the P-12 capture zone.

RESPONSE:

An additional monitor well (2-428B) was placed southwest of P-12.

- The sources of contamination at wells 1-65B and 1-67B should be identified.

RESPONSE:
The source of contamination at well 1-65B has not been determined. Well 1-67B is located within CG39 and is being addressed in a RCRA Facility Investigation being done at that site.

- The source area for the contamination detected in well 1-72B, located southeast of recovery well P-12, should be identified.

RESPONSE:
Well 1-72B is located within CG39 and is being addressed in a RCRA Facility Investigation being done at that site.

- Additional investigations should be conducted west of the north-south runway in layers 1 through 7 to determine the horizontal and vertical extent of contamination. Following delineation, recommendations for remediation should be completed and an alternative selected and implemented.

RESPONSE:
Additional monitor wells have been placed in the USZ and LSZ and are sampled and analyzed annually through the basewide sampling program.

- Remediation in the vicinity of well 2-162B identified the source of contamination to be the 290 Fuel Farm. What is the status of the remediation planned for 1999?

RESPONSE:
Dual phase recovery was initiated in the 290 area beginning in 1998 and expanded in 99 and 00. Recovery utilizing 30 recovery wells in the USZ is currently in operation to remove contamination from the USZ and prevent migration to the LSZ.

- It is recommended that the RAOs for this site be reassessed based on changes in MCLs and the likelihood that DNAPL exists.

RESPONSE:
This is currently being addressed through the TI Waiver process.

- It is recommended that review of RAOs should focus more on TCE containment rather than total aquifer restoration. The RAO review should also consider the feasibility benefit and risk associated with natural attenuation of TCE.

RESPONSE:
This is currently being addressed through the TI Waiver process.

North Tank Area

- A vacuum enhanced pumping (VEP) technology demonstration is planned for the NTA in 1999. What is the status of the VEP demonstration?
- It was recommended that a complete O&M plan (with monitoring requirements) be completed with the VEP system.

RESPONSE:
The VEP system was activated in 99 and remains operational at the site. A Remedial Action Plan (RAP) was submitted to the Oklahoma Corporation Commission (OCC) in accordance to their rules and regulations. The OCC issued a closure letter for the site. The O&M Plan, although programmed, was never completed. Currently, the site is under contract for Quarterly Monitoring Reports through 2001. A new contract for semi-annual monitoring will be implemented in 02.

Pit Q-51

Annual inspection of the concrete cap is recommended to ensure that the cap integrity is maintained.

RESPONSE:
The concrete cap is part of the floor of Building 3001, the integrity of which is addressed as a maintenance function of 3001.

Soldier Creek Sediment and Surface Water

To ensure that exposure to and migration of contaminants does not occur at concentrations greater than remediation goals (the human health-based cleanup goals and ecological RGOs), annual monitoring efforts and risk evaluations should continue for the SCSSW OU. The additional sampling details identified as uncertainties in the ERA should be added to the next round of monitoring to more clearly define ecological risk. Options for remediation (e.g., phytoremediation) should be considered if these results indicate that an unacceptable risk exist. New toxicity data (i.e., for alpha-cholordane and beryllium) should be used in subsequent HHRAs.

Additionally, methods for evaluating dermal exposure should consider the USEPA (1997) draft guidance which recommends adjusting oral toxicity values for estimating potential risk for dermal contact.

RESPONSE:
- Annual sampling and reporting is still being done.
- Contaminated sediments removed, don't need to address uncertainties in ERA as they no longer exist.
- Toxicity data is updated every year to complete the yearly RA.
- Updated RA guidance is used every year to complete the RA.