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LETTER REGARDING U S NAVY RESPONSES TO REGULATOR COMMENTS ON DRAFT  
FINAL REMEDIAL ACTION PLAN FOR RISK BASED REMEDIATION AT SITE ST14 NAS  
FORT WORTH TX  
3/3/1997  
CARSWELL AIR FORCE BASE

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**NAVAL AIR STATION  
FORT WORTH JRB  
CARSWELL FIELD  
TEXAS**

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**ADMINISTRATIVE RECORD  
COVER SHEET**

AR File Number 327



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS AIR FORCE CENTER FOR ENVIRONMENTAL EXCELLENCE  
BROOKS AIR FORCE BASE TEXAS

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3 March 1997

MEMORANDUM FOR TNRCC (M. Weegar)

FROM: HQ AFCEE/ERD  
3207 North Road  
Brooks AFB, TX 78235

SUBJECT: Naval Air Station Ft. Worth JRB; TNRCC Solid Waste  
Registration No. 65004  
EPA ID No. TX0571924042  
Hazardous Waste Permit No. 50289  
Draft Final Remedial Action Plan for Risk-Based  
Remediation of Site ST14; Response to 8 November 1996  
Request for Revised Remedial Action Plan

Dear Mr. Weegar,

This letter addresses recent comments (dated 8 November 1996) received on the remedial action plan (RAP) for the petroleum hydrocarbon spill at site ST14 (Solid Waste Management Unit (SWMU) 68), the former base refueling area (Area of Concern (AOC) 7, the french underdrain system (SWMU 64), and the north oil/water separator (SWMU 67). This letter also incorporates the agreements reached during a meeting held between Geof Meyer, Sam Taffinder (AFCEE/ERT) and me. Please note that the above referenced RAP is not intended to address the unnamed stream (AOC 14); proposed remedial plans for this SWMU are being conducted as part of a separate, ongoing project.

The Petroleum Storage Tank Division's Responsible Party Remediation Section (PST) and the Industrial and Hazardous Waste Division's Corrective Action Section (IHW) express in the letter the opinion that the remedy proposed in the April 1996 RAP would not adequately manage the co-mingled groundwater contamination observed at site SD13 (i.e., AOC 7 and SWMUs 64 and 67). Several apparent deficiencies were identified by TNRCC to help guide subsequent revisions to the RAP. The following paragraphs present the Air Force's proposed resolution to each of the identified issues (listed by paragraph number corresponding to TNRCC's 8 November letter).



**Item 1:** The April 1996 RAP will be revised to describe the Air Force's ongoing efforts to remove (by hand bailing) any groundwater free product that is encountered in any wells sampled as part of the current quarterly groundwater sampling and analysis program (GSAP). Free product in wells in the area of site SD13 (AOC 7) will be removed monthly beginning in January 1997 for six months. At the end of that time AFCEE will recommend a permanent solution to free-product in area wells, if deemed appropriate. The addendum will also describe potential contingency actions that could be undertaken (such as installation of passive wicking in impacted wells) if hand bailing is deemed inadequate to contain and remove this environmental nuisance.

**Item 2:** The April 1996 RAP incorporates sampling data collected as part of several field investigations, including the 1985-1990 IRP RI sampling events, the 1993 bioventing pilot test, the 1994 Resource Conservation and Recovery Act (RCRA) facility investigation (RFI), and 1994-1995 Air Force Center for Environmental Excellence (AFCEE)-sponsored sampling events conducted to support determination and implementation of a risk-based remedy for SWMU 64, SWMU 67, SWMU 68, and AOC 7. The RAP focuses on fuel hydrocarbon compounds, the only organic chemical compounds detected at the subject SWMUs at concentrations above appropriate screening-level comparison criteria (see Section 4 of the RAP). The first draft of the RAP was submitted for review on 20 November 1995; two briefings on the findings and recommendations of the RAP were presented at Base Realignment and Closure (BRAC) Cleanup Team (BCT) meetings on 14 September 1995 and 14 December 1995.

No sampling data collected subsequent to the 1994-1995 AFCEE-sponsored field investigation events were incorporated into the RAP. Consequently, detections of low concentrations of trichloroethene (TCE) and tetrachloroethane (PCE) at monitoring well OT15C, as reported in the June 1996 IRP Basewide Quarterly Groundwater Monitoring Second Semi-Annual Report, are not incorporated into the RAP. However, these data are described in the 12 November 1996 FAR, particularly as they relate to long-term monitoring plans for the site. Available sampling data from this well indicate that concentrations of these compounds have been steadily decreasing over time. Specifically, PCE was detected in April 1995 at 2.45 µg/L. In July 1995, PCE was detected at 6.44 µg/L, which is slightly above its maximum contaminant level (MCL) of 5 µg/L; at the same time TCE was detected at 3.64 µg/L, which is still below its MCL of 5 µg/L. However, by October 1995, neither compound was detected in well OT15C. Neither compound has been detected in subsequent sampling

events, although quarterly monitoring will continue as part of the GSAP.

The Air Force proposes to update the risk estimates presented in the RAP to include GSAP analytical results through 16 January 1996 and modify the proposed long-term monitoring plan to include continued sampling of this well for chlorinated compounds.

**Item 3:** The April 1996 RAP (p. 9-2) prescribes the basic plans for partially removing the french underdrain system (SWMU 64) and abandoning the north oil/water separator (SWMU 67). As stipulated in the RAP, all corrective actions undertaken to remove/abandon these structures would be implemented in concert with IHW and documented in a FAR (dated 12 November 1996). The revised RAP also will briefly describe these activities in the context of compliance with 30 Texas Administrative Code (TAC) Section 335.555 to ensure that IHW concurrence with the addendum is sufficient for documented closure of SWMU 64 and SWMU 67.

Additionally, the April 1996 RAP includes an assessment of natural chemical attenuation processes that will effectively decontaminate residual chemical contamination and SWMU 64 components. As explained in Section 5.6 of the RAP, the model is inclusive of residual contamination at AOC 7. The conservative fate and transport model results indicated that removal of the french underdrain system may be warranted to interrupt potential preferential chemical migration pathways to downgradient surface water. Once the migration was interrupted, natural chemical attenuation processes (that have been documented to be occurring at the site) are expected to be sufficient to reduce the only COPC (benzene) below its Plan A industrial cleanup criterion of 29  $\mu\text{g}/\text{L}$  by the year 2000 and below the Plan A residential cleanup criterion of 5  $\mu\text{g}/\text{L}$  by the year 2007. These conservative model simulations are based on a single detection of 59  $\mu\text{g}/\text{L}$  of benzene at AOC 7 during the 1994 RFI; this detection has never been duplicated in subsequent sampling events. Field data described in the 12 November 1996 FAR indicate that partial removal and clay backfilling of the french underdrain system has successfully minimized discharges to surface water and increased groundwater residence time (which will enhance the effectiveness of natural attenuation processes). The revised RAP also will recap these findings and summarize recent analytical groundwater results for AOC 7 to demonstrate that natural chemical attenuation processes are reliably decontaminating residual chemical contamination and SWMU 64 components.

The aerial extent of the plume originating from SWMU 68 encompasses SWMU 68, SWMU64, SWMU 67 and AOC 7. The groundwater

monitoring program presented in the April 1996 RAP (p. 10-1) provides groundwater monitoring coverage for all four of these sites. The Air Force proposes that following receipt of the addendum to the RAP that in addition to SWMU 64 and SWMU 67, AOC 7 be closed with no further action required because the monitoring program for SWMU 68 will suffice as a compliance program for contamination in the area.

**Item 4:** As described in the July 1994 RAP Work Plan and subsequent briefings to the Carswell BCT, the risk-based corrective actions developed for SWMU 64, SWMU 67, SWMU 68, and AOC 7 were based on an assessment of the risks to potential human and ecological receptors due to exposure to specific organic chemicals detected in site environmental media. The risk-based corrective action process developed by the Texas Natural Resource Conservation Commission (TNRCC) prior to May 1996 was followed to develop the RAP. The April 1996 RAP summarizes (p. 4-15; p. 5-26) how residual chemical contamination in the form of contaminated soils and free product will serve as a long-term source of specific chemicals to potential exposure media (i.e., groundwater and soil). The Bioplume II model developed to predict the fate and transport of the only fuel hydrocarbon compound COPC (benzene) in groundwater underlying the area includes a continuing but diminishing source term that accounts for the effects of free product weathering and leaching from soils. Consequently, the remedy proposed in the April 1996 RAP is inclusive of free product and residual soil contamination that could act as a source of groundwater contamination. Oxidation of fuel hydrocarbons such as BTEX is assumed to result in complete mineralization to carbon dioxide and water (see Section 5 of the RAP).

As a side note, both the fuel products JP-4 jet fuel and/or gasoline, which are the sources of contamination at the sites in question, exhibit low acute toxicity by the oral and dermal routes of exposure. Furthermore, available data indicate that there are no neurotoxic concerns associated with exposure to JP-4 jet fuel or gasoline. JP-4 jet fuel and gasoline are not mutagenic, and are not developmental or reproductive toxicants. USEPA (1992) has assigned diesel and related middle distillates (e.g., JP-4 jet fuel) to the weight-of-evidence Group D: Not Classifiable as to Human Carcinogenicity.

The analytical sampling data used in the quantitative risk assessment in the April 1996 RAP reflect the chemical nature of the two source fuels, and is inclusive of the known carcinogens that comprise the parent, unweathered fuel sources. In general, these two types of fuels are typically enriched with aromatics and isoalkanes to give superior performance. More specifically, single-ring monoaromatics such as BTEX usually represent a significant fraction of the aromatics in JP-4 jet fuel and

gasoline. In gasoline, these single-ring monoaromatics such as BTEX accounted for more than 98% the total aromatic fraction. BTEX usually accounts for more than 20% by weight of the product. Consequently, analytical data for aromatics such benzene and naphthalene represent the majority of petroleum constituents dissolved in groundwater that are part of the parent fuel.

**Item 5:** HQ AFCEE/ER is responsible for the cleanup of on-base sites. AFBCA is responsible for off-base sites. The unnamed stream (AOC 14) is an off-base site and therefore managed by AFBCA. The explanation of contamination at AOC 14 provided here is HQ AFCEE/ERD's current understanding of site activities.

Contamination at AOC 14 is documented in a 1994 Law Environmental RCRA Facility Investigation Report. The report contains surface water and sediment data for AOC 14. Metals analysis was conducted only on stream sediments; VOC, oil and grease, and total petroleum hydrocarbon (TPH) analyses were conducted on surface water.

Results of surface water sampling did not identify contamination above surface water criteria. TPH and oil and grease contamination did exist, but at levels that did not indicate significant contamination of AOC 14. Further contamination of AOC 14 has been drastically reduced since the north oil-water separator (SWMU 67) was removed, effectively eliminating flow and hence potential contamination of AOC 14.

Results of sediment data indicated that arsenic exceeded National Oceanic and Atmospheric Administration (NOAA) guidance values. Iron did not exceed NOAA guidance values for sediment. However, elevated concentrations of ferrous iron in groundwater are chemical indicators of bio-oxidation of fuel hydrocarbons. Once this ferrous iron-rich groundwater is exposed to air (i.e., at the exit of the now-removed oil-water separator, SWMU 67) the ferrous iron oxidizes to ferric iron again. Ferric iron usually precipitates, resulting in the observed "iron staining." By precipitating at the groundwater discharge point the iron is no longer available to migrate within surface water or impact downstream potable water quality. AFBCA is currently in the process of remediating the unnamed stream by removing arsenic-contaminated and iron-stained soils and sediments. This action will eliminate contaminated sediments and therefore further possible downstream contamination. This project is being monitored by IHW so that project goals will be met.

The April 1996 RAP includes a comprehensive screening evaluation to identify COPCs (see Section 4). The exposure algorithms developed by TNRC PST for Plan A Assessments were used to generate screening-level criteria for all detected

chemicals in soil and groundwater. Iron was included in this evaluation (Tables 4.1 and 4.2). Because iron is considered an essential human nutrient, it is usually eliminated early in the COPC process. Using a provisional toxicity value (RfD-oral) developed by USEPA-NCEA, a residential ingestion-based soil screening level of 23,000 mg/kg can be developed. The maximum concentration of iron measured in soils at the site was 5,300 mg/kg. Consequently, no potential adverse threat to industrial or residential receptors is expected from iron in soil. The April 1996 RAP does not quantitatively incorporate iron (or any other inorganic constituent) into the risk assessment, which includes industrial worker but not recreator contact with surface water impacted by groundwater. Recreators were eliminated from the conceptual site model (CSM) as a reasonable receptor group (p. 6-5) due to the industrial use of the area. As a result of the meeting held on 16 December 1996, the Air Force will revise the CSM to include recreators and use available historical data to further evaluate the effect on human health and aquatic life of metals in Farmers Branch. In addition, metals data collected during the latest round of groundwater monitoring will be used to enhance the risk assessment.

**Item 6:** Future land use is discussed in Section 3.8 of the April 1996 RAP. Color-coded maps of the proposed land re-use plans to be implemented across the base are presented in the RAP. Site ST14 (SWMU 68) is to be maintained for base refueling operations (military use). Site SD13 (AOC 7, SWMU 64, and SWMU 67) are to be part of an open space area associated with the flood-prone areas along Farmers Branch. As a result of the meeting held on 16 December 1996, the Air Force will further evaluate land-use plans to ensure that exposure scenarios match current land use plans. If this land will be excessed as part of BRAC plans the Air Force will coordinate that action with the Carswell Redevelopment Authority.

The following additional actions resulted from the meeting held 16 December 1996 between AFCEE (J. Dunkle and Sam Taffinder) and TNRCC (Geoffrey Meyer). They will be addressed as part of the revised RAP or by letter to TNRCC.

1. An exposure scenario examining the impact of groundwater on Farmer's Branch will be evaluated in the revised RAP, particularly with regard to metals from upgradient flow. This will be accomplished as part of the response to Item 5.

The Air Force will look at the occurrence of metals in wells upgradient of Farmer's Branch and perform a spatial analysis of metals in the area to determine if they are naturally occurring. Existing data will be used to the extent possible to examine the occurrence of metals in the groundwater. Data from Jacobs

Engineering's recent background sampling event as well as recent metals sampling during the January 1997 basewide groundwater sampling event will also be used in the analysis.

2. Several of Mr. Meyer's comments related to analytical data:

a. AFCEE will review the degree to which historical data (1993 and before) was used in determining contaminants of potential concern. Dichlorobenzene hits from prior Radian work was cited by Mr. Meyer as an example of contaminants of concern which may have been excluded from the risk assessment.

b. Table A-6, Vol 2 of RAP. Tetramethyl benzene in surface water (sample ST14-SW3) was 33.3 micrograms/L. The concentration is less than 10 times the blank concentration, which apparently makes this a valid value. Mr. Meyer's review of related documents also identifies methylene chloride, TCE, PCE and possibly 1,2,3,4-tetramethylbenzene, 1,3,5-trimethylbenzene and 1,2,4-trimethylbenzene as COPCs. The constituents were compared to available MCLs consistent with Beneficial Groundwater I and TNRCC Risk Reduction Rules for treatment of groundwater. The Beneficial Groundwater I determination comes from the fact that groundwater is moving toward Farmer's Branch, and this pathway needs to be evaluated. AFCEE's initial review of the data shows that PCE and TCE were included in the Plan A screening (section 4 of the RAP). Recent positive detections of TCE and PCE will be included in the risk assessment as part of our response to Item 2. AFCEE will also review available analytical data (including pre-1993 data) and determine if all chemicals of potential concern were included in the risk assessment.

3. With regard to impact of upgradient flow on Farmer's Branch, the two proposed compliance wells contained in the RAP will initially need to be sampled for Appendix IX constituents. The Air Force will also add a third compliance well west of well OT15B.

4. The Air Force will determine whether samples were analyzed for Appendix IX constituents during previous investigations of the area.

5. TNRCC believes that some of the MCLs in Table 4.2 may be incorrect. The Air Force will look at these levels, as well as aquatic life levels to make sure a proper comparison was made. AFCEE used Federal MCLs in lieu of State MCLs for the RAP; the RAP will be revised to reflect the State MCL list.

6. Mr. Meyer asked the Air Force to check calculations used in the RAP to determine the rate of groundwater movement. Mr.

Meyer believed that the rate of groundwater movement near Farmer's Branch may be faster than that upgradient. This is true, and the transport model (Bioplume II) accounted for increased transmissivity (i.e., increased groundwater velocity) near the area of the creek. See Appendix E of the RAP.

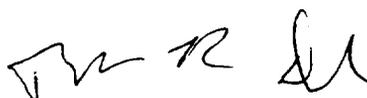
7. Mr. Meyer requested that the Air Force determine if the suspected underground storage tanks associated with SD-13 have been removed. Mr. Meyer stated that the tanks would need to be decontaminated or removed in order to meet Risk Reduction Standard 2 regulations.

The Air Force has determined that the geophysical investigation of the supposed tank area conducted by Law Environmental was inconclusive. Subsequent discussions have lead some people familiar with the program to believe that the investigation conclusively determined that tanks were in fact in the area of SD-13. This was not the case. If there was information pointing to the existence of tanks in the area the Air Force would have investigated and removed the tanks. The Air Force will revise the RAP to include a more complete discussion of the results of previous geophysical investigations in the area of SD-13.

I hope that the proposed resolutions are deemed satisfactory by TNRCC IHW. The schedule for revisions to the RAP are based on approval of the background study for NAS Fort Worth JRB submitted by AFBCA on 31 January 1997, as well as receipt of results from the January round of basewide groundwater sampling. A schedule will be developed and submitted to TNRCC when this data becomes available. I welcome continuing discussions on these issues so that we may move forward with approval of a permanent closure plan for the subject sites.

Should you have any questions or wish to discuss these responses, please contact me at (210) 536-5290.

Sincerely,



Joseph R. Dunkle  
Remedial Program Manager  
NAS Ft. Worth JRB

cc:

Tim Sewell (TNRCC Region 4 Field Office)

Sam Taffinder (AFCEE/ERT)

Charlie Rice (AFCEE/ERB)

Doug Downey (Parsons-Denver)

Leigh Benson (Parsons-Denver)

Olen Long (AFBCA-OL/H)

Rafael Casanova (EPA Region 6)

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