TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

July 15, 2005

CERTIFIED MAIL #3885
RETURN RECEIPT REQUESTED

Mr. Johnny Guelker (PXSO-ESEP)
Lead for Site Support
Department of Energy
Albuquerque Field Office
P.O. Box 30030
Amarillo, Texas 79120

Mr. Dennis Huddleston, Manager
BWXT - Environmental Services Division
Department of Energy
Albuquerque Field Office
P.O. Box 30030
Amarillo, Texas 79120

Re: **Conditional Approval** - Groundwater Final RCRA Facility Investigation Report dated March 15, 2004, with supplemental information submitted by DOE-Pantex on November 1, 2004 and May 23, 2005
U.S. Department of Energy (DOE), Pantex Plant
TCEQ Solid Waste Registration No. 30459
TCEQ Hazardous Waste Permit No. HW-50284
EPA ID No. TX4890110527

Dear Messrs. Guelker and Huddleston:

The Texas Commission on Environmental Quality (TCEQ) reviewed the above referenced submittals that details the results from numerous investigations for the groundwater located beneath Pantex. The Groundwater RCRA Facility Investigation Report (Groundwater RFI) is presented by the

Department of Energy (DOE) to establish the nature and extent of chemical constituents in ground water and support the evaluation of risk to human health and the environment. The Groundwater RFI addresses the nature and extent of constituents of concern (COCs) in the Perched and Ogallala Aquifers that originated from 13 Waste Management Groupings (WMGs) located throughout the DOE-Pantex facility.

After submittal of the initial Groundwater RFI dated March 15, 2004, the TCEQ sent technical comments dated August 3, 2004 and March 2, 2005 to address and clarify data gaps in the investigation record. DOE responded to the TCEQ technical comments in correspondence dated November 1, 2004 and May 23, 2005. The TCEQ has considered DOE responses and concludes that the data gaps associated with the Groundwater RFI can be managed through long-term monitoring (LTM). Therefore, the TCEQ is approving the Groundwater RFI contingent upon utilizing LTM to manage the uncertainties in the investigation record.

Enclosure 1 to this letter identifies the technical responses from the TCEQ, Environmental Protection Agency (EPA) and the DOE and the final resolution of all outstanding technical comments associated with the Groundwater RFI. Based on our review of the Groundwater RFI and supplemental information (*identified in Attachments A through E of Enclosure 1 to this letter*), the TCEQ is requiring LTM and completion of the remaining field activities outlined in the agreements as a condition of approval to meet the requirements established by 30 Texas Administrative Code (TAC) §335, Subchapter S. The TCEQ agrees in principle that soil and groundwater uncertainties can be managed through LTM and fulfill the assessment required by the Risk Reduction Standard (RRS) rule. However, those uncertainties must be defined in the final closure letter(s) to fulfill the requirements of the RRS rule prior to moving to the next phase (i.e., risk assessment and corrective measure study). The uncertainties associated with the soil and groundwater investigations will be managed as part of LTM established by the Compliance Plan (CP-50284).

In addition, the Environmental Protection Agency (EPA) is evaluating this report and will submit their comments separately. DOE must address the conditions of concurrence in the EPA's letter as a condition of TCEQ approval of the Groundwater RFI. Note that the investigation of radionuclides is being addressed in a separate report (Final Pantex Plant Radiological Investigation Report, January 2004). This letter does not address any radionuclide issues associated with the solid waste management units (SWMUs) in the Groundwater RFI.

Please be aware that it is the continuing obligation of persons associated with a site to ensure that municipal hazardous waste and industrial solid waste are managed in a manner which does not cause the discharge or imminent threat of discharge of waste into or adjacent to waters in the state, a nuisance, or the endangerment of the public health and welfare as required by 30 TAC §335.4. If the response actions described in the report fail to comply with these requirements, please take any necessary and authorized action to correct such conditions. A TCEQ field inspector may conduct an inspection of your site to determine compliance with the report.

Questions concerning this letter should be directed to me at (512) 239-2243. When responding by mail, please submit an original and one copy of all correspondence, etc. to the Corrective Action Section at Mail Code MC-127 with an additional copy submitted to the TCEQ Region 1 Office in Amarillo. A timely response should be submitted to the TCEQ to address these comments. Please be aware that I will be available to discuss these comments at your convenience.

Sincerely,

Robert Musick P.G., Project Manager
Team I, Corrective Action Section
Remediation Division
Texas Commission on Environmental Quality

REM/rm

cc: Mr. Jim McWilliams, Region Project Manager, TCEQ Region 01 Office - Amarillo
Ms. Camille Hueni, Superfund Division, Texas Section (6SF-AP), USEPA Region VI

Enclosure 1: Technical Comments and Resolution
Tier 1 Notes for June 13th and 14, 2005 Meeting
Table 1 - Action Items
Table 2 - Agreements
Attachment A - Tier 1 Resolution Table
Attachment B - TCEQ Technical Comments dated March 2, 2005
Attachment C - EPA Technical Comments dated March 14, 2005
Attachment D - DOE's Response to TCEQ Comments
Attachment E - DOE's Response to EPA Comments

Pantex Tier 1 Team Meeting Notes

Pantex Tier 1 Team
Meeting Notes

TCEQ Building
Austin, Texas
June 13 & 14, 2005

Contents

Final Tier 1 Team Meeting Notes – June 13-14, 2005

Meeting Summary

This meeting focused on resolving outstanding regulatory comments and issues to gain TCEQ approval with EPA concurrence of the Pantex groundwater RFIR and to close the investigation phase for chemical constituents. By end of day, June 14, 2005, it was determined this goal had been achieved and the meeting was adjourned with a number of agreements and action items resulting from the two-day meeting.

The Tier 1 Team consensus to move the project forward was based on agreements summarized in the Agreements in Table 2, the Tier 1 Comment Resolution column in Attachment A, and in the Action Items in Table 1. The details of those agreements will be considered the conditions for approval of the RFIR documents, and were based on discussion of those remaining issues from the formal comments and responses included in Attachments B, C, D and E.

Note that the review and approval of the Radionuclide Remedial Investigation is proceeding on a separate, parallel track. The agreements from the June 13-14, 2005, meeting do not include decisions for radionuclide constituents, which will be included in a separate document.

Future meetings will be held to implement the resolutions and agreements of these meeting notes.

.

Participants

Tier 1 Team:
Johnnie Guelker-NNSA
Dennis Huddleston-BWXT
Camille Hueni-EPA
Robert Musick-TCEQ

Attendees:
Martin Amos-BWXT
Don Boothby-TCEQ

Facilitation Team:
Jay Babbitt-Sapere Consulting
Jeff Smyth-Sapere Consulting

Table 1. Action Items

Action	Responsible Party/Due Date
From April 21 Meeting:	
1. Modify the groundwater RFIR Executive Summary to explain the decision to complete only a limited number of wells in the Ogallala below the portion of the Perched aquifer that has been impacted. This decision was made explicitly to minimize the potential for introducing preferential pathways from the Perched aquifer to the Ogallala.	DOE Due Date: August 1, 2005
1a. Modify the groundwater RFIR to reflect the agreements represented in these notes: • Revise the Executive the Summary to be consistent with the agreements in Table 2. • Append the Resolution Matrix • An inserted page is included in the Ogalla conclusion section to refer to the agreements in Table 2.	DOE Due Date: August 15, 2005
2. Clarify in a letter to DOE that the ROD is the trigger date to establish the FFA (180 days).	EPA Due Date: August 1, 2005
From June 13-14 Meeting:	
3. Plan a public announcement/meeting for the regulatory closeout per RCRA. • RCRA closure letter (2nd letter) • Similar announcement, regarding radionuclides • DOE will attend	TCEQ and EPA Due Date: One meeting to be scheduled for August/September timeframe.
4. Provide an additional overlay that shows the interim actions that have been conducted since remediation began.	DOE Due Date: July 15, 2005
5. Send a response letter to EPA Letter dated March 14, 2005, with the answers based on core team discussion from June 14, 2005, meeting.	DOE Due Date: June 24, 2005
6. Final approval letter for GW RFIR.	TCEQ (and EPA concurrence) Due Date: July 15, 2005
7. Final approval letter for the 252-site closure.	TCEQ (and EPA concurrence) Due Date: August 15, 2005
8. Submit a closure map and the SWMU table for the 252 sites (Admin, RRS 1, 2 & 3 closures) to TCEQ and EPA.	DOE Due Date: July 22, 2005

9. Provide a schedule for Playa 3 sub-basin, Pratt Playa, and well-drilling completion for SVS 7a and 7b.	DOE Due Date: June 17th, 2005 (via email)
10. Provide a compact disc on the Ogallala and the Perched aquifers to EPA and TCEQ. The disc should include: • protocol for the low-flow sampling in specific detail • Identify the wells with corrosion (e.g., where well-replacements will occur) • list of where the wells are screened • core descriptions	DOE Due Date: July 22, 2005

Table 2. Agreements

Issue	Agreement
Nature and Extent	Nature and Extent has been established for all known sources of releases associated with the 13 waste management groupings (WMGs) to the Perched and Ogallala aquifers.
Contaminant sources to the Ogallala aquifer	Perched aquifer is a potential source to the Ogallala that must be mitigated to prevent potential impact to the Ogallala aquifer.
Completed pathways to the Ogallala aquifer	A completed pathway to the Ogallala aquifer did historically exist (i.e., Well PTX01-1003).
	It is uncertain if more completed pathways to the Ogallala aquifer existed historically, or exist currently. Data indicate there are non-trending sporadic hits of constituents at low, non-actionable concentrations below regulatory screening levels. However, all RRS1 exceedances will be carried forward to the Baseline Risk Assessment for further evaluation. Source abatement and mitigating actions have also been taken that have reduced potential for completing pathways to the Ogallala aquifer. Any remaining uncertainties can be better understood by proceeding to the fate and transport (F&T) modeling and the baseline risk assessment (BLRA), and managed through long-term monitoring (LTM).

Attachment A. Tier 1 Team Resolution Table

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
A. Groundwater General Comment	TCEQ Comments: TCEQ and E-Mail dated Feb 2, 2005	Not addressed	N/A	N/A
Groundwater General Comment No. 1	15 Percent of Solid Waste Management Units (SWMUs) are located outside of Industrial areas and will be addressed on Site basis	Investigation in Zones 4, 5, 7, 8, and 10 demonstrate vertical extent in soils. Therefore, GW investigation was not pursued.	Discrete source areas (soils and soil gas) with the most potential to impact ground water should clearly be identified in the text and graphics. Cleanup decisions will most likely target sources from those areas;	Zones 4, 5, 7 and 8 will be closed to RRS No. 3, and have uncertainty management through Long-Term Monitoring (LTM). To complete the investigation in Zones 4 and 5 (i.e., SVS 7a and 7b) DOE will install two new investigation wells. In Zone 10, it is agreed that SWMUs 144, 145, 146, 68d, and SVS 8 will be closed to a RRS No. 3. All other Zone 10 SWMUs that are identified as a RRS No. 2 closure in the RFI will be closed under RRS No. 3 with provisions for uncertainty management. It was agreed to develop LTM and an early detection program for these zones in conjunction with the CMS to monitor uncertainties in the investigation record.

GROUNDWATER AND INDEPENDENT SOIL RFIR COMMENT RESOLUTION

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Groundwater General Comment No. 2	DOE Groundwater Investigations address approximately 85% of facility beneath Zones 11, 12, Fire Training Area, and Burning Ground WMA	Agrees groundwater investigation occurred primarily in these zones. Historic processes establish this investigation approach. Also, major recharge occurred in these zones (Playas 1, 3). Beyond looking at clusters of SWMUs; DOE looked at areas with the potential for infiltration from surface water (Playas and Ditches) and the other is Soil Gas in the unsaturated zone. Texas Bureau of Economic Geology (TBEG) studies indicate that SWMUs without standing water have minimal potential for vertical transport to Perched. Conclusion is Soil Gas resulting in groundwater contamination from these areas	N/A	A site wide assessment was conducted to determine where to focus the investigation. As a result, 85% of SWMUs are located in the industrial zones. These areas are the focus of the closure. The remaining units are not in the primary industrial zones, but instead are discrete and isolated. They are investigated individually and closed. These independent units represent about 15% of the SWMUs at Pantex. To manage investigations throughout the DOE-Pantex facility, Pantex identified 13 waste management groupings (WMGs) that combined SWMUs for the purpose of conducting an environmental investigation. As a result of investigations, Tier 1 team agrees that: • Major groundwater influence is from Playas (i.e., Playas 1 and 3) and some ditches (i.e., Zones 11 and 12), which will be further assessed in the fate and transport modeling. • It appears that contamination is often found within approx -imately 20 feet of surface and decreases significantly downward in areas of minimal recharge. • Pantex performed numerous interim corrective measures (ICMs) to remove/reduce potential for contaminant migration to groundwater. • Vapor phase studies indicated soil gas is concentrated in Zone 11, Burning Ground WMA, and Zone 12. Cross-media contamination from soil to groundwater is insignificant outside of the Playa 1 area.

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Groundwater General Comment No. 3	The Ogallala Aquifer Groundwater data does not support DOE's position that no contamination is in Ogallala. The Burning Ground WMA well PTX01-1003 resulted in Ogallala contamination. Groundwater data suggest multiple sources of contamination at Pantex, but none that can be linked to a SWMU. The Fine Grained Zone (FGZ) may be acting as a leaking aquitard.	The Ogallala groundwater data show metals, not organics, as the primary detections and Risk Reduction Standard (RRS) No. 1 exceedances Soluble constituents of potential concern (COPCs) such as RDX, TNT, HMX, Hexavalent Chrome, TCE have been detected in the Perched Aquifer. Fate and Transport show these as target COPCs to reach Ogallala Aquifer earliest.	N/A	The groundwater RFI recognizes that groundwater monitoring Well –PTX01-1003 near the Burning Ground WMA is a historic preferential pathway to the Ogallala Aquifer. It is uncertain if more completed pathways to the Ogallala aquifer existed historically or currently. However, data indicates there are non-trending sporadic hits in low, non-actionable concentrations below human health screening levels. Therefore, levels are not actionable. Source abatement and mitigating actions have also been taken that have reduced potential for completing pathways to the Ogallala aquifer. This uncertainty can be managed through LTM and better understood by proceeding to risk assessment and F&T modeling. The Tier 1 Team recognizes and agrees with the decision to complete only a limited number of wells in the Ogallala below the portion of the perched aquifer that has been impacted. This decision was made explicitly to minimize the potential for introducing preferential pathways from the perched aquifer to the Ogallala. Detections of organic constituents such as: NT2, DEPH, TCE, BZME, ACE have occurred, but are typically: • Below Practical Quantitation Limits (PQLs); • Non-trending; • Not reproducible; and • Not associated with metal exceedances. Proposed Tier 1 meeting July 18/19 (or an alternate date) will review DOE's F&T approach. The F&T model will be further discussed as part of the next Corrective Measures Phase

GROUNDWATER AND INDEPENDENT SOIL RFIR COMMENT RESOLUTION

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Groundwater General Comment No. 4	Monitoring and Corrective Action will be designed to address uncertainties at Pantex. Uncertainties are part of the assessment phase. TCEQ will work with DOE to identify well locations. Uncertainty Management will be part of the Corrective Action Program of the Compliance Plan Once the investigation is completed by identifying uncertainties and extent of contamination, the project can proceed to risk assessment phase	No response No response No response Base map and overlays will define the uncertainties associated with groundwater.	The ground water data set must be further evaluated to reconcile sample analyses from different well types and sampling protocols for the Perched and Ogallala aquifers. An investigation data set, or Tier 1, should be comparable data, which will be used as decision-level data; data that is not comparable should be considered as Tier 2 data to "flag" areas for further evaluation or trends. Extent determinations for both aquifers will be based on Tier 1 data;	Tier 1 meeting has been established in Austin, July 18/ 19 (or an alternate date) to begin work on long term monitoring approach and review Fate and Transport approach. TCEQ approvals/EPA concurrence are twofold: • Groundwater RFI (by July 15, 2005), • Closure of all the zones (August 15th). The Pantex closure letter will also: • Identify uncertainties to be carried forward (e.g., reduced or managed through long term monitoring) (for soil) by referencing the soil closure letters, and (for groundwater) in the Groundwater RFI closure letter which will further define 1) the integrity of the fine grain zone, and 2) the potential for the perched zone contamination to impact the Ogallala; • Include a table that provides status for all 252 units; and, • Include a map providing status for all 252 units.

GROUNDWATER AND INDEPENDENT SOIL RFIR COMMENT RESOLUTION

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Groundwater General Comment No. 5		Noted Statement	N/A	N/A
Groundwater Specific Comment	Specific comments address Zones 11, 12, FTA, BG WMA and not other portions of the property. Twelve topics in previous GW correspondence have been categorized into four major topics. Complete response includes letter and TCEQ comment resolution.	No comment	N/A	DOE provided responses on June 6, 2005 to TCEQ comments. TCEQ will email acknowledgement of receipt. This will close the record on these comments. The TCEQ will evaluate and determine any uncertainties that must be managed as a result of these comments.

GROUNDWATER AND INDEPENDENT SOIL RFIR COMMENT RESOLUTION

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Groundwater Specific Comment No. 1.a	Demonstration of attainment of closure of a SWMU required, and understanding of cross-media migration. Full closure approval is contingent upon completion of GW. The table in DOE response links the soils with GW to establish the primary sources of contamination	No response necessary	N/A	Agreement on GW RFI Closure statement.

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Groundwater Specific Comment No. 1.b	Table links the SWMUs/Waste Management Groupings for a closure determination, contaminant maps showing the extent of releases from discrete units	DOE provided transparent overlay maps. The base maps and overlays provided the basis of understanding that TCEQ and EPA were seeking for source extent. Majority of soil RFIs are closing/remediating to RRS No. 3 that will be further assessed during risk assessment phase. Releases for soils identified Releases from soils to Perched Aquifer have been identified	Discrete source areas (soils and soil gas) with the most potential to impact ground water should clearly be identified in the text and graphics. Cleanup decisions will most likely target sources from those areas;	The Tier 1 team agrees that the perched aquifer is a potential source to the Ogallala that must be mitigated to prevent potential impact to the Ogallala aquifer. DOE provided transparent overlay maps as part of the DOE response that illustrate the relationships between the SWMUs, completed pathways from surface to the Perched Aquifer, and contaminant plumes in the Perched Aquifer. These transparent overlay maps address several of the concerns identified by the TCEQ in correspondence on the Groundwater RFI. Also, when the transparent overlay maps are combined with the cross-walk table from DOE's response dated November 1, 2004, it appears the major sources of contamination and the extent of releases to environmental media (soils and groundwater) have been defined that were released from the WMGs. These overlays provide the basis of understanding that TCEQ and EPA are seeking for source extent. The majority of SWMU investigations will be closed/remediated using RRS 3 criteria. Therefore releases to environmental media will be assessed during the risk assessment phase in accordance with the approved Baseline Risk Assessment Work Plan dated February 2003 (human exposure receptors approved August 8, 2003). As discussed with DOE in a Tier 1 meeting on June 13, 2005, all environmental data associated with the SWMUs closing under RRS 2 and 3 will be directly compared to health-based action levels to establish risk. Pantex will provide an additional overlay that illustrates areas that have had interim actions (e.g., soil removals, SVE implementation, soil covers).

GROUNDWATER AND INDEPENDENT SOIL RFIR COMMENT RESOLUTION

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Groundwater Specific Comment No. 1.c	Concerns about the following: 1. Variable screen lengths 2. Screen placement 3. Deteriorating well casing (Condition of Well)	1. Screen lengths vary because of variations in the thickness of the aquifer. Screen lengths are long to acknowledge the declining water table (sample in top 30 feet of aquifer). Low flow sampling allows groundwater to flow continuously through the well therefore should represent groundwater conditions. 2. Screen placement was determined by geophysical logs for the location of the zones of highest hydraulic conductivity. In Ogallala, screens were set in zone of highest hydraulic conductivity.3. Pantex has well maintenance program that routinely evaluates the integrity of the monitor well system. Wells with severe corrosion have been abandoned or replaced. Pantex will evaluate variations in well construction, conditions, sampling methods and effects on data quality. Downhole videos will be reviewed to assist in determining if a well should be abandoned. Pantex removed FLUTe and Solonist when the well was releasing organic compounds from the materials of construction.	Discrete source areas (soils and soil gas) with the most potential to impact ground water should clearly be identified in the text and graphics. Cleanup decisions will most likely target sources from those areas;	It is recognized that the investigation phase resulted in investigation and monitor wells that may have different well placement, screen length, screen placement, well construction, etc. that may not be optimum for LTM of uncertainties associated with the investigations at DOE-Pantex. As part of defining the long term monitoring approach Tier 1 team will determine: • preferred sampling approach (e.g., low flow); • well requirements(e.g., type of well, screening, etc) for monitoring; • well rehab/abandonment and maintenance program/approach; and, • requirements for data comparability. The meeting scheduled for the week of July 18/19 (or an alternate date) will be the initial discussion of these topics.

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Groundwater Specific Comment No. 1.c *Continued from previous page*	4. Non-used data (not within historical trends) 5. Comparability of unlike data between different wells with different well screens, etc. 6. Like data should be compared to determine extent and closure decision	No comment 5. Filtered samples had minimal effect on interpretation of nature and extent Out of 56,000 records only 10 filtered sample results (9 P and 1 O) were used to replace unfiltered sample results. 6. How do we know the Ogallala well sampling data comprise one data population, as the data is not from the same stratigraphic horizon or same depth?		The resolution can be found under comment No. 1.a and b.

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Groundwater Specific Comment No. 1.c *Continued from previous page*		7. Other limitations are the use of background data to establish RRS closures/remediation is discussed later. Pantex believes the Risk Reduction Rule Guidance Document, 2004 version (RRRGD) is based on an appropriate background data set for the Ogallala Aquifer beneath and adjacent to the site. The RRS 1 exceedances are heavily influenced by production wells used to develop background. Background may be set too low because of the minimum turbidity of the production wells; therefore the investigation data are compared to extremely low action levels. These comparisons result in exceedances of RRS 1 action levels when in reality the exceedances are minimal. Exceedances were identified for further evaluation. Pantex will retain any RRS 1 exceedances in the Ogallala for evaluation of uncertainties through the BLRA.	Section 1.0 summarizes that COPC's for the Perched aquifer are those constituents that are detected in ground water above the RRS1 Action Level or are COPC's in overlying soils. Extent of contamination is evaluated for those constituents where there are enough detections to define a plume. DOE selects COPC's for the Ogallala by further screening constituents against site history, presence as a COPC in the overlying Perched aquifer, comparison to regional background, and trend analysis. This concept is carried throughout the report, and includes additional screening of metals due to turbid samples and deteriorating well casings.	The RRRGD action levels were used to determine exceedances. The Schriver & Hopkins report and neighbor wells were not used to establish exceedances. All RRS 1 exceedances are being carried forward to the baseline risk assessment (BLRA) for evaluation as part of the uncertainty analysis.

GROUNDWATER AND INDEPENDENT SOIL RFIR COMMENT RESOLUTION

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Groundwater Specific Comment No. 1.d	Stated it has conducted numerous studies of lineaments, paleochannels, playa lakes, ditches, etc. Pantex should summarize the studies as part of the RFI so conclusions can be documented and verified.	Information is available from a variety of sources. Older studies are provided in RFI reports and new studies are submitted as independent reports. Modeling is being prepared for submittal which is a comprehensive report for the requested information. Modeling provides detailed information of all site conditions based on geostatistical interpretation of site data. The Groundwater Modeling will provide the capability of understanding site characteristics.	Soil removals have been summarized in the RFIR; however, contaminants from those soils had potential to migrate through the vadose to ground water prior to removal. Although it is assumed that the higher contaminant concentrations were reduced through these removals, a mobilized component of the source in the vadose would still have potential to impact ground water. How was that potential evaluated? How will these removal areas be considered in the fate and transport model? If we had more information on these "source areas", then we could approach the infiltration/ground water modeling with more realistic assumptions. The Ground Water RFIR will also serve as a geohydrologic template for a fate and transport model to predict migration of contaminants (chemical and radionuclide) from source areas to groundwater. Modeling results will support the human health risk assessment, selection of long term monitoring locations and final remedies. As such, we are looking to this document to provide adequate detail linking discrete source areas (and contaminants) to probable migration pathways to current or potential ground water impacts. The mechanisms (hydraulic conductivity, site stratigraphy, geologic features) that affect migration through the vadose zone to ground water must also be defined in the Ground Water RFIR, as well as site-specific input parameters which will be used for the model. Again, it is our understanding that fate and transport modeling will address both chemical and radionuclide constituents.	Modeling is not scheduled until later this year. The July 18/19 meeting (or an alternate date) will be the initial discussion of the Fate and Transport Modeling.

GROUNDWATER AND INDEPENDENT SOIL RFIR COMMENT RESOLUTION

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Groundwater Specific Comment No. 2.a	Because of limited control wells associated with defining the limits of the Perched Aquifer, the impacts are not definitively established. The saturated thickness and potentiometric maps are inconsistent with those shown in the Soil RFIs.	Sections 3.3.2.1 and 3.3.2.2 in the Groundwater RFI discuss map revisions. The Perched groundwater downgradient of the Southeast Area were defined from borings in 1999 and additional wells in 2003 that were dry (extent of aquifer). These wells define the extent of the Perched Zone. The Time Domain Electromagnetic Survey (TDEM) defines the qualitative confirmation of this interpretation. Texas Tech University (TTU) and the Corps of Engineers (Corps) data will be evaluated to address uncertainties regarding Perched Aquifer to the southwest (near Zone 10 and Zone 8 area). Through the Groundwater RFI effort, Pantex refined the interpretation of the Perched Groundwater extent and FGZ based on data that had been collected since the 2000 Groundwater Summary and Progress Report. TDEM used to interpret around Playas 3 and 4. The industrial operations occurred in central and Southwest portions of plant where borings, wells, etc. were focused. Areas north and west of the plant did not have discharges and contamination. In addition, interplaya areas have minimal recharge and do not represent a significant source of contamination to the Perched Groundwater.	The Perched aquifer should be further evaluated for its potential to source releases to the Ogallala. The Fine-Grained Zone has been defined as an impermeable barrier which prevents vertical migration from the Perched Aquifer. However, it is not clear if this is supported throughout the site; well borings and hydraulic conductivity values seem to also indicate a variable transmissivity, which may promote vertical migration from the Perched to depth. This may be most evident in those "boundary areas" where the absence of Perched ground water is related to increased permeability in the FGZ. Please provide more discussion on the relationship between the Perched aquifer, the FGZ, and the Ogallala	Resolved by monitoring investigation uncertainties through LTM established by the Compliance Plan. As discussed in meetings between DOE, EPA and TCEQ on June 13th and 14th, 2005, the uncertainties associated with the fine-grained zone's (FGZ's) ability to retard the migration of contamination from the Perched Aquifer to the Ogallala Aquifer will be carried forward and managed as part of LTM. The presence of most soil gas plumes at DOE-Pantex is correlated with the uplands areas, therefore releases caused by soil gas have minimal recharge compared to the ditches and playas. Resolution is same as Groundwater general comment 2. No additional Corps or TTU data exists to evaluate. Presence of soil gas is not correlated to areas of recharge.

GROUNDWATER AND INDEPENDENT SOIL RFIR COMMENT RESOLUTION

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Groundwater Specific Comment No. 2.b	Groundwater RFI includes COPC maps using data from various types of Groundwater wells completed in multiple zones. Different well completions (screens), extent, etc. may not be represented. COPC distribution pattern is critical for designing an effective monitor/CA system	Refer to General A.3. The Perched Aquifer is not sufficiently thick to warrant further investigation and concentration distribution as a function of depth. Plans to decrease the volume of recharge and water in the Perched, therefore concentration distribution as a function of depth will become more irrelevant. Since Ogallala has only sporadic hits, no concentrations were in the RFI for COPCs > RRS 1. For detection in the Ogallala, please see Appendix A of the Groundwater RFIR.	N/A	Resolution is Tier 1 Team agreement on Groundwater RFI Closure statement.
Groundwater Specific Comment No. 2.c	TDEM is useful in verifying conclusions of RFI. TCEQ expected an interpretation of TDEM data.	In Executive Summary and Page 50 of the TDEM, the data was evaluated in the context of physical data collected during investigations and with the recognition of interferences (power lines). An interpretive map was provided as Figure 32, Page 51. The TDEM was qualitative in nature and no further action is warranted with regard to the information provided in this report	The Perched aquifer should be further evaluated for its potential to source releases to the Ogallala. The Fine-Grained Zone has been defined as an impermeable barrier which prevents vertical migration from the Perched Aquifer. However, it is not clear if this is supported throughout the site; well borings and hydraulic conductivity values seem to also indicate a variable transmissivity, which may promote vertical migration from the Perched to depth. This may be most evident in those "boundary areas" where the absence of Perched ground water is related to increased permeability in the FGZ. Please provide more discussion on the relationship between the Perched aquifer, the FGZ, and the Ogallala	All information has been provided by DOE.

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Groundwater Specific Comment No. 3.a	The TCEQ approved the RRRGD action levels in letter dated June 24, 2003. Pantex made changes based on letter and resubmitted RRRGD dated March 2004. DOE response dated November 1, 2004 indicates that groundwater data were evaluated against action levels in the March 2004 RRRGD. A review of the March 2004 update to the TCEQ indicates that a demonstration has not been presented to the RRRGD dated March 2004, therefore the action levels used in the Groundwater RFI may be inappropriate.	Per a June 24, 2003 letter, TCEQ identified only 3 metals having outliers in the groundwater data set. Pantex provided a table in Appendix C (C3-1) detailing TCEQ's identification of outliers and action taken. The table notes that 2 of the 3 outliers were removed from the data set, (lithium and magnesium), and chromium values were justified. RE: Chromium – Pantex provided justification to retain outliers in the data set. Based on a review of data from surrounding neighbor wells, located Southwest, West and Northeast of Pantex property, the high-end value is indicative of naturally occurring background of chromium. See electronic file attached to the DOE response for data that was not available for use in the RRRGD. Data shows detections for wells on the western side of the Pantex Plant with concentrations ranging from 0.52 ug/L to 40.5 ug/L. Neighbor well data from the Northwest, West, Southwest and Texas Tech University (TTU) indicate a range of 0.563 to 19 ug/L. Higher values are found in neighbor wells, but maintenance may be the reason. No problems found with analytical data and turbidity of 4 NTU, therefore the highest value of 32 ug/L in well-PTX08-1011a is similar to data collected at other locations.	N/A	In the TCEQ letter dated June 24, 2003, a demonstration was required to remove data set outliers (high-end values) from the groundwater data set population for three metals (i.e., lithium, magnesium and chromium) or justify why these outliers should be retained in the population when establishing background values. DOE submitted its justification in Appendix C (Table C3-1) of the Risk Reduction Rule Guidance Document dated March 2004. DOE removed high-end values for lithium (410 ug/l and 430 ug/L) and magnesium (34300 ug/l) and recalculated the background values without the outliers. In the RRRGD, DOE explained its reasons to retain high-end values for chromium (7.1 ug/L and 31.8 ug/L), therefore the groundwater value for chromium remained unchanged at 32 ug/L. Although the justification in Appendix C is limited, it is noted that the chromium background value 32 ug/L is one order of magnitude lower than the drinking water standard (100 ug/L) established by the Maximum Concentration Limit (MCL) under Section 141 of the Federal Safe Drinking Water Act. Also, the background of 32 ug/L is lower than the regulatory action level identified in RRS 2 (i.e., Media Specific Concentration).

GROUNDWATER AND INDEPENDENT SOIL RFIR COMMENT RESOLUTION

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Groundwater Specific Comment No. 3.b	The Groundwater RFI indicates regional groundwater data used for comparison and to screen data. Regional groundwater data was compared with groundwater beneath Pantex to determine if this is within a regional trend. The RRRGD, 2004 should be used to evaluate compliance with regulatory decisions.	The RRRGD was used for point-to-point comparisons with Ogallala data. As discussed in specific comments B.1.c, the background in the RRRGD was artificially low for metals. For an additional check to determine if the exceedances were due to industrial activities Pantex utilized groundwater data presented by TCEQ and Schriver and Hopkins in the report entitled, "Updated Water Quality Evaluation of the Ogallala Aquifer including Selected Metallic and non-metallic inorganic constituents". Other criteria were also used: potential source area; Perched contamination above known area; distributions in Perched and Ogallala; comparison of filtered vs. nonfiltered, trends in analytical data. The Groundwater RFI suggests that elevated metals in the Ogallala are not related to site activities. The RFI also indicates the nine COPCs that exceed RRS 1 Media Specific Concentrations (MSCs) in the Ogallala are caused by the artificially low action levels approved in the RRRGD. Pantex excluded several metals as COPC because they were not associated with that industrial area. All RRS 1 exceedances determined to be COPCs (B.CN, Cr, Cr-6, Ni, Sr) are mapped and represented in Chapter 10.	Section 1.0 summarizes that COPC's for the Perched aquifer are those constituents that are detected in ground water above the RRS1 Action Level or are COPC's in overlying soils. Extent of contamination is evaluated for those constituents where there are enough detections to define a plume. DOE selects COPC's for the Ogallala by further screening constituents against site history, presence as a COPC in the overlying Perched aquifer, comparison to regional background, and trend analysis. This concept is carried throughout the report, and includes additional screening of metals due to turbid samples and deteriorating well casings.	The Schriver & Hopkins report and neighbor wells were not used to establish exceedances. All RRS 1 exceedances are being carried forward to the baseline risk assessment for evaluation as part of the uncertainty analysis. The RFI data indicate that DOE utilized the RRRGD dated March 2004 to determine the extent of contamination in groundwater as required in the TCEQ letter dated June 24, 2003. In the RFI, DOE compared its groundwater quality to a regional water quality study titled, "Updated Water-Quality Evaluation of the Ogallala Aquifer Including Selected Metallic and Non-Metallic Inorganic Constituents, dated November 1998 authored by Schriver and Hopkins". Although this study has value for qualitative comparison, the groundwater regulatory decisions at DOE-Pantex are established through the facility-wide background identified in the RRRGD dated March 2004.

GROUNDWATER AND INDEPENDENT SOIL RFIR COMMENT RESOLUTION

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Groundwater Specific Comment No. 3.c	To meet rule, Pantex must characterize to nature and extent by establishing the concentration of COPCs. Each COPC must be investigated to background as determined by RRRGD. Marginally exceeded COPCs above RRS 1 values that showed no pattern or release signature, therefore was not considered a release and screened out for further investigations and plume characterization.	Even if Ogallala sample data were not compared to regional background values (not RRRGD values), exceedances of RRS 1 values would not lead to the conclusion that a plume exists. Presentation of the Perched data without considering the regional water quality data would lead to some changes in the extent of the defined plumes.	Section 1.0 summarizes that COPC's for the Perched aquifer are those constituents that are detected in ground water above the RRS1 Action Level or are COPC's in overlying soils. Extent of contamination is evaluated for those constituents where there are enough detections to define a plume. DOE selects COPC's for the Ogallala by further screening constituents against site history, presence as a COPC in the overlying Perched aquifer, comparison to regional background, and trend analysis. This concept is carried throughout the report, and includes additional screening of metals due to turbid samples and deteriorating well casings.	Pantex used RRS 1 values to screen against in the RFI, not regional background. All RRS 1 exceedances in groundwater will be carried forward to the risk assessment for evaluation as part of the uncertainty analysis. Each measured value is directly compared to the RRS 1 action level. DOE established the extent of releases based on the RRS 1 action level. All exceedances of the RRS 1 will be carried forward to the risk assessment for evaluation as part of the uncertainty analysis.

GROUNDWATER AND INDEPENDENT SOIL RFIR COMMENT RESOLUTION

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Groundwater Specific Comment No. 4.a	The FGZ exhibits low permeability, therefore Perched is a source of future contamination to the Ogallala. Detections /historic contamination of Ogallala not expressed in RFI. Pantex identifies fate and transport modeling in the southern portion of the property where the FGZ thins and increases in permeability.	See General Comment A.3. If contamination enters the Ogallala beneath Pantex, the completed pathway would be in the SE area. The first indication of this would be detections of the soluble Perched zone contaminants in groundwater samples collected from downgradient Ogallala monitoring wells. The Corrective Measures Study will evaluate potential remedies or pathways from the Perched Aquifer to the receptors, or from the Perched to the Ogallala. Any proposed remedy will address any completed pathway.	The Perched aquifer should be further evaluated for its potential to source releases to the Ogallala. The Fine-Grained Zone has been defined as an impermeable barrier which prevents vertical migration from the Perched Aquifer. However, it is not clear if this is supported throughout the site; well borings and hydraulic conductivity values seem to also indicate a variable transmissivity, which may promote vertical migration from the Perched to depth. This may be most evident in those "boundary areas" where the absence of Perched ground water is related to increased permeability in the FGZ. Please provide more discussion on the relationship between the Perched aquifer, the FGZ, and the Ogallala.	Agree that the SE area and facility playas are primary areas that may affect the Ogallala Aquifer. Agree that monitoring is needed to evaluate the Perched Aquifer (source of contamination) and determine pathways to Ogallala. Agree that the Corrective Measure Study (CMS) will include LTM and final remedies to mitigate the Perched Aquifer as a source of current and future threats.

GROUNDWATER AND INDEPENDENT SOIL RFIR COMMENT RESOLUTION

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Groundwater Specific Comment No. 4.b	The Soil RFIs were conditionally approved with the data gaps below 70 feet being addressed via groundwater monitoring. In Pantex response dated November 1, 2004, it was indicated what historical sources was the potential to impact lower soils (Ogallala Fm) and GW will be evaluated through fate and transport modeling. Fate and transport modeling without field confirmation is not acceptable.	DOE Response (No EPA Comment): Transport through the unsaturated to the Perched Zone will continue for some time, even after source areas have been removed and surface water sources diverted from contamination area. The vertical flux will approach the long-term infiltration rate of interplaya areas of approx. 0.1 inches/year. The low hydraulic conductivity of FGZ provides a limit to the vertical migration of contaminants through the unsaturated zone. As infiltration continued, saturation increased at the FGZ interface, resulting in a "mounding" of ground water to create the Perched zone Mounding will dissipate as sources of high infiltration have been removed from the site and pumping lowers the levels of saturation. Pantex intends to implement remedies to reduce the volume of water and concentration of COPCs, therefore mitigating future risk to offsite receptors. Evaluation of effectiveness of these remedies will be accomplished through LTM. LTM will consist of water level monitoring in the Perched Zone to verify reduction of the saturated zone and to document reduction in COPC levels. Pantex will continue to monitor soil gas from SVE systems to document reduction in COPC concentrations with time to document that secondary source areas in the Perched zone are mitigated. Pantex will map the extent of Perched zone over time to document the expected reduction in the Perched water table and saturated thicknesses. Pantex will continue to sample onsite production wells and monitor the quality of water from City of Amarillo production wells Pantex will propose sentinel and early detection monitor wells in addition to existing monitoring wells to protect theses production wells and to monitor for possible future transport to the east of Pantex site in the Ogallala Aquifer.		Concur with DOE Response

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Soil Comment Playa and Ditches Pratt Lake	Requested sampling of surface area in the April 25, 2005 letter to DOE. Conducted site visit to evaluate the issue.	DOE's response to sampling Pratt Lake identified concern with other activities not associated with Pantex showing up in the sampling. E-mail submittal to TCEQ and EPA from DOE dated 5/31/2005 identified a sampling proposal. As per agreement identified in meeting on April 21 and 22, 2005, Pantex will sample the ditches in the northeast corner of Pantex located South of FM 293. Parameters to be sampled from five locations are RDX, HMX, TNT, Mercury, silver.	N/A	The selected ditches identified in the DOE proposal should verify if any COCs from Pantex were released to Pratt Lake. If COPCs above RRS 1 values are detected at the sampling locations, then additional sampling will be warranted.
Soil Comment Playa and Ditches OSTP Supplemental Information	TCEQ requested information for the Tailwater Pit and Old Sewage Treatment Pond (OSTP) Demolition Area.	Based on DOE's response dated March 10, 2005, samples collected in this OSTP demolition area meet RRS 2. In a April 6, 2005 teleconference, the TCEQ and EPA agreed to evaluate the supplemental data	N/A	OSTP received RRS 2 closure.

GROUNDWATER AND INDEPENDENT SOIL RFIR COMMENT RESOLUTION

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Playa 4 (SWMU 9)	The Soil RFIR addresses environmental impacts associated with Pantex and other potential responsible parties, PRPs (e.g., TTU and Corps). A review of all investigation data will be evaluated at the same time.	DOE's Playa 4 investigation has been conducted and submitted to the TCEQ and EPA. Pantex believes sufficient information is presented to determine impacts from Pantex operations.	N/A	DOE has completed the site characterization for Playa 4. DOE has submitted the RFI for Playa 4 and the data suggest that releases from Playa 4 are limited to soils/sediments and have not migrated to groundwater The TCEQ will approve, and EPA will concur with, the site characterization for Playa 4, but if additional information establishes that the releases from Playa 4 have impacted groundwater, then the TCEQ will request additional information to be submitted by DOE to support the Groundwater RFIs conclusions.
Soil Comment Independent Site SVS 7a and 7b	In the April 25, 2005, TCEQ letter, the TCEQ requested additional sampling to complete investigation and better understand the waste managed in demolition landfills.	In an e-mail dated May 3, 2005, DOE submitted a response that was based on teleconferences between TCEQ, EPA and DOE on March 11, 2005. The email included sampling locations, SVS Work Plan excerpts, historical information, proposed Perched groundwater well locations.	N/A	Concur with DOE response. DOE to submit schedule for well installation and sampling. This investigation is not material to GW RFI closure.

GROUNDWATER AND INDEPENDENT SOIL RFIR COMMENT RESOLUTION

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Soil Comment Independent Site SVS 7a and 7b *Continued from previous page*	In the April 25, 2005 TCEQ letter, the TCEQ requested additional sampling to complete investigation and better understand the waste managed in demolition landfills.	In an e-mail dated May 3, 2005, DOE submitted a response that was based on teleconferences between TCEQ, EPA and DOE on March 11, 2005. The email included sampling locations, SVS Work Plan excerpts, historical information, proposed Perched groundwater well locations.	N/A	Concurrence with DOE response and proposed approach. DOE will provide schedule for well installation and sampling. This investigation is not material to Groundwater RFI closure.
Soil Comment Independent Site Playa 3 sub-basin	In the April 25, 2005 TCEQ letter, the TCEQ requested sampling in the top 2 feet to address ecological and human risk.	DOE submitted a sampling plan in March 2005.	N/A	Concurrence with DOE response and proposed approach. DOE will provide schedule for well installation and sampling. This investigation is not material to Groundwater RFI closure.
Soil Comment Zone 10 WMG	RRS 2 closure proposal	DOE requested that SWMU Nos. 144, 145, 68d, SVS 8 will close to RRS 3; Pantex removed the RRS 3 data from the closure data set and requested a RRS 2 closure for AOC 3a, SVS3/SWMU 67, SWMU 143, Unassigned AOCs, SWMU 146	N/A	Agree that units will be closed to RRS 3. DOE will send an email acknowledging this. *Email sent on June 17, 2005.*
Soil Comment Zone 10 WMG	Discovery of new unit	Submitted VSI Report dated November 23, 2004 for Discovery of a New SWMU in Zone 10 Operational Area.	N/A	DOE will modify submittal to include additional evaluation of the other 7 berms that were constructed as blast barriers between the former Zone 10 buildings.

GROUNDWATER AND INDEPENDENT SOIL RFIR COMMENT RESOLUTION

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
Soil Comment RRRGD Borrow Fill Misapplication of 0'-2'	RRRGD - Borrow Fill	DOE responded on June 6th.	N/A	TCEQ will respond to comments.
Soil Comment RRRGD Stand Comments	RRRGD - STAND Comments	DOE responded on June 6th.	N/A	TCEQ will respond to comments
Soil Comment RRRGD Stand Comments	RRRGD - TCEQ Comments		N/A	TCEQ will respond to comments

GROUNDWATER AND INDEPENDENT SOIL RFIR COMMENT RESOLUTION

TCEQ COMMENT NO.	TCEQ POSITION (Attachment B)	DOE RESPONSE (Attachment D and E)	PARALLEL EPA COMMENT (Attachment C)	TIER 1 TEAM RESOLUTION
TCEQ Comments	TCEQ requires that Pantex address the TCEQ comments on groundwater as part of final resolution. In the April 21st and 22nd meeting, it was agreed that these comments would be addressed by DOE in an email. The goal was to resolve these outstanding comments and address investigation data gaps, etc. in the LTM program.	E-Mail submittal dated June 6, 2005 to address TCEQ GW RFIR comments.		Comments closed per Tier 1 agreement based on receipt of email.

Table 2. EPA Comments not correlating to TCEQ Comments (1 page)

EPA COMMENT	EPA POSITION	DOE RESPONSE TO EPA POSITION	EPA RESPONSE TO DOE	TIER 1 TEAM RESOLUTION
Please provide more information on when the wastewater treatment discharge will be diverted from Playa 1 to surface irrigation. Provide a map with the location of the infiltration gallery and SWMUs/source areas. Also, what will be the expected discharge volume to the irrigation system? What will be the residual recharge to Playa 1 from rain events once the flow is diverted? This information will be significant in how we approach the fate and transport modeling, and ultimately, remedy selection.	Please provide more information on when wastewater discharges will be diverted from Playa 1 to surface irrigation	Provided requested information	DOE has provided the requested information.	No additional response required.
RRS2 Residential/Industrial Action Levels are equivalent to the Federal Drinking Water MCL. Modify the table for the following COPC's: AS 10ug/l; HG 2ug/l; SB 6 ug/l; TL 2 ug/l; BIS3EHP 6 ug/l; PCP 10 ug/l. The MCLs are lower than the action levels listed. Please evaluate for any changes in COPC conclusion or isoconcentration maps.	Please evaluate referenced tables for changes when using MCLs for As, Hg, Sb, Tl, BIS3EHP and PCP instead of action levels (since MCLs are lower than action levels).	Provided requested information	DOE has provided the requested analysis.	No additional response required.

Attachment B

TCEQ's Technical Comments on the Groundwater RFI dated March 15, 2004 that was transmitted to DOE in an e-mail on March 2, 2005

A. **General Comment** - Upon review of the Groundwater RFI, the TCEQ had provided two sets of comments. The first set of comments covered 12 major topics and was communicated to the DOE-Pantex in a letter dated August 3, 2004. The second set of comments was detailed technical comments that were communicated to DOE-Pantex through two e-mails dated June 29, 2004 and August 9, 2004. DOE-Pantex responded to the 12 major comments in a November 1, 2004 letter. The detailed technical comments communicated through the e-mail have remained unresolved and must be addressed to complete the administrative record for the groundwater assessment. The "General Comments" below address the Groundwater RFI approach and scope.

1. Approximately 15 percent of the SWMU/Areas of Concern (AOCs) are located in industrial zones 4, 5, 7, 8 and 10 that have minimal or no groundwater sampling data as part of the groundwater investigation. Therefore, groundwater contamination in these industrial areas will be addressed on a case by case basis to determine if additional groundwater assessment is required to attain a regulatory decision.

2. The Groundwater RFI and DOE-Pantex's response establishes that the groundwater assessment targets contamination associated with the heavily industrialized portions of DOE-Pantex where the majority of SWMUs are located. Approximately 85 percent of the SWMU/AOCs investigated in the Soil RFI are located in zones 11, 12, Fire Training Area and the Burning Ground Area resulting in a more comprehensive investigation in these areas compared to other industrialized areas. The "Specific Comments" in Section B of this enclosure and the two e-mails sent to DOE on June 29, 2004 and August 9, 2004 address the groundwater investigation associated with zones 11, 12, Fire Training Area and the Burning Ground Area and do not address releases to groundwater from the SWMUs in zones 4, 5, 7, 8 and 10.

3. The Ogallala Aquifer groundwater data does not support DOE-Pantex's position that releases to the Ogallala Aquifer are solely from one monitor well (i.e., PTX01-1003) near the Burning Ground Waste Management Area. In fact the groundwater data suggests that multiple sources of contamination exist at DOE-Pantex. Although it may not be possible to link contamination in the Ogallala Aquifer with specific solid waste management units (SWMUs) or waste management groupings (WMGs), it is very likely that the fine grain zone (FGZ) is acting as a

leaking aquitard beneath portions of DOE-Pantex resulting in likely migration of contamination from the Perched to the Ogallala Aquifer.

4. Any future monitoring and/or corrective action for the industrialized areas at Pantex will be designed to address uncertainties associated with data gaps in the investigation record. Once uncertainties are identified as part of the assessment phase, the TCEQ will work with DOE-Pantex to establish the location of groundwater monitor wells to address the identified uncertainties. Uncertainty management will be implemented as part of a Corrective Action Program of the Compliance Plan (CP-30459). Once the groundwater investigation is complete by identifying the uncertainties and nature and extent of contaminant plumes, the project can proceed to the risk assessment phase and establish risks in accordance with the approved baseline risk assessment work plan.

5. As established by the DOE-Pantex's response letter, the Texas Water Commission (*predecessor to the TCEQ*) approved a Groundwater RFI Work Plan in 1992 for investigation of groundwater contamination at DOE-Pantex. It should be noted that the Risk Reduction Standard (RRS) rules became effective on June 28, 1993 (*after approval of the work plan*). Utilization of a Pre-RRS work plan to fulfill the closure requirements under the RRS rules is not applicable.

B. **Specific Comments** - The specific comments address the groundwater investigation associated with zones 11, 12, Fire Training Area and the Burning Ground Area and do not address areas which may have released to groundwater from other industrial areas at Pantex. The comments below address the TCEQ's position on the 12 major topics originally communicated in the TCEQ letter dated August 3, 2004. The TCEQ has combined the 12 topics into four (4) major categories that address similar concerns with the Groundwater Assessment. These concerns are identified below. It should be noted that a complete response by DOE must address the comments identified in this letter along with resolution of the technical comments discussed in the June 29 and August 9th, 2004 e-mails.

1. **Closure Determination and Groundwater Data**

a. Linking Soil and Groundwater Assessments for a Closure Decision - The TCEQ agrees that demonstration of attainment of closure of a SWMU requires an understanding of cross-media migration. Therefore the TCEQ letters addressing the Soil RFIs establish that full closure approval is contingent upon completion of all required assessments for groundwater. The table in DOE-Pantex's response identifies SWMUs that have releases to the Perched Aquifer. DOE-Pantex's response links the soil assessments with the groundwater assessments to establish the

primary sources of contamination that have impacted soils and the Perched Aquifer.

b. Source Extent - In DOE-Pantex's response, the table links the SWMUs/WMGs that have released to the Perched Aquifer. For a closure determination, contaminant plume maps showing the extent of releases from discrete units or discrete groupings (if data allows) must be provided. *DOE-Pantex must provide contaminant plume maps linked to discrete SWMUs/WMGs, to identify where potential response actions may be necessary to abate risk.*

c. Monitor Well System and Data Quality - The TCEQ has concerns about the variable screen lengths; screen placement in the aquifer; deteriorated well casings; and the non-used data that do not fit historical trends. Also, the question of comparability of data from different wells and sampling methods, etc. remain. It is appropriate that information should be combined with "like data" to demonstrate the extent of the contaminant plume for a closure decision since a direct comparison of the data may be inconclusive in defining the impacts to the Perched and Ogallala Aquifers. *DOE-Pantex should evaluate well types and data quality and, if necessary, install additional wells to address data needs to support closure for specific SWMUs/WMGs.*

d. RFI Conclusions - DOE-Pantex has stated it has conducted numerous studies of lineaments, paleochannels, playa lakes, ditches, natural occurring constituents, land-uses, evapotranspiration and major migration pathways to groundwater to characterize groundwater contaminant plumes. DOE-Pantex has utilized these studies to make conclusions in the Groundwater RFI. These studies are not well documented in the Groundwater RFI and the TCEQ is unable to verify these conclusions. *DOE-Pantex should summarize the numerous studies that have been performed and identify how these studies influenced the Groundwater RFI's conclusions.*

2. **Geologic and Groundwater Characterization**

a. Hydrogeological Characterization - Because of the minimal number of control wells associated with defining the limits of the Perched Aquifer and associated contamination, the lateral extent of the Perched Aquifer and any impacts are not definitively established. Also, the saturated thickness and potentiometric maps in the Groundwater RFI illustrate a configuration of the Perched Aquifer that is inconsistent with those shown in the major Soil RFIs. *DOE-Pantex should identify the rationale behind the*

preparation and interpretation that resulted in the modified Perched Aquifer maps and extent of contamination.

b. Groundwater Data - The Groundwater RFI included maps that show the extent of COPCs in groundwater using data from various types of groundwater wells that were completed in multiple zones. The TCEQ is concerned that because of the wide variance of different well completions (e.g., screen length, placement and well materials), the configuration of the contaminant plume in the aquifer may be different than the contaminant plume maps provided in the Groundwater RFI. A detailed understanding of COPC distribution pattern is critical for designing an effective monitoring and corrective action system. *Please sort the groundwater data based on screen depths, etc. and provide maps of individual COPCs collected in the same portion of the aquifer; and, Identify the distribution and concentration of COPCs in the Perched and Ogallala Aquifers.*

c Time Domain Electromagnetic (TDEM) Report - The TDEM Report was useful in verifying some of the investigation conclusions made by DOE-Pantex. The TCEQ anticipated that the TDEM Report would provide an interpretation of the extent of the Perched Aquifer. An interpretive map was not included in the TDEM Report or DOE-Pantex's response. *Please provide an interpretive map of the TDEM data to resolve some of the uncertainties associated with the groundwater assessment.*

3. **Regulatory Action Levels**

a. Risk Reduction Rule Guidance Document - The TCEQ has conditionally approved (*TCEQ letter dated June 24, 2003*) regulatory action levels proposed by Pantex in the document titled, "Risk Reduction Rule Guidance Document (RRRGD), dated April 2002. Pantex resubmitted the RRRGD on March 2004 with modifications to address the TCEQ's conditions of approval. DOE Pantex's response dated November 1, 2004 indicates that groundwater data (e.g., VOCs and Perchlorate) were evaluated against the action levels identified in the March 2004 update to the RRRGD. A review of the March 2004 update to the RRRGD indicates that a "demonstration" has not been presented to the TCEQ for many of the data set outliers as required by the TCEQ letter dated June 24, 2003. Therefore, TCEQ cannot definitively determine if the action levels utilized in the Groundwater RFI are appropriate for regulatory decisions without the demonstration being completed as required by the TCEQ letter. *DOE-Pantex*

must demonstrate that data set high-end values (i.e., outliers) should remain in the site specific background data set.

b. Regional Background - The Groundwater RFI indicates regional water quality data were used for comparison and to screen data. Sections 4.0 and 11.0 of the Groundwater RFI indicate regional groundwater quality data were used to evaluate the presence of COPCs in the Perched Aquifer (Section 4.0) and Ogallala Aquifer (Section 11.0). Also, Section 14.1 indicates regional water quality data was compared with groundwater beneath Pantex to determine if groundwater was within the regional trend. The approved RRRGD should be used for action levels (organic, inorganic) to make regulatory decisions. *Please evaluate references to 'regional background' in the Groundwater RFI and determine if a comparison to site specific background will change the extent determination, closure decision, etc., along with the RFI's conclusion.*

c. Release Definition and Constituents of Potential Concern (COPCs) Extent Determination - To meet the requirements of RRS rules (30 TAC 335, Subchapter S), the investigation must characterize the nature and extent by establishing the concentrations of COPCs in the environmental media. In the RRS rule, each COPC must be investigated to the background value (as determined in the RRRGD) or to the lowest Practical Quantitation Limit (PQL). At Pantex, if a COPC (e.g., metals, soil gas) marginally exceeded the RRS No. 1 action level and did not establish a pattern or signature of a release based on the data collected, the COPC was not considered a release and was screened from further investigation and plume characterization. *DOE-Pantex must demonstrate that screening COPCs has not changed the groundwater contaminant plume characterization in the RFI.*

4. **Sources of Contamination and uncertainty management**

a. The Perched Aquifer as a Source - The DOE-Pantex response states the fine-grained zone (FGZ) typically exhibits low permeability; therefore the Perched Aquifer is a possible source of "future contamination" to the Ogallala Aquifer. Detections of COPCs in the Ogallala Aquifer, as well as the potential historic contamination to the Ogallala Aquifer, is not clearly expressed in the RFI. DOE-Pantex's response identifies a need for fate and transport modeling in the southern portion of the DOE-Pantex property where the FGZ thins and increases in permeability. *It is necessary that the characterization of groundwater include an*

assessment of completed pathways based on collection of groundwater data prior to utilizing fate and transport modeling to extrapolate the migration patterns of the Perched and Ogallala Aquifers.

b. Uncertainty Management - The Soil RFIs approved to date were conditionally approved with the requirement that data gaps below approximately 70 feet bgs would be addressed through groundwater monitoring. In DOE-Pantex's response dated November 1, 2004, it was indicated that historical sources with the potential to impact lower soils (Ogallala Formation below approximately 70 feet bgs) and groundwater will be evaluated through fate and transport modeling. Any fate and transport modeling without field confirmation is not acceptable. *Please describe the design of additional monitoring systems that will be used to confirm model predictions.*

Attachment C

EPA's Technical Comments on DOE's Initial Response (dated August 4, 2004) to Comments on the Groundwater RFI transmitted to DOE in a letter dated March 14, 2005

The following information provides the Environmental Protection Agency (EPA) original comments (letter dated August 4, 2004 letter) on the Department of Energy (DOE) *Pantex Plant Final RCRA Facility Investigation Report (RFIR) for Groundwater, March 15, 2004*; DOE responses to comments (letter dated November 8, 2004); and EPA discussion of those responses (EPA responses dated March 14, 2005 are in italic). To capture the response thread, the original EPA comment has been included, followed by the DOE verbatim response, and this letter's EPA response in italics. This section is followed by general comments and a request for information to support discussions and the administrative record:

Discussion of DOE Response to August 8, 2004 EPA Comments

1. EPA original comment: The ground water data set must be further evaluated to reconcile sample analyses from different well types and sampling protocols for the Perched and Ogallala aquifers. An investigation data set, or Tier 1, should be comparable data, which will be used as decision-level data; data that is not comparable should be considered as Tier 2 data to "flag" areas for further evaluation or trends. Extent determinations for both aquifers will be based on Tier 1 data;

> DOE response: "The three-year data set was used to define the extent of the contaminants in the perched groundwater and is equivalent to the EPA definition of Tier 1 data. The seven-year data set was used to define the nature of the contamination and examine if any trends exist that establish individual compounds as contaminants. These data are believed sufficient for identifying areas for additional evaluation and trend analysis."
>
> EPA response: *DOE's response is noted. However, there are remaining questions for the Ogallala aquifer data set that have not been addressed. For example, the screened intervals for the sampled Ogallala wells range from 30-foot lengths to over 200-foot lengths. Please evaluate data comparability for those Ogallala wells in the investigation and monitoring network. Consider the length of the screened interval (larger intervals may result in dilution of contaminants), the sampling interval, the sampling techniques, and where samples were filtered. Please provide details for the low-flow sampling technique, which may be considered to address sample dilution. Also, include a summary of Ogallala well construction (screened interval; sampling intervals) and sampling technique for each well. Provide an explanation why Ogallala well data*

should be considered comparable from well to well, with discussions of these variables.

The Ground Water RFIR discusses that samples were filtered if turbidity levels exceeded 5 NTUs. Filtering affects inorganic contaminant concentrations. Please provide a table listing where samples were filtered, by well and sampling event for both the Perched and Ogallala Aquifers. Were filtered wells used to determine extent of contamination? Note that EPA evaluates risk to human health based on unfiltered samples for metals. Results from filtered samples can be considered during the risk evaluation process; however, the 95% UTL risk-based concentration will be calculated only using those inorganic concentrations derived from unfiltered samples.

In summary, EPA does not agree that the current network of wells in the Ogallala is sufficient to support trend analysis, particularly considering the outstanding data comparability issues and minimum coverage of interior well locations.

2. EPA original comment: Discrete source areas (soils and soil gas) with the most potential to impact ground water should clearly be identified in the text and graphics. Cleanup decisions will most likely target sources from those areas;

DOE response: "The Groundwater RFIR and supporting Soils RFIRs provide the level of detail required to identify these discrete source areas. However, during recent discussions with EPA and TCEQ on October 12-13, 2004, Pantex agreed to develop and furnish a table showing the relationship of each Solid Waste Management Unit and Area of Concern, the contaminants of potential concern identified in soil/soil gas, and the contaminant that have migrated from the Solid Waste Management Unit/Area of Concern to the perched groundwater. This table has been included for your information."

EPA response: *The additional information was received. There are, however, outstanding comments on the Independent Sites RFIR, the Playas and Ditches RFIR, and Zone 10 which may require additional ground water investigation. Ground water coverage is limited to those sites in Zones 11, 12, the Burning Grounds, the Fire Training Area, and Playa 1. The source area-to-ground water pathway may not be adequately supported by sampling in the remaining areas: Zones 4, 5, 7, 8, and 10. Additional investigations for impacts to the Perched and Ogallala aquifers may be necessary to close those areas.*

Soil extent maps (Figs. 7.1-1 to 7.1-8) define those areas where HE, Herbicides, Metals, Perchlorate, Pesticides, SVOC, and VOC were detected above the Method Practical Quantitation Limit (PQL) or site-specific background levels. To complete the source delineation for soils, please provide a map(s) which identifies those sites with RRS2 exceedances in soils, for each group of constituents. Include locations for the soil removal sites (interim action sites with contaminants

exceeding RRS2 concentrations) referenced in Table 5.2.2.1. These additional maps will provide a clearer picture of potential source areas, and document where early action has removed source Contaminants of Potential Concern (COPCs).

The soil extent maps demonstrate concentrations above detection and background, but do not pinpoint potential soil source areas, where RRS2 is exceeded and the potential for migration is more significant. Both are necessary. Please provide this information on the1"=1000' and 1"=2000' scaled site maps.

The DOE table (referenced above) cross-links Solid Waste Management Sites (SWMUs)/Areas of Concern with COPCs in soils and the Perched aquifer. Please see the comment regarding COPC screening for the Perched and Ogallala aquifers, under "General Comments."

3. EPA original comment: Soil removals have been summarized in the RFIR; however, contaminants from those soils had potential to migrate through the vadose to ground water prior to removal. Although it is assumed that the higher contaminant concentrations were reduced through these removals, a mobilized component of the source in the vadose would still have potential to impact ground water. How was that potential evaluated? How will these removal areas be considered in the fate and transport model? If we had more information on these "source areas", then we could approach the infiltration/ground water modeling with more realistic assumptions.

DOE response: "Chapter 5 of the subject report provides a description of the hot spot removals (excavations) and other ICMs [Interim Corrective Measures]; and identifies the locations of these ICMs and references for detailed information. Subsurface soils beneath the hot spot removals have been characterized for nature and extent according to 30 TAC 335, Subchapter S. Assessment of historical sources with the potential to impact lower soils and groundwater will be evaluated through the fate and transport modeling when the potential for its existence is determined to be credible based on the physics of the flow system; that is, in areas of sufficient source term with focused recharge."

EPA response: *DOE's response is noted. Please provide a map with the locations of removals (note previous comment.) COPC concentrations at removal sites typically exceeded RRS2 levels and, historically, may have had the most potential for migration to ground water, representing a worst case scenario for the fate and transport modeling. The relative mobility of a worst case source term should be demonstrated in both those areas impacted by "focused recharge" and those areas without recharge potential. Please include a summary of COPC concentrations representative of the removal sites, for the modeling phase. EPA considers fate and transport modeling as one evaluation tool to support remedial decisions, not as a stand-alone mechanism for final decisions.*

4. EPA original comment: Please provide more information on when the wastewater treatment discharge will be diverted from Playa 1 to surface irrigation. Provide a map with the location of the infiltration gallery and SWMUs/source areas. Also, what will be the expected discharge volume to the irrigation system? What will be the residual recharge to Playa 1 from rain events once the flow is diverted? This information will be significant in how we approach the fate and transport modeling, and ultimately, remedy selection.

> DOE response: "The infrastructure for diverting treated wastewater discharge from the sewage treatment facility (approximately 200,000 gallons per day) to subsurface irrigation, instead of discharging into Playa 1, is expected to be operational November 2004. Completion of this project will also provide flexibility for discharge of treated water form the perched groundwater footprint at Pantex. The attached map shows the area where the discharge will be diverted. As part of the selection criteria, the area was reviewed to confirm that Solid Waste Management Units/source areas would not be impacted by the subsurface irrigation.
>
> Estimates of the residual recharge to Playa 1 from only rainfall and storm water runoff, and future effects on the perched groundwater gradient and thickness as a result of corrective measure alternatives, will be evaluated as part of fate and transport modeling. For additional information regarding this project, please refer to the enclosed compact disk. This disk contains copies of the Underground Injection Control Authorization and the Texas Land Application Permit, issued by the TCEQ on June 27, 2003, and October 6, 2003, respectively."
>
> EPA response: *DOE has provided the requested information.*

5. EPA original comment: The Perched aquifer should be further evaluated for its potential to source releases to the Ogallala. The Fine-Grained Zone has been defined as an impermeable barrier which prevents vertical migration from the Perched Aquifer. However, it is not clear if this is supported throughout the site; well borings and hydraulic conductivity values seem to also indicate a variable transmissivity, which may promote vertical migration from the Perched to depth. This may be most evident in those "boundary areas" where the absence of Perched ground water is related to increased permeability in the FGZ. Please provide more discussion on the relationship between the Perched aquifer, the FGZ, and the Ogallala;

> DOE response: "The Airborne Time Domain Electromagnetic Survey was provided to you by letter dated October 18, 2004, to aid in the review of the Groundwater RFIR. Chapter 10 of the Groundwater report describes how several of the contaminants in the perched groundwater exceed RRS2 action levels. The FGZ typically exhibits a low permeability. Pantex recognizes the perched aquifer is a possible source of future contamination for the Ogallala aquifer."

Modeling the fate and transport of contaminants identified through the investigation will assess the potential for the perched groundwater to impact the Ogallala aquifer. This assessment will be conducted following approval of the Groundwater RFIR, particularly in the south and southeast part of the Pantex property where the Fine-Grained Zone thins and increases in permeability. Figure 3-18 of the Groundwater RFIR depicts this understanding."

EPA response: *The Time Domain Electromagnetic (TDEM) Survey provides information which supports DOE's recharge models for the Playas. However, there is no evaluation regarding the vertical flow potential across the FGZ to the Ogallala included in this report. The TDEM resolution was unable to quantify vertical and horizontal flow paths within the FGZ to the Ogallala and the authors indicate that much of the critical southeast area was obscured by interference.*

DOE has represented the TDEM as an important study to resolve questions concerning the Perched Aquifer-FGZ-Ogallala migration pathway. However, an interpretation has not been provided to relate the TDEM findings to existing site data. Was there a strong correlation with TDEM findings? Where? How did the Perched aquifer extent correspond to DOE's well-based information? The TDEM supports that the Playas are significant recharge areas. Were there similar correlations to ditches? Cultural noise may prevent any conclusions regarding the south/southeast areas, where there is ongoing concern about contamination in the Perched aquifer potentially impacting the deeper Ogallala. However, if time-slices could be tied to existing borehole data, could correlations be made to extrapolate FGZ thickness in other areas? Would this be beneficial in developing a monitoring network?

DOE states that "Chapter 10 of the Groundwater report describes how several of the contaminants in the perched groundwater exceed RRS2 action levels. The FGZ typically exhibits a low permeability. Pantex recognizes the perched aquifer is a possible source of future contamination for the Ogallala aquifer." The Ground Water RFIR contradicts this statement by concluding there is not a migration pathway to the Ogallala.

6. EPA original comment: The Ground Water RFIR will also serve as a geohydrologic template for a fate and transport model to predict migration of contaminants (chemical and radionuclide) from source areas to groundwater. Modeling results will support the human health risk assessment, selection of long term monitoring locations and final remedies. As such, we are looking to this document to provide adequate detail linking discrete source areas (and contaminants) to probable migration pathways to current or potential ground water impacts. The mechanisms (hydraulic conductivity, site stratigraphy, geologic features) that affect migration through the vadose zone to ground water must also be defined in the Ground Water RFIR, as well as site-specific input parameters which will be used for the model. Again, it is our understanding that fate and transport modeling will address both chemical and radionuclide constituents.

DOE response: "The information presented in the Groundwater and Soils RFIRs will serve as the template for fate and transport modeling of the contaminants. The modeling results will support both the risk assessment and the corrective measures study; including long term monitoring requirements. As agreed during discussions with EPA and TCEQ on October 12-13, 2004, a table showing the relationship of each SWMU/AOC to soil and soil gas Constituents of Potential Concern (COPCs) and the effect to the perched groundwater, has been prepared and is provided on the enclosed compact disc.

While the Groundwater RFIR describes the characteristics of each geologic feature, and focuses attention on the features with the most influence on the potential for migration, the site-specific input parameters will be described in detail, in the fate and transport model required by Section X of the Compliance Plan issued to Pantex by TCEQ on October 21, 2003. Solid Waste Management Units/Areas of Concern that are being closed to RRS3, as described in 30 TAC 335, Subchapter S will be evaluated through a human health risk assessment, in accordance with the work plan approved by both EPA and TCEQ. As part of this risk assessment, fate and transport modeling will be performed, when needed, to assess the future impact of the risk driving COPCs, whether radionuclide or chemical constituent."

EPA response*: The Ground Water RFIR provides a template for the Perched aquifer and the upper few feet of the FGZ, including those parameters which affect vertical and horizontal flow. There is little data, however, on the vertical and horizontal flow paths from the lower FGZ to the Ogallala, and within the Ogallala, which may make predictive modeling difficult. This must be part of future discussions.*

General Comments

1. Screening Chemicals of Potential Concern (COPC): Section 1.0 summarizes that COPC's for the Perched aquifer are those constituents that are detected in ground water above the RRS1 Action Level or are COPC's in overlying soils. Extent of contamination is evaluated for those constituents where there are enough detections to define a plume. DOE selects COPC's for the Ogallala by further screening constituents against site history, presence as a COPC in the overlying Perched aquifer, comparison to regional background, and trend analysis. This concept is carried throughout the report, and includes additional screening of metals due to turbid samples and deteriorating well casings.

EPA compares constituent concentrations point-by-point to background (95% UTL concentration) for inorganics and the Method PQL for organics. A site is considered "impacted," or a pathway completed, if constituents are detected over background (site-specific, not regional) concentrations, or if organic constituents are present at concentrations above the PQL. Comparison to risk-based screening levels, or further

evaluation in a risk evaluation, determines whether existing concentrations pose a significant risk to human health or the environment. This approach is consistent with the Texas Commission on Environmental Quality's screening against Risk Reduction Standards 1 and 2 (RRS1 and RRS2) levels. If a site requires a RRS3 closure, all contaminants above background or the PQL will be evaluated in the baseline risk assessment.

Most areas across Pantex will close to a RRS3, driven by uncertainties in vertical sampling, or contaminants above RRS2 in soil and/or ground water. The contaminant concentrations in the Perched aquifer will drive RRS3 closures for most of the site. EPA guidance allows for consideration of historical knowledge, trend analysis, frequency of detections and other information when evaluating site data and defining COPC's. However, there are uncertainties regarding the boundary conditions of the Perched, and particularly regarding the Ogallala, which have been discussed.

Considering those uncertainties, it is not appropriate at this time to eliminate or narrow COPC's for the Ogallala. Contaminants in the Ogallala appear to be non-trending, sporadic, and below health-based screening levels; however, there are issues concerning the Ogallala data set, as discussed, which must be reconciled. For these reasons, it is premature to conclude that there are no COPC's in the Ogallala. And it is likely that most of the detections will be carried forward into the baseline risk assessment under a RRS3 closure for the site. Pending further discussions, this comment may also apply to screening COPC's in the Perched aquifer, affecting the recommendations and conclusions of this report.

Screening COPC's in ground water can be particularly sensitive if risk-driving constituents are eliminated from further evaluation, as may be the case for AS. Section 4.1.3 discusses that metals CO, CR, MN, and NI were removed from the data set due to suspected casing deterioration. Constituents should not be removed from the data set if they are COPCs associated with site contamination, as is CR.

As a general comment, elimination of COPC's through additional screens was referenced throughout the document. It is not clear, however, where COPC's dropped and why, and if isoconcentration maps were constructed only for a narrowed COPC list. We can address this issue in more detail in discussions, as this impacts decisions on extent determination and defines what constituents will be considered in the risk assessment.

2. Tables 10.2-3 and Metal Summaries/Table 1.0.2-7 Summary of Perched SVOC Data:

RRS2 Residential/Industrial Action Levels are equivalent to the Federal Drinking Water MCL. Modify the table for the following COPC's: AS 10ug/l; HG 2ug/l; SB 6 ug/l; TL 2 ug/l; BIS3EHP 6 ug/l; PCP 10 ug/l. The MCLs are lower than the action levels listed. Please evaluate for any changes in COPC conclusion or isoconcentration maps.

Attachment D

DOE's Response (dated May 23, 2005) to TCEQ's Technical Comments (dated March 2, 2005) for the RFI Groundwater Investigation

(DOE's Response in Bold Type)

A. **General Comment** - Upon review of the Groundwater RFI, the TCEQ had provided two sets of comments. The first set of comments covered 12 major topics and was communicated to the DOE-Pantex in a letter dated August 3, 2004. The second set of comments was detailed technical comments that were communicated to DOE-Pantex through two e-mails dated June 29, 2004 and August 9, 2004. DOE-Pantex responded to the 12 major comments in a November 1, 2004 letter. The detailed technical comments communicated through the e-mail have remained unresolved and must be addressed to complete the administrative record for the groundwater assessment. The "General Comments" below address the Groundwater RFI approach and scope.

1. Approximately 15 percent of the SWMU/Areas of Concern (AOCs) are located in industrial zones 4, 5, 7, 8 and 10 that have minimal or no groundwater sampling data as part of the groundwater investigation. Therefore, groundwater contamination in these industrial areas will be addressed on a case by case basis to determine if additional groundwater assessment is required to attain a regulatory decision.

Investigations completed in Zones 4, 5, 7, 8 and 10 demonstrate vertical extent of contaminants in unsaturated soils above perched groundwater. Therefore, investigation of perched groundwater in these areas has not been pursued.

Nevertheless, Pantex has agreed to install two perched groundwater wells in the vicinity of Supplemental Verification Sites (SVS) 7a&b as part of resolving the Independent Sites RFIR comments. These wells will aid in addressing the uncertainty expressed in comments received from TCEQ. A proposed groundwater-monitoring network for long-term and early detection monitoring for these zones will be developed in conjunction with the CMS.

2. The Groundwater RFI and DOE-Pantex's response establishes that the groundwater assessment targets contamination associated with the heavily industrialized portions of DOE-Pantex where the majority of SWMUs are located. Approximately 85 percent of the SWMU/AOCs investigated in the Soil RFI are located in zones 11, 12, Fire Training Area and the Burning Ground Area resulting in a more comprehensive investigation in these areas compared to other industrialized areas. The "Specific Comments" in Section B of this enclosure and the two e-mails sent to DOE on June 29, 2004 and August 9, 2004 address the groundwater investigation associated with zones 11, 12, Fire Training Area and the

Burning Ground Area and do not address releases to groundwater from the SWMUs in zones 4, 5, 7, 8 and 10.

Pantex agrees that the groundwater investigation effort is weighted to address the SWMUs/AOCs in Zones 11 and 12, Fire Training Area and Burning Grounds. The groundwater investigation effort was directed in this way based on information about the historic processes conducted in these areas, the nature and extent of contaminants identified in the soils investigations, and the conditions of focused recharge known to have occurred in many of these areas.

Considering just the location of SWMUs is not the most appropriate way of determining those sources that have or will lead to contamination of perched groundwater. Two types of areas with potential to contaminate perched groundwater and contribute to levels of saturation in the perched zone were considered. These include areas with the potential for infiltration from standing water, including ditch areas and playas, with underlying sources of contamination in the unsaturated zone. Other source areas with the potential to contaminate groundwater include soil gas in the unsaturated zone.

Contaminant concentrations greater than RRS 2 action levels have been voluntarily reduced through remedial actions. For instance, Pantex has already voluntarily:

- ***Reduced contaminant sources through soil excavation;***
- ***Reduced soil gas contamination through a SVE system;***
- ***Reduced infiltration rates through installation of landfill covers;***
- ***Lined ditches in areas with residual HE contamination;***
- ***Eliminated industrial wastewater discharge to ditches;***
- ***Reduced discharge of treated sanitary wastewater to Playa 1; and,***
- ***Stabilized perched groundwater contaminants through installation of a pump and treat system.***

SWMUs without high infiltration from standing water have minimal potential for vertical transport to the perched groundwater via a cross media migration pathway. This is supported by TBEG studies that indicate that interplaya recharge areas have infiltration rates of less than 0.1 inches per year, as is summarized in a forthcoming subsurface modeling report

Vapor phase transport of VOCs has been identified through sampling of FLUTe™ soil gas wells in the unsaturated zone above the perched groundwater. These wells are concentrated near source areas that include Zone 11, the Burning Grounds, and areas in Zone 12 where solvents or solvent contaminated wash water were historically discharged to the soils. Resulting impacts to groundwater are localized beneath sources in these areas as demonstrated in the respective soil RFIRs.

For further clarification, enclosed is Attachment A, which contains maps and overlays showing the remaining source areas that have impacted groundwater in the perched zone. Corrective measure studies will address all remaining contaminant sources with the potential to impact groundwater.

3. The Ogallala Aquifer groundwater data does not support DOE-Pantex's position that releases to the Ogallala Aquifer are solely from one monitor well (i.e., PTX01-1003) near the Burning Ground Waste Management Area. In fact the groundwater data suggests that multiple sources of contamination exist at DOE-Pantex. Although it may not be possible to link contamination in the Ogallala Aquifer with specific solid waste management units (SWMUs) or waste management groupings (WMGs), it is very likely that the fine grain zone (FGZ) is acting as a leaking aquitard beneath portions of DOE-Pantex resulting in likely migration of contamination from the Perched to the Ogallala Aquifer.

The Groundwater RFIR recognizes the existence of a preferential pathway associated with former monitoring well PTX01-1003. This recognition does not imply that any RRS 1 exceedance in the Ogallala data set is associated with this former pathway.

The Groundwater RFIR represents that sporadic, non-trending RRS 1 exceedances exist in the Ogallala groundwater sampling results. The RRS 1 exceedances are typically sampling results for naturally occurring constituents, <u>not</u> organic compounds or the soluble constituents identified in the overlying perched groundwater.

Soluble constituents released to the environment through legacy activities at Pantex, such as RDX, TNT, HMX, hexavalent chromium, and trichloroethene, have been identified in the perched groundwater. None of these perched groundwater contaminates have been detected in the Ogallala sampling results above RRS 1. In accordance with fate and transport principles, including physical and chemical properties of the aforementioned constituents, these soluble perched groundwater contaminates would be the constituents that would possibly reach the Ogallala Aquifer earliest in the scenario described in comment, 3 above.

4. Any future monitoring and/or corrective action for the industrialized areas at Pantex will be designed to address uncertainties associated with data gaps in the investigation record. Once uncertainties are identified as part of the assessment phase, the TCEQ will work with DOE-Pantex to establish the location of groundwater monitor wells to address the identified uncertainties. Uncertainty management will be implemented as part of a Corrective Action Program of the Compliance Plan (CP-30459). Once the groundwater investigation is complete by identifying the uncertainties and nature and extent of contaminant plumes, the project can

proceed to the risk assessment phase and establish risks in accordance with the approved baseline risk assessment work plan.

As agreed and documented during Tier 1 team discussions held April 21-22, 2005; a base map and several overlays are enclosed in Attachment A to aid in defining the uncertainties associated with the groundwater investigation record. Pantex is supportive of reaching concurrence with TCEQ and EPA on the path forward.

5. As established by the DOE-Pantex's response letter, the Texas Water Commission (*predecessor to the TCEQ*) approved a Groundwater RFI Work Plan in 1992 for investigation of groundwater contamination at DOE-Pantex. It should be noted that the Risk Reduction Standard (RRS) rules became effective on June 28, 1993 (*after approval of the work plan*). Utilization of a Pre-RRS work plan to fulfill the closure requirements under the RRS rules is not applicable.

Comment noted.

B. **Specific Comments** - The specific comments address the groundwater investigation associated with zones 11, 12, Fire Training Area and the Burning Ground Area and do not address areas which may have released to groundwater from other industrial areas at Pantex. The comments below address the TCEQ's position on the 12 major topics originally communicated in the TCEQ letter dated August 3, 2004. The TCEQ has combined the 12 topics into four (4) major categories that address similar concerns with the Groundwater Assessment. These concerns are identified below. It should be noted that a complete response by DOE must address the comments identified in this letter along with resolution of the technical comments discussed in the June 29 and August 9th, 2004 e-mails.

1. **Closure Determination and Groundwater Data**

a. Linking Soil and Groundwater Assessments for a Closure Decision - The TCEQ agrees that demonstration of attainment of closure of a SWMU requires an understanding of cross-media migration. Therefore the TCEQ letters addressing the Soil RFIs establish that full closure approval is contingent upon completion of all required assessments for groundwater. The table in DOE-Pantex's response identifies SWMUs that have releases to the Perched Aquifer. DOE-Pantex's response links the soil assessments with the groundwater assessments to establish the primary sources of contamination that have impacted soils and the Perched Aquifer.

No response needed.

b. Source Extent - In DOE-Pantex's response, the table links the SWMUs/WMGs that have released to the Perched Aquifer. For a closure determination, contaminant plume maps showing the extent of releases from discrete units or discrete groupings (if data allows) must be provided. *DOE-Pantex must provide contaminant plume maps linked to discrete SWMUs/WMGs, to identify where potential response actions may be necessary to abate risk.*

See response to General Comment A.2. The soil RFIRs contain pertinent information that includes the discussion of migration pathways to groundwater and the conceptual site models. The crosswalk table provided in response to previous comments also addresses this issue. Finally, Section 7.3 in the Groundwater RFIR addresses soil and soil gas related to perched groundwater contamination.

The base map and overlays described in response to general comments A.2 and A.4, above, provide the basis for the understanding that the TCEQ and EPA seek regarding the source extent. The majority of soil SWMUs are RRS 3 that will be further addressed with risk assessment and fate and transport modeling. Releases from soils in WMGs or specific SWMUs have been addressed and extent determined in the soil RFIRs. Releases to perched groundwater have been documented in the Groundwater RFIR and further analysis of environmental impacts will be dealt with during the risk assessment.

c. Monitor Well System and Data Quality - The TCEQ has concerns about the variable screen lengths; screen placement in the aquifer; deteriorated well casings; and the non-used data that do not fit historical trends. Also, the question of comparability of data from different wells and sampling methods, etc. remain. It is appropriate that information should be combined with "like data" to demonstrate the extent of the contaminant plume for a closure decision since a direct comparison of the data may be inconclusive in defining the impacts to the Perched and Ogallala Aquifers. *DOE-Pantex should evaluate well types and data quality and, if necessary, install additional wells to address data needs to support closure for specific SWMUs/WMGs.*

Screen placement in the Ogallala Aquifer was determined by a review of geophysical logs for the location of the zones of highest hydraulic conductivity. Where these logs showed no or reduced hydraulic conductivity, screen blanks were installed. Screen lengths vary because of variations in the thickness of the aquifer. In the Ogallala Aquifer, screens were set in the zone of highest hydraulic conductivity. If an ongoing plume of contamination is present, it will be detected and confirmed through subsequent sampling. Also, screen lengths are long to acknowledge the declining water table. Wells are typically sampled in the top 30 feet of the aquifer.

Low flow sampling was the predominant sampling method used to collect the data described in the three-year data set. Low flow sampling is based on the concept that permeable materials allow groundwater to flow continuously through a well; samples obtained by this method should be representative of the adjacent groundwater conditions.

The use of filtered groundwater sampling data had minimal effect on interpretation of the nature and extent of contamination. Of 56,000 records in the three-year data set, only 10 filtered sample results (9 perched, 1 Ogallala) were used to replace unfiltered sample results.

Pantex assumes that "like data" comparison means, "How do we know that the Ogallala well sampling data comprise one data population?" As pointed out in your comment, the limitation to the use of these data is that it is not from the same stratigraphic horizon or the same depth below the water table. Other limitations concerning the use of background data to establish Risk Reduction Standards are discussed in specific comment B.3.

As discussed with TCEQ and EPA during the selection of wells to include for derivation of groundwater background levels, Pantex believes that RRRGD is based on an appropriate background data set for the Ogallala Aquifer beneath and adjacent to the site. The magnitude of the Risk Reduction Standard 1 (RRS 1) action levels are heavily influenced by the low turbidity of samples collected from the City of Amarillo production wells. In the RFIR, background comparison values are consistent with the RRRGD, which included samples from City of Amarillo production wells and on-site investigation wells in the southwest area of the property. This data set may contain concentrations that are unreasonably low because production wells pump continuously and have negligible turbidity. These data are being compared to infrequently pumped monitoring wells that are sampled by low-flow procedures and in many cases with unfiltered sample preparation. Unfortunately, this comparison results in some apparent exceedance of RRS 1 action level, when in reality there are none. The positive aspect of this analysis is that the apparent exceedances were identified for further evaluation.

Pantex believes that it is appropriate to retain the existing data set and identify RRS 1 exceedances in the Ogallala groundwater data set as COPCs for evaluation of uncertainties through the baseline risk assessment.

To address concerns over the effect of well condition on data quality, Pantex presently has a well maintenance program that routinely evaluates the integrity of the monitoring well system. In instances where wells have severe corrosion and are unusable, Pantex has abandoned those wells and installed replacement wells (e.g., abandonment of OW-WR-20 and replacement with PTX06-1088). Pantex will continue to review variations in well construction and conditions

and sampling methods and effects on data quality. Specifically, downhole videos will be reviewed to assist in determining when it is necessary to abandon wells. Pantex has already been proactive in removing FLUTe™ and Solonist™ sampling devices that provided non-quality data by releasing organic compounds from the materials of construction.

d. RFI Conclusions - DOE-Pantex has stated it has conducted numerous studies of lineaments, paleochannels, playa lakes, ditches, natural occurring constituents, land-uses, evapotranspiration and major migration pathways to groundwater to characterize groundwater contaminant plumes. DOE-Pantex has utilized these studies to make conclusions in the Groundwater RFI. These studies are not well documented in the Groundwater RFI and the TCEQ is unable to verify these conclusions. *DOE-Pantex should summarize the numerous studies that have been performed and identify how these studies influenced the Groundwater RFI's conclusions.*

The information requested is available from a variety of sources. Older studies have been previously provided to the TCEQ, while some are discussed in this RFIR and referenced in previous reports. New information has been provided to the TCEQ (i.e., the TDEM Report). The USDOE is currently reviewing a report describing development of the Pantex Subsurface Model in preparation for its submittal to TCEQ and EPA later this year. This is a comprehensive assessment of all the requested information. A summary of the findings of this report is discussed in response to General Comment A.3. The modeling report provides detailed coverage of all site conditions based on geostatistical interpretation of site data. Three-dimensional visualization of stratigraphic layers and hydraulic properties will provide the capability of understanding site characteristics in three dimensions that were not previously possible.

2. **Geologic and Groundwater Characterization**

a. Hydrogeological Characterization - Because of the minimal number of control wells associated with defining the limits of the Perched Aquifer and associated contamination, the lateral extent of the Perched Aquifer and any impacts are not definitively established. Also, the saturated thickness and potentiometric maps in the Groundwater RFI illustrate a configuration of the Perched Aquifer that is inconsistent with those shown in the major Soil RFIs. *DOE-Pantex should identify the rationale behind the preparation and interpretation that resulted in the modified Perched Aquifer maps and extent of contamination.*

Sections 3.3.2.1 and 3.3.2.2 of the Groundwater RFIR discuss map revisions. The perched groundwater zone downgradient of the site to the southeast was defined through temporary borings in 1999 and confirmed with additional 2003 Groundwater wells placed to the east that were dry. As groundwater flows downgradient in unconfined conditions, this defines the extent of the perched zone and contaminant migration. The TDEM study provided a qualitative confirmation of this interpretation. Information from recent investigations by Texas Tech and USACE will be evaluated to address uncertainty regarding extent of the perched zone to the southwest.

Through the Groundwater RFIR effort, Pantex spent a considerable amount of time refining interpretation of the perched groundwater extent and what is known of the FGZ based on new data that had been collected since the 2000 Groundwater Summary and Progress Report was published. The TDEM information was used in this interpretation to identify the extent of the perched zone around Playas 3 and 4. As described in the RFIRs, the industrial processes occurred in the central and SE portions of the plant, where the majority of effort for extent definition of perched groundwater has been focused. Areas north and west of the plant did not have significant industrial wastewater discharges and contamination has not been identified in these areas. In addition, these interplaya areas have minimal recharge and do not represent a significant source of contaminants to the perched groundwater.

b. Groundwater Data - The Groundwater RFI included maps that show the extent of COPCs in groundwater using data from various types of groundwater wells that were completed in multiple zones. The TCEQ is concerned that because of the wide variance of different well completions (e.g., screen length, placement and well materials), the configuration of the contaminant plume in the aquifer may be different than the contaminant plume maps provided in the Groundwater RFI. A detailed understanding of COPC distribution pattern is critical for designing an effective monitoring and corrective action system. *Please sort the groundwater data based on screen depths, etc. and provide maps of individual COPCs collected in the same portion of the aquifer; and, Identify the distribution and concentration of COPCs in the Perched and Ogallala Aquifers.*

Please refer to General Comment A.3. The perched groundwater saturation is not sufficiently thick to warrant further investigation of concentration distribution as a function of depth. As plans are to reduce the volume of water in this perched zone, the concentration distribution as a function of depth will become even further irrelevant. Individual maps were provided for each COPC in the perched groundwater in the Groundwater RFIR. No concentration distribution maps were provided for COPCs in the Ogallala Aquifer, as there are no distributions for which this is reasonable when the timing of the RRS 1

exceedances is considered. For detection locations, please see the data in Appendix A of the Groundwater RFIR.

c. Time Domain Electromagnetic (TDEM) Report - The TDEM Report was useful in verifying some of the investigation conclusions made by DOE-Pantex. The TCEQ anticipated that the TDEM Report would provide an interpretation of the extent of the Perched Aquifer. An interpretive map was not included in the TDEM Report or DOE-Pantex's response. *Please provide an interpretive map of the TDEM data to resolve some of the uncertainties associated with the groundwater assessment*.

As described in the Executive Summary and on page 50 of the TDEM report, the TDEM data were evaluated in the context of the physical data collected during investigations and with recognition of the cultural interferences. An interpretive map is provided as Figure 32 on page 51. This map is fairly basic given the difficulty of interpreting the TDEM data obtained from the Pantex flyover. The TDEM report was qualitative in nature and no further action is warranted with regard to the information provided in this report.

3. **Regulatory Action Levels**

a. Risk Reduction Rule Guidance Document - The TCEQ has conditionally approved (*TCEQ letter dated June 24, 2003*) regulatory action levels proposed by Pantex in the document titled, "Risk Reduction Rule Guidance Document (RRRGD), dated April 2002. Pantex resubmitted the RRRGD on March 2004 with modifications to address the TCEQ's conditions of approval. DOE Pantex's response dated November 1, 2004 indicates that groundwater data (e.g., VOCs and Perchlorate) were evaluated against the action levels identified in the March 2004 update to the RRRGD. A review of the March 2004 update to the RRRGD indicates that a "demonstration" has not been presented to the TCEQ for many of the data set outliers as required by the TCEQ letter dated June 24, 2003. Therefore, TCEQ cannot definitively determine if the action levels utilized in the Groundwater RFI are appropriate for regulatory decisions without the demonstration being completed as required by the TCEQ letter. *DOE-Pantex must demonstrate that data set high-end values (i.e., outliers) should remain in the site-specific background data set.*

Per the June 24, 2003 letter from TCEQ, only 3 metals were identified as having high-end values in the groundwater data set. Pantex provided a table in Appendix C (Table C3-1) detailing TCEQ's identification of high-end values and the action taken (removal or justification for retention) for each high-end value. Table C3-1 is attached to this response. The table notes that high-end

values were removed for 2 of the 3 metal high-end values identified by TCEQ (lithium and magnesium values noted as removed, chromium values noted as justified).

Pantex provided a justification for the retention of the high-end value for chromium identified by TCEQ. Based on review of data from surrounding neighbor wells and Pantex wells located to the southwest, west, and northwest of Pantex Plant property, the high-end value in the background data set is indicative of naturally occurring background for chromium. Please see the electronic file attached to this response for data that were not available for use in the RRRG.

The data attachment shows that data detections for Pantex wells located on the western side of the Plant (upgradient from Pantex sources) range from 0.52 ug/L to 40.5 ug/L. Neighbor well data from the northwest, west and southwest of Pantex and Texas Tech property indicate a range of values of 0.563 ug/L to 19.5 ug/L. Higher values have been reported in the neighbor wells, but it is possible that well maintenance activities may have affected those sample results. No problems were found with the Pantex well data or sampling activities (validation indicates no problem with the analytical data and turbidity was reported as 4 NTU for the highest data point). Therefore, the highest value of 32 ug/L identified in PTX08-1011A is similar to data collected at other locations.

b. Regional Background - The Groundwater RFI indicates regional water quality data were used for comparison and to screen data. Sections 4.0 and 11.0 of the Groundwater RFI indicate regional groundwater quality data were used to evaluate the presence of COPCs in the Perched Aquifer (Section 4.0) and Ogallala Aquifer (Section 11.0). Also, Section 14.1 indicates regional water quality data was compared with groundwater beneath Pantex to determine if groundwater was within the regional trend. The approved RRRGD should be used for action levels (organic, inorganic) to make regulatory decisions. *Please evaluate references to 'regional background' in the Groundwater RFI and determine if a comparison to site-specific background will change the extent determination, closure decision, etc., along with the RFI's conclusion.*

In all cases, the RRRGD was used for point-to-point comparison with Ogallala groundwater sample data. However, as expressed in the response to specific comment B.1.c the background in the RRRGD that was developed using some onsite Pantex wells and City of Amarillo pumping wells had artificially low concentrations for naturally occurring constituents such as metals. For an additional check on whether some metal concentrations were related to onsite activities, an unofficial comparison was made against regional groundwater

quality values presented by TCEQ and Schriver and Hopkins in the report entitled, "Updated Water Quality Evaluation of the Ogallala Aquifer Including Selected Metallic and Non-metallic Inorganic Constituents." Other criteria used to determine the presence of COPCs in the Ogallala include:

- ***Potential source areas based on historical use;***
- ***Presence of the compound in the overlying perched groundwater;***
- ***Comparison of perched groundwater distribution to Ogallala Aquifer distribution;***
- ***Impacts of filtered sample data compared to unfiltered sample data;***
- ***Naturally occurring soil background concentrations in the Ogallala Formation; and,***
- ***Trends in analytical data.***

Specifically, the GW RFIR states that regional groundwater quality would suggest that elevated levels of B, CO, CR, MN, MO, NI, SE, V, and ZN in the Ogallala are not related to site activities. This would indicate that there is no observed influence in water quality in the Ogallala from Pantex Plant operations and that these constituents are not COPCs.

Some of these metals were determined to be COPCs in the perched groundwater, exceeding RRS 1 levels. Other metals were excluded as COPCs because they were not used in processes at Pantex. All RRS 1 exceedances determined to be COPCs (B, CN, CR, CR-6, NI, and SR) are mapped as part of the figures presented in Chapter 10.

c. Release Definition and Constituents of Potential Concern (COPCs) Extent Determination - To meet the requirements of RRS rules (30 TAC 335, Subchapter S), the investigation must characterize the nature and extent by establishing the concentrations of COPCs in the environmental media. In the RRS rule, each COPC must be investigated to the background value (as determined in the RRRGD) or to the lowest Practical Quantitation Limit (PQL). At Pantex, if a COPC (e.g., metals, soil gas) marginally exceeded the RRS No. 1 action level and did not establish a pattern or signature of a release based on the data collected, the COPC was not considered a release and was screened from further investigation and plume characterization. *DOE-Pantex must demonstrate that screening COPCs has not changed the groundwater contaminant plume characterization in the RFI.*

Even if Ogallala sample data were not compared against regional water quality data and other criteria as discussed in response to specific comment B.3.b, the exceedances of RRS 1 action levels would not lead to the conclusion that a plume exists. Likewise, presentation of the perched data without considering the regional water quality data and other criteria would lead to some changes in the extent of the defined plumes.

4. **Sources of Contamination and uncertainty management**

a. The Perched Aquifer as a Source - The DOE-Pantex response states the fine-grained zone (FGZ) typically exhibits low permeability, therefore the Perched Aquifer is a possible source of "future contamination" to the Ogallala Aquifer. Detections of COPCs in the Ogallala Aquifer, as well as the potential historic contamination to the Ogallala Aquifer, is not clearly expressed in the RFI. DOE-Pantex's response identifies a need for fate and transport modeling in the southern portion of the DOE-Pantex property where the FGZ thins and increases in permeability. *It is necessary that the characterization of groundwater include an assessment of completed pathways based on collection of groundwater data prior to utilizing fate and transport modeling to extrapolate the migration patterns of the Perched and Ogallala Aquifers.*

Please see the response to general comment A.3. If contamination were to enter the Ogallala beneath and adjacent to the Pantex Plant, the completed pathway would be in the southeast area, i.e., south and east of Zone 12 on Texas Tech University property, and the earliest indication of this possibility would be observed as detections of the soluble perched groundwater contaminates in samples collected from downgradient Ogallala Aquifer monitoring wells. Corrective measure studies are proposed to assure that practical remedies are pursued to ensure that there will be no completed pathways to receptors from the perched zone.

b. Uncertainty Management - The Soil RFIs approved to date were conditionally approved with the requirement that data gaps below approximately 70 feet bgs would be addressed through groundwater monitoring. In DOE-Pantex's response dated November 1, 2004, it was indicated that historical sources with the potential to impact lower soils (Ogallala Formation below approximately 70 feet bgs) and groundwater will be evaluated through fate and transport modeling. Any fate and transport modeling without field confirmation is not acceptable. *Please describe the design of additional monitoring systems that will be used to confirm model predictions.*

Transport through the unsaturated zone to the perched zone will continue for some time, even after source areas have been removed and surface water sources have been diverted away from contaminated areas. The vertical migration flux will gradually approach the long-term infiltration rate of interplaya areas of approximately 0.1 inches/year. The low hydraulic conductivity of the FGZ underlying most of Pantex provides a limit to the

vertical migration of contaminants through the unsaturated zone. Infiltration accumulates there as saturation and a perched mound. This mound will begin to dissipate as sources of high infiltration have been removed from the site and pumping lowers the levels of saturation. Pantex intends to implement practical remedies to reduce the volume of water in the perched zone and reduce the concentrations of contaminants in perched groundwater, thereby mitigating potential future risk to offsite receptors.

Future evaluation of the effectiveness of these remedies will be accomplished through long-term monitoring of groundwater. The long-term monitoring system will have several components. There will be water level monitoring in the perched zone to verify reduction of perched water to appropriate volumes in the saturated zone and sampling to document reduction in contaminant levels due to oxidation and redox manipulation. Pantex will continue to monitor extracted soil gas from SVE systems to document reduction in soil gas concentrations with time so that potential secondary source areas of contamination of groundwater in the perched zone are effectively mitigated. Pantex will map the diminished extent of the perched zone with time based on decreasing water elevation and saturated thicknesses. Pantex will continue to sample on-site production wells and monitor the quality of water from City of Amarillo production wells, which are groundwater sinks for all groundwater flow and contamination that could potentially enter the Ogallala Aquifer from the Pantex site. Pantex will also propose sentinel and early detection monitoring wells in addition to existing monitoring wells to protect these production wells and investigate possible future transport to the east of the Pantex site in the Ogallala Aquifer.

Attachment E

DOE's Responses (Dated June 24, 2005) to the Technical Comments from the EPA for the RFI Groundwater Investigation

(*DOE's response in bold*)

The following information provides the Environmental Protection Agency (EPA) original comments (letter dated August 4, 2004 letter) on the Department of Energy (DOE) *Pantex Plant Final RCRA Facility Investigation Report (RFIR) for Groundwater, March 15, 2004*; DOE responses to comments (letter dated November 8, 2004); and EPA discussion of those responses. To capture the response thread, the original EPA comment has been included, followed by the DOE verbatim response, and this letter's EPA response in italics. This section is followed by general comments and a request for information to support discussions and the administrative record:

Discussion of DOE Response to August 8, 2004 EPA Comments

1. EPA original comment: The ground water data set must be further evaluated to reconcile sample analyses from different well types and sampling protocols for the Perched and Ogallala aquifers. An investigation data set, or Tier 1, should be comparable data, which will be used as decision-level data; data that is not comparable should be considered as Tier 2 data to "flag" areas for further evaluation or trends. Extent determinations for both aquifers will be based on Tier 1 data;

> DOE response: "The three-year data set was used to define the extent of the contaminants in the perched groundwater and is equivalent to the EPA definition of Tier 1 data. The seven-year data set was used to define the nature of the contamination and examine if any trends exist that establish individual compounds as contaminants. These data are believed sufficient for identifying areas for additional evaluation and trend analysis."
>
> EPA response and DOE's comments in bold: *DOE's response is noted. However, there are remaining questions for the Ogallala aquifer data set that have not been addressed. For example, the screened intervals for the sampled Ogallala wells range from 30-foot lengths to over 200-foot lengths. Please evaluate data comparability for those Ogallala wells in the investigation and monitoring network.* ***In the Ogallala Aquifer, some Pantex investigative wells were constructed with screen lengths that range from 30 feet to over 200 feet. However, using the low flow sampling procedure, sample dilution is not an issue. The purge rate for low flow sampling is approximately 0.25 gallon/minute. Because low flow sampling is based on the concept that in permeable materials groundwater is flowing continuously through a well, samples obtained by this method should be representative of the adjacent groundwater conditions.*** *Consider the length of the screened interval (larger*

intervals may result in dilution of contaminants), the sampling interval, the sampling techniques, and where samples were filtered. ***The three-year data set contains sample results from predominantly low flow sampling techniques described in the Sampling and Analysis Plan. Filtering of samples occurs when previous samples collected from that specific well indicate high turbidity (i.e., filtered, as well as unfiltered samples are collected from new wells initially). The use of filtered groundwater sampling data had minimal effect on interpretation of the nature and extent of contamination. Of 56,000 records in the three-year data set, only 10 filtered sample results (9 perched, 1 Ogallala) were used to replace unfiltered sample results.*** *Please provide details for the low-flow sampling technique, which may be considered to address sample dilution.* ***A low flow sampling procedure was provided to TCEQ in 1998, and approved in April 1999. A later procedure was approved as part of the Sampling and Analysis Plan submitted in support of the application for Compliance Plan No. 50824, which was approved on October 21, 2003. Pantex believes that vertical hydraulic gradients are minimal between different stratigraphic zones that are present within the perched and Ogallala saturated intervals. Therefore, dilution in the wells is anticipated to be minimal and low flow sampling should be representative of adjacent water quality. Examination of the perched groundwater COPCs indicates that the contaminants with the highest solubility that were prevalent in releases during legacy operations are the ones that reached perched groundwater. These COPCs include those high explosives exhibiting the highest solubilities (RDX, TNT, HMX), hexavalent chromium, boron, and TCE.*** *Also, include a summary of Ogallala well construction (screened interval; sampling intervals) and sampling technique for each well. Provide an explanation why Ogallala well data should be considered comparable from well to well, with discussions of these variables.*

Construction details for the wells are contained in Appendix C of the Groundwater RFIR. Pantex understands the well-to-well comparison described in your comment to mean, "How do we know that the Ogallala well sampling data comprise one data population?" As pointed out in your comment, some of the limitations to the use of this data are: (1) all samples are not from the same stratigraphic horizon or the same depth below the water table, (2) the wells are not all constructed in the same manner, and (3) sampling procedures have changed over time. Other limitations concerning the use of background data to establish Risk Reduction Standards are discussed in comment No 3, below.

As discussed with TCEQ and EPA during the selection of wells to include for derivation of groundwater background levels, Pantex believes that RRRGD is based on an appropriate background data set for the Ogallala Aquifer beneath and adjacent to the site. The magnitude of the Risk Reduction Standard 1 (RRS 1) action levels are heavily influenced by the low turbidity of samples collected from the City of Amarillo production wells. In the RFIR, background comparison values are consistent with the RRRGD, which included samples from City of Amarillo production wells and on-site investigation wells in the

southwest area of the property. This background data set may contain concentrations that are unreasonably low because production wells pump continuously and have negligible turbidity. These data are being compared to infrequently pumped monitoring wells that are sampled by low flow sampling procedures and in many cases with unfiltered sample preparation. Unfortunately, this comparison results in some apparent exceedance of RRS 1 action levels, when Pantex believes that in reality there is no contamination. The positive aspect of this analysis is that the apparent exceedances were conservatively identified for further evaluation.

As a way of managing the uncertainty associated with interpretation of the Ogallala Aquifer investigative data, Pantex believes that it is appropriate to retain the existing data set and identify RRS 1 exceedances as COPCs for analysis of uncertainties through the baseline human health risk assessment.

The Ground Water RFIR discusses that samples were filtered if turbidity levels exceeded 5 NTUs. Filtering affects inorganic contaminant concentrations. Please provide a table listing where samples were filtered, by well and sampling event for both the Perched and Ogallala Aquifers. ***The filtered results presented in the tables from Appendix A are attached. These filtered data were used in the extent determination in accordance with the data use procedure presented in Figure 4-1 of the Groundwater RFIR.*** *Were filtered wells used to determine extent of contamination?* ***Yes, some of the filtered data were used to determine extent of contamination. These data were applied to the extent determination in accordance with the procedure depicted in Figure 4-1 and further explained in Chapter 4 of the Groundwater RFIR. The overall nature of the contamination was unaffected by the filtering.*** *Note that EPA evaluates risk to human health based on unfiltered samples for metals. Results from filtered samples can be considered during the risk evaluation process; however, the 95% UTL risk-based concentration will be calculated only using those inorganic concentrations derived from unfiltered samples.* ***Risk values are being calculated using unfiltered results, however, the effects of using filtered data instead of the unfiltered results is being evaluated in the uncertainty analysis.***

In summary, EPA does not agree that the current network of wells in the Ogallala is sufficient to support trend analysis, particularly considering the outstanding data comparability issues and minimum coverage of interior well locations. ***This issue will be considered during design of the final Compliance Plan well placement and uncertainty management. As part of the uncertainty analysis in the Human Health Risk Assessment, Pantex agrees to evaluate the RRS 1 exceedances in the Ogallala groundwater data set to determine the impact on the cumulative risk to an offsite receptor.***

2. EPA original comment: Discrete source areas (soils and soil gas) with the most potential to impact ground water should clearly be identified in the text and graphics. Cleanup decisions will most likely target sources from those areas;

DOE response: "The Groundwater RFIR and supporting Soils RFIRs provide the level of detail required to identify these discrete source areas. However, during recent discussions with EPA and TCEQ on October 12-13, 2004, Pantex agreed to develop and furnish a table showing the relationship of each Solid Waste Management Unit and Area of Concern, the contaminants of potential concern identified in soil/soil gas, and the contaminant that have migrated from the Solid Waste Management Unit/Area of Concern to the perched groundwater. This table has been included for your information."

EPA response: *The additional information was received. There are, however, outstanding comments on the Independent Sites RFIR, the Playas and Ditches RFIR, and Zone 10 which may require additional ground water investigation. Ground water coverage is limited to those sites in Zones 11, 12, the Burning Grounds, the Fire Training Area, and Playa 1. The source area-to-ground water pathway may not be adequately supported by sampling in the remaining areas: Zones 4, 5, 7, 8, and 10.*

DOE's response: ***Investigations completed in Zones 4, 5, 7, 8 and 10 demonstrate vertical extent of contaminants in unsaturated soils above perched groundwater. Therefore, investigation of perched groundwater in these areas has not been pursued. Nevertheless, Pantex has agreed to install two perched groundwater wells in the vicinity of Supplemental Verification Sites 7a&b as part of resolving the Independent Sites RFIR comments. These wells should aid in addressing the uncertainty expressed in comments received from TCEQ and EPA.***

Additional investigations for impacts to the Perched and Ogallala aquifers may be necessary to close those areas.

DOE's response: ***Installing additional groundwater wells where it is believed there is not enough water to sample, based on other investigative wells in the area, is part of the uncertainty management program that Pantex will be developing in conjunction with the long-term monitoring network. The perched groundwater investigative wells south of the Burning Grounds and around the landfills between zones 7 and 5 are either dry or there is not enough water to sample. There are perched groundwater investigative wells located north of Zone 10 and around Playa 2 where routine sampling occurs. Pantex anticipates that there will not be a need for additional remedial activities at SWMUs without high infiltration sources.***

Soil extent maps (Figs. 7.1-1 to 7.1-8) define those areas where HE, Herbicides, Metals, Perchlorate, Pesticides, SVOC, and VOC were detected above the Method Practical Quantitation Limit (PQL) or site-specific background levels. To complete the source delineation for soils, please provide a map(s), which identifies those sites with RRS2 exceedances in soils, for each group of constituents. Include locations for the soil

removal sites (interim action sites with contaminants exceeding RRS2 concentrations) referenced in Table 5.2.2.1. These additional maps will provide a clearer picture of potential source areas, and document where early action has removed source Contaminants of Potential Concern (COPCs).

The soil extent maps demonstrate concentrations above detection and background, but do not pinpoint potential soil source areas, where RRS2 is exceeded and the potential for migration is more significant. Both are necessary. Please provide this information on the1"=1000' and 1"=2000' scaled site maps.

DOE's response: ***Two types of areas with potential to contaminate perched groundwater and contribute to levels of saturation in the perched zone were considered. These include areas with the potential for infiltration from standing water, including ditch areas and playas, with underlying sources of contamination in the unsaturated zone. Other source areas with the potential to contaminate groundwater include soil gas in the unsaturated zone.***

Contaminant concentrations greater than RRS 2 action levels have been voluntarily reduced through remedial actions. For instance, Pantex has already voluntarily:

- ***Reduced contaminant sources through soil excavation;***
- ***Reduced soil gas contamination through a SVE system;***
- ***Reduced infiltration rates through installation of landfill covers;***
- ***Lined ditches in areas with residual HE contamination;***
- ***Eliminated industrial wastewater discharge to ditches;***
- ***Reduced discharge of treated sanitary wastewater to Playa 1; and,***
- ***Stabilized perched groundwater contaminants through installation and operation of a pump and treat system.***

SWMUs without high infiltration from standing water have minimal potential for vertical transport to the perched groundwater via a cross media migration pathway. This is supported by TBEG studies that indicate that interplaya recharge areas have infiltration rates of less than 0.1 inches per year, as is summarized in a forthcoming subsurface modeling report

Vapor phase transport of VOCs has been identified through sampling of FLUTe™ soil gas wells in the unsaturated zone above the perched groundwater. These wells are concentrated near source areas that include Zone 11, the Burning Grounds, and areas in Zone 12 where solvents or solvent contaminated wash waters were historically discharged to the soils. Resulting impacts to groundwater are localized beneath sources in these areas as demonstrated in the respective soil RFIRs.

For further clarification, enclosed is Attachment A, which contains maps and overlays showing the remaining source areas that have impacted, or have the potential to impact groundwater in the perched zone. Corrective measure

studies will address all remaining contaminant sources with the potential to impact groundwater.

The DOE table (referenced above) cross-links Solid Waste Management Sites (SWMUs)/Areas of Concern with COPCs in soils and the Perched aquifer. Please see the comment regarding COPC screening for the Perched and Ogallala aquifers, under "General Comments."

DOE's response: ***No response necessary.***

3. EPA original comment: Soil removals have been summarized in the RFIR; however, contaminants from those soils had potential to migrate through the vadose to ground water prior to removal. Although it is assumed that the higher contaminant concentrations were reduced through these removals, a mobilized component of the source in the vadose would still have potential to impact ground water. How was that potential evaluated? How will these removal areas be considered in the fate and transport model? If we had more information on these "source areas", then we could approach the infiltration/ground water modeling with more realistic assumptions.

EPA response and DOE's comment in bold: "Chapter 5 of the subject report provides a description of the hot spot removals (excavations) and other ICMs [Interim Corrective Measures]; and identifies the locations of these ICMs and references for detailed information. Subsurface soils beneath the hot spot removals have been characterized for nature and extent according to 30 TAC 335, Subchaper S. ***This sampling information from below the excavations will be used in fate and transport modeling and risk assessment.*** Assessment of historical sources with the potential to impact lower soils and groundwater will be evaluated through the fate and transport modeling when the potential for its existence is determined to be credible based on the physics of the flow system; that is, in areas of sufficient source term with focused recharge."

EPA response: *DOE's response is noted. Please provide a map with the locations of removals (note previous comment.) COPC concentrations at removal sites typically exceeded RRS2 levels and, historically, may have had the most potential for migration to ground water, representing a worst case scenario for the fate and transport modeling. The relative mobility of a worst case source term should be demonstrated in both those areas impacted by "focused recharge" and those areas without recharge potential. Please include a summary of COPC concentrations representative of the removal sites, for the modeling phase. EPA considers fate and transport modeling as one evaluation tool to support remedial decisions, not as a stand-alone mechanism for final decisions.*

DOE's response: ***Please refer to Figure 1-4 on Page 1-18 of the Site-Wide Ecological Risk Assessment Report, February 2005, submitted by letter of May 9, 2005 and Attachment A; which depict the locations of interim corrective measures implemented at Pantex. Also, Pantex is required to submit a comprehensive groundwater model by***

September 2005 in accordance with Compliance Plan No. 50284, issued by TCEQ on October 21, 2003. This model will be used to predict future impacts to the Ogallala Aquifer so they may be assessed in the human health risk assessment and corrective measures study. This model addresses the issues of multiple sources, leakage through the FGZ, and other contaminant transport concerns.

4. EPA original comment: Please provide more information on when the wastewater treatment discharge will be diverted from Playa 1 to surface irrigation.
Provide a map with the location of the infiltration gallery and SWMUs/source areas. Also, what will be the expected discharge volume to the irrigation system? What will be the residual recharge to Playa 1 from rain events once the flow is diverted? This information will be significant in how we approach the fate and transport modeling, and ultimately, remedy selection.

> DOE response: "The infrastructure for diverting treated wastewater discharge from the sewage treatment facility (approximately 200,000 gallons per day) to subsurface irrigation, instead of discharging into Playa 1, is expected to be operational November 2004. Completion of this project will also provide flexibility for discharge of treated water form the perched groundwater footprint at Pantex. The attached map shows the area where the discharge will be diverted. As part of the selection criteria, the area was reviewed to confirm that Solid Waste Management Units/source areas would not be impacted by the subsurface irrigation.
>
> Estimates of the residual recharge to Playa 1 from only rainfall and storm water runoff, and future effects on the perched groundwater gradient and thickness as a result of corrective measure alternatives, will be evaluated as part of fate and transport modeling. For additional information regarding this project, please refer to the enclosed compact disk. This disk contains copies of the Underground Injection Control Authorization and the Texas Land Application Permit, issued by the TCEQ on June 27, 2003, and October 6, 2003, respectively."
>
> EPA response: *DOE has provided the requested information.*

DOE's response: ***No response necessary.***

5. EPA original comment: The Perched aquifer should be further evaluated for its potential to source releases to the Ogallala. The Fine-Grained Zone has been defined as an impermeable barrier, which prevents vertical migration from the Perched Aquifer. However, it is not clear if this is supported throughout the site; well borings and hydraulic conductivity values seem to also indicate a variable transmissivity, which may promote vertical migration from the Perched to depth. This may be most evident in those "boundary areas" where the absence of Perched ground water is related to increased permeability in the FGZ. Please provide more discussion on the relationship between the Perched aquifer, the FGZ, and the Ogallala;

DOE response: "The Airborne Time Domain Electromagnetic Survey was provided to you by letter dated October 18, 2004, to aid in the review of the Groundwater RFIR. Chapter 10 of the Groundwater report describes how several of the contaminants in the perched groundwater exceed RRS2 action levels. The FGZ typically exhibits a low permeability. Pantex recognizes the perched aquifer is a possible source of future contamination for the Ogallala aquifer."

Modeling the fate and transport of contaminants identified through the investigation will assess the potential for the perched groundwater to impact the Ogallala aquifer. This assessment will be conducted following approval of the Groundwater RFIR, particularly in the south and southeast part of the Pantex property where the Fine-Grained Zone thins and increases in permeability. Figure 3-18 of the Groundwater RFIR depicts this understanding."

EPA response: *The Time Domain Electromagnetic (TDEM) Survey provides information which supports DOE's recharge models for the Playas. However, there is no evaluation regarding the vertical flow potential across the FGZ to the Ogallala included in this report. The TDEM resolution was unable to quantify vertical and horizontal flow paths within the FGZ to the Ogallala and the authors indicate that much of the critical southeast area was obscured by interference.*

DOE has represented the TDEM as an important study to resolve questions concerning the Perched Aquifer-FGZ-Ogallala migration pathway. However, an interpretation has not been provided to relate the TDEM findings to existing site data. Was there a strong correlation with TDEM findings? Where? How did the Perched aquifer extent correspond to DOE's well-based information? The TDEM supports that the Playas are significant recharge areas. Were there similar correlations to ditches? Cultural noise may prevent any conclusions regarding the south/southeast areas, where there is ongoing concern about contamination in the Perched aquifer potentially impacting the deeper Ogallala. However, if time-slices could be tied to existing borehole data, could correlations be made to extrapolate FGZ thickness in other areas? Would this be beneficial in developing a monitoring network?

DOE states that "Chapter 10 of the Groundwater report describes how several of the contaminants in the perched groundwater exceed RRS2 action levels. The FGZ typically exhibits a low permeability. Pantex recognizes the perched aquifer is a possible source of future contamination for the Ogallala aquifer." The Ground Water RFIR contradicts this statement by concluding there is not a migration pathway to the Ogallala.

DOE's response: ***While the results of the TDEM corroborated the site conceptual model, no quantitative data regarding thicknesses of perched saturation and the FGZ or hydraulic conductivity were obtained. The authors of the TDEM report, the Texas Bureau of Economic Geology (TBEG), correlated the study information to the physical investigation data and concur with the representation of perched groundwater/ FGZ in***

the Groundwater RFIR. Information conveyed by the TBEG to Pantex indicates that the electromagnetic responses recorded during the survey for the depth of interest, i.e., where physical investigation of the subsurface has identified perched groundwater and/or FGZ, do not allow for differentiation of perched groundwater and FGZ thicknesses. Pantex does not intend to pursue further interpretation or evaluation of TDEM data. Rather, efforts will be focused on potential remedies in the areas of concern, such as reducing levels of saturation and contaminants in the perched groundwater zone as a way of reducing future potential risk.

Also, Pantex believes that the Ogallala groundwater sample results do not indicate that contaminants from the perched groundwater have migrated vertically to the Ogallala Aquifer yet. Nevertheless, uncertainty exists in this interpretation of the data and long-term monitoring is needed to confirm this interpretation.

6. EPA original comment: The Ground Water RFIR will also serve as a geohydrologic template for a fate and transport model to predict migration of contaminants (chemical and radionuclide) from source areas to groundwater. Modeling results will support the human health risk assessment, selection of long term monitoring locations and final remedies. As such, we are looking to this document to provide adequate detail linking discrete source areas (and contaminants) to probable migration pathways to current or potential ground water impacts. The mechanisms (hydraulic conductivity, site stratigraphy, geologic features) that affect migration through the vadose zone to ground water must also be defined in the Ground Water RFIR, as well as site-specific input parameters which will be used for the model. Again, it is our understanding that fate and transport modeling will address both chemical and radionuclide constituents.

> DOE response: "The information presented in the Groundwater and Soils RFIRs will serve as the template for fate and transport modeling of the contaminants. The modeling results will support both the risk assessment and the corrective measures study; including long term monitoring requirements. As agreed during discussions with EPA and TCEQ on October 12-13, 2004, a table showing the relationship of each SWMU/AOC to soil and soil gas Constituents of Potential Concern (COPCs) and the effect to the perched groundwater has been prepared and is provided on the enclosed compact disc.
>
> While the Groundwater RFIR describes the characteristics of each geologic feature, and focuses attention on the features with the most influence on the potential for migration, the site-specific input parameters will be described in detail, in the fate and transport model required by Section X of the Compliance Plan issued to Pantex by TCEQ on October 21, 2003. Solid Waste Management Units/Areas of Concern that are being closed to RRS3, as described in 30 TAC 335, Subchapter S will be evaluated through a human health risk assessment, in accordance with the work plan approved by both EPA and TCEQ. As part of this risk assessment, fate and transport modeling will be performed, when needed, to assess the future impact of the risk driving COPCs, whether radionuclide or chemical constituent."

EPA response: *The uncertainties discussed for the Ogallala and Perched-FGZ-Ogallala migration pathway will also contribute to uncertainties in the fate and transport model. The data comparability issue for the Ogallala must be resolved. Model calibration provides the basis for predictive modeling by comparing known and predicted concentrations. Any uncertainties in the data for the Ogallala will bias the model results.*

The Ground Water RFIR provides a template for the Perched aquifer and the upper few feet of the FGZ, including those parameters which affect vertical and horizontal flow. There is little data, however, on the vertical and horizontal flow paths from the lower FGZ to the Ogallala, and within the Ogallala, which may make predictive modeling difficult. This must be part of future discussions.

DOE's response: ***Uncertainties in Ogallala sampling data are addressed in response to comments No. 1 and No.2, above. These uncertainties have no influence on the groundwater modeling, as predicted results were not calibrated to observed chemical concentrations in the Ogallala. Because the model is a physically consistent representation in three dimensions that accounts for physical and chemical transport processes at the site, uncertainty in the model is minimized. Sensitivity analysis that involves varying of ranges of model parameters assures that predicted impacts are conservatively represented. In addition, Pantex will be evaluating several site activities, which are conservative with respect to the existing model predictions. These activities include reducing saturation and contaminant concentrations in the perched zone.***

General Comments

1. Screening Chemicals of Potential Concern (COPC): Section 1.0 summarizes that COPC's for the Perched aquifer are those constituents that are detected in ground water above the RRS1 Action Level or are COPC 's in overlying soils. Extent of contamination is evaluated for those constituents where there are enough detections to define a plume. DOE selects COPC's for the Ogallala by further screening constituents against site history, presence as a COPC in the overlying Perched aquifer, comparison to regional background, and trend analysis. This concept is carried throughout the report, and includes additional screening of metals due to turbid samples and deteriorating well casings.

EPA compares constituent concentrations point-by-point to background (95% UTL concentration) for inorganics and the Method PQL for organics. A site is considered "impacted," or a pathway completed, if constituents are detected over background (site-specific, not regional) concentrations, or if organic constituents are present at concentrations above the PQL. Comparison to risk-based screening levels, or further evaluation in a risk evaluation, determines whether existing concentrations pose a significant risk to human health or the environment. This approach is consistent with the Texas Commission on Environmental Quality's screening against Risk Reduction Standards 1 and 2 (RRS1 and RRS2) levels. If a site requires a RRS3 closure, all

contaminants above background or the PQL will be evaluated in the baseline risk assessment.

Most areas across Pantex will close to a RRS3, driven by uncertainties in vertical sampling, or contaminants above RRS2 in soil and/or ground water. The contaminant concentrations in the Perched aquifer will drive RRS3 closures for most of the site. EPA guidance allows for consideration of historical knowledge, trend analysis, frequency of detections and other information when evaluating site data and defining COPC's. However, there are uncertainties regarding the boundary conditions of the Perched, and particularly regarding the Ogallala, which have been discussed.

Considering those uncertainties, it is not appropriate at this time to eliminate or narrow COPC's for the Ogallala. Contaminants in the Ogallala appear to be non-trending, sporadic, and below health-based screening levels; however, there are issues concerning the Ogallala data set, as discussed, which must be reconciled. For these reasons, it is premature to conclude that there are no COPC's in the Ogallala. And it is likely that most of the detections will be carried forward into the baseline risk assessment under a RRS3 closure for the site. Pending further discussions, this comment may also apply to screening COPC's in the Perched aquifer, affecting the recommendations and conclusions of this report.

Screening COPC's in ground water can be particularly sensitive if risk-driving constituents are eliminated from further evaluation, as may be the case for AS. Section 4.1.3 discusses that metals CO, CR, MN, and NI were removed from the data set due to suspected casing deterioration. Constituents should not be removed from the data set if they are COPCs associated with site contamination, as is CR.

As a general comment, elimination of COPC's through additional screens was referenced throughout the document. It is not clear, however, where COPC's dropped and why, and if isoconcentration maps were constructed only for a narrowed COPC list. We can address this issue in more detail in discussions, as this impacts decisions on extent determination and defines what constituents will be considered in the risk assessment.

DOE's response: ***The Groundwater RFIR represents that sporadic, non-trending RRS 1 exceedances exist in the Ogallala groundwater sampling results. The RRS 1 exceedances are typically sampling results for naturally occurring constituents. These RRS 1 exceedances are <u>not</u> typically organic compounds or the soluble constituents identified in the overlying perched groundwater, and detections of these constituents are not reproducible.***

Soluble constituents released to the environment through legacy activities at Pantex, such as RDX, TNT, HMX, hexavalent chromium, and trichloroethene, have been identified in the perched groundwater. These perched groundwater contaminates have rarely been detected in the Ogallala sampling results above RRS 1, and have not been reproduced or confirmed through subsequent sample collection and analysis. According to fate and transport principles, including physical and chemical properties

of the aforementioned constituents, these soluble perched groundwater contaminates would be the constituents that would possibly reach the Ogallala Aquifer earliest.

In the RFIR, background was based on the RRRGD, which included samples from City of Amarillo production wells and on-site investigation wells in the southwest area of the property. This data set may have concentrations that are unreasonably low because production wells pump routinely and have negligible turbidity. These data are being compared to infrequently pumped monitoring wells that are sampled using low flow procedures and in many cases with unfiltered sample preparation. Unfortunately, this comparison results in some apparent Ogallala groundwater exceedances of risk reduction standard 1 action levels for naturally occurring constituents, when in reality Pantex believes there is no contamination.

As a result of the aforementioned factors, Pantex evaluated the measured results for Ogallala groundwater samples that exceeded the RRS 1 actions levels presented in the RRRGD in the context of the regional background study (Shriver and Hopkins) and information about the turbidity of these samples, and the conditions of the wells from which the samples were collected. The results of this evaluation led Pantex to conclude that these data do not indicate that the Ogallala Aquifer has been impacted by natural migration of contaminants associated with legacy releases from Pantex operations yet.

Nevertheless, as a means of analyzing the uncertainty, Pantex will evaluate the Ogallala exceedances of RRS 1 action levels, identified by direct comparison with the sampling results, as part of the Human Health Risk Assessment. This approach should ensure that the present risk is not underestimated.

2. Table 10.2-3 and Metal Summaries/Table 10.2-7 Summary of Perched SVOC Data: RRS2 Residential/Industrial Action Levels are equivalent to the Federal Drinking Water MCL. Modify the table for the following COPC's: AS 10ug/l; HG 2ug/l; SB 6 ug/l; TL 2 ug/l; BIS3EHP 6 ug/l; PCP 10 ug/l. The MCLs are lower than the action levels listed. Please evaluate for any changes in COPC conclusion or isoconcentration maps.

DOE's response: ***Pantex evaluated the data set for any changes based on application of the aforementioned MCLs instead of the RRS 2 action levels. This comparison yielded the following changes.***

- ***For AS, perched groundwater investigative wells PTX08-1003 and PTX10-1014 were found to exhibit concentrations of 11.5 and 11.7 μg/l, respectively. AS results for samples collected from these wells were not previously identified as exceedances. Please note that the 11.7 μg/l AS sample exhibited a turbidity reading of 178 NTUs. This high turbidity is probably the cause of this exceedance. A turbidity measurement was not recorded for the 11.5 μg/l result.***
- ***For SB, four additional perched groundwater investigative wells exhibited exceedances when compared to the MCL of 6 μg/l. These four wells are PTX06-1023 and PTX06-1013 (both east of Playa 1 and adjacent to FM2373),***

PTX06-1042 (east of Zone 12 and adjacent to FM 2373) and PTX06-1010 (in the northeast portion of Zone 12 South).

- ***For TL, the metal would be added with two perched groundwater investigative wells exhibited exceedances when compared to the MCL of 2 μg/l. These wells are PTX07-1O05 (near Landfill 1) and PTX01-1008 at the Burning Grounds.***
- ***For BIS2EHP, only perched groundwater investigative well OW-WR-45 was added. The turbidity measurement for this sample was 170 NTU. This would be the only exceedance for BIS2EHP.***