SWR# <u>30459</u>

### DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

# RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA725)

### **Current Human Exposures Under Control**

Facility Name:	U.S. Department of Energy, National Nuclear Security Administration, Pantex Plant
Facility Address:	955 FM2373 (HWY 60 & FM2373), Amarillo, Carson County, Texas 79120-0030
Facility EPA ID #:	TX4890110527

- 1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination? (**Yes, as documented by RCRA Facility Investigation Reports submitted to the Texas Commission on Environmental Quality**)
  - X If yes check here and continue with #2 below.
  - \_\_\_\_\_ If no re-evaluate existing data, or
  - \_\_\_\_\_ if data are not available skip to #6 and enter "IN" (more information needed) status code.

# **BACKGROUND**

### Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

### **Definition of "Current Human Exposures Under Control" EI**

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate riskbased levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

### **Relationship of EI to Final Remedies**

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions ONLY, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA Corrective Action program's overall mission to protect human health and the environment requires that Final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

### **Duration / Applicability of EI Determinations**

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **"contaminated"**<sup>1</sup> above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action (from SWMUs, RUs or AOCs)?

Groundwater	Yes X	<u>No</u> 	<u>?</u>	Rationale / Key Contaminants RCRA Facility Investigation has shown that perched groundwater at the Pantex Plant has contaminant concentrations above protective "risk-based values". Contaminants include High Explosives, Hexavalent Chromium, Volatila Organic Compounds, and Sami
Air (indoors) <sup>2</sup> Surface Soil (e.g., <2 ft)	X	<u>X</u>		Volatile Organic Compounds. Conclusion based on monitoring results. RCRA Facility Investigation indicates surface soils at some locations have concentrations above "risk-based values". Contaminants include High Explosives,
Surface Water Sediment	<u>X</u>	<u> </u>		Metals, Volatile Organic Compounds, and Semi- volatile Organic Compounds. Conclusion based on RCRA Facility Investigation results and environmental monitoring results. RCRA Facility Investigation results indicates sediment in some ditabas has contaminent concentrations about
Subsurf. Soil (e.g., >2 ft)	<u>x</u>			"risk-based values". Contaminant concentrations above "risk-based values". Contaminants include High Explosives, Metals, Volatile Organic Compounds, and Semi-volatile Organic Compounds. RCRA Facility Investigation indicates subsurface soils at some locations have concentrations above "risk- based values". Contaminants include High Explosives,
Air (outdoors)		X		Volatile Organic Compounds, and Semi- volatile Organic Compounds. Conclusion based on environmental monitoring results.

If no (for all media) - skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

X If yes (for any media) - continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

If unknown (for any media) - skip to #6 and enter "IN" status code.

Footnotes:

<sup>1</sup> "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

<sup>2</sup> Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggest that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks.

Page 3

Key Containmants				
Media	Contaminant	Max Detected	RRS2 <sup>A</sup>	Reference
Perched Groundwater	RDX	2,650 ug/l	26 ug/l	*
Perched Groundwater	HMX	418 ug/l	5,100 ug/l	*
Perched Groundwater	2,4-Dinitrotoluene	30 ug/l	1 ug/l	*
Perched Groundwater	Trichloroethene	224 ug/l	5 ug/l	*
Perched Groundwater	Hexavalent Chromium	14,000 ug/l	100 ug/l	*
Perched Groundwater	Perchlorate	343 ug/l	12 ug/l	*
Key Contaminants				
Media	Contaminant	Max Detected	RRS2 <sup>A</sup>	Reference
Soil/Sediment	RDX	94,000 mg/kg	2.6 mg/kg	*
Soil/Sediment	HMX	75,400 mg/kg	5,100 mg/kg	*
Soil/Sediment	2,4-Dinitrotoluene	156 mg/kg	0.15 mg/kg	*
Soil/Sediment	Lead	50,000 mg/kg	15 mg/kg	*
Soil/Sediment	Barium	274,000 mg/kg	1,000 mg/kg	*

\* Final Groundwater Resource Conservation and Recovery Act Facility Investigation (RFI) Report (RFIR) and Independent Sites Final RFIR, U.S. DOE/NNSA Pantex Plant, March 2004.

<sup>A</sup> RRS2 refers to the State of Texas Risk Reduction Standard Number 2 industrial clean-up level. The definition of Risk Reduction Standard 1, Risk Reduction Standard 2 and Risk Reduction Standard 3 can be viewed in Title 30 of the Texas Administrative Code, Chapter 335, Sections 335.551-569.

Rationale and Reference(s):

Var Cantaninante

Environmental media marked with a "yes" exhibit contaminant concentrations above Texas Risk Reduction Standard 2 based on RCRA Facility Investigations conducted at Pantex.

The Texas Commission on Environmental Quality (TCEQ) is the regulatory oversight agency for environmental cleanups in Texas. Closure of sites associated with releases from solid waste management units or other areas is classified in the State of Texas by residual contaminant levels that correspond to one of three Risk Reduction Standards. Risk Reduction Standard 1 represents release site closure where no residual contaminant concentration levels remain that are above established background levels. Risk Reduction Standard 2 represents release site closure where residual contamination remains but at contaminant concentration levels that are protective of human health and the environment without implementation of post-closure care. Risk Reduction Standard 3 represents release site closure where residual contaminant concentration levels in environmental media require a baseline risk assessment evaluation, corrective measure study and corrective measure implementation of the chosen final remedy. In many cases, post-closure care in the form of administrative, and/or institutional controls, and/or engineering controls are required for release sites closed under Risk Reduction Standard 3 in order to protect human health and the environment.

Once a release site has been approved by the State for closure under Risk Reduction Standard 1, no additional activities are required. Release sites approved for closure under Risk Reduction Standard 2 require deed recordation that limits the future use of the site depending on closure to residential or industrial cleanup levels. Release sites approved for closure under Risk Reduction Standard 3 require post-closure care in the form of continued remedial actions until approved cleanup levels are met and/or it can be demonstrated that residual contamination does not represent risk to human health and the environment above approved cleanup levels in the absence of post-closure care. Release sites closed under Risk Reduction Standard 3 generally require corrective action monitoring and maintenance until the post-closure care period is complete.

The RCRA Corrective Action Program at Pantex evaluated 251 solid waste management units and areas of concern for investigation and remediation purposes. Remediation activities conducted at Pantex to date

include: Treatability Studies such as in-situ bioremediation of soil, Interim Corrective Actions such as "hot-spot removal", Accelerated Voluntary Cleanups such as Perched Groundwater Pump and Treat and Soil Vapor Extraction, and Interim Stabilization Measures Design/Construction such as landfill covers. These activities are implemented to mitigate risks to human health and the environment, stabilize impacted media to minimize further migration of contaminants, and to support final remedies that will: 1) reduce contaminant concentrations in soils, sediment, and groundwater sufficiently to achieve a No Further Action required designation, which is equivalent to closure under Risk Reduction Standard 1; or 2) obtain closure by implementation of administrative controls with no post closure care required, which is identified as a Risk Reduction Standard 2 closure; or 3) obtain closure by implementation of institutional and/or engineered controls with post closure care required, which is identified as a Risk Reduction Standard 3 closure.

No Further Actions based on closure to Risk Reduction Standard 1 and closure under Risk Reduction Standard 2 are anticipated for 58 of the 251 units at Pantex. The Resource Conservation and Recovery Act corrective action process consisting of Baseline Risk Assessment, Corrective Measure Studies, Corrective Measures Implementation Project Plans, Corrective Measures Designs, and Corrective Measures Construction will be used for the implementation of final cleanup actions at release sites where Treatability Studies, Interim Corrective Measures, and/or Accelerated Voluntary Cleanup Actions are unable to achieve closure under Risk Reduction Standard 1 or 2. Release sites at Pantex recommended for closure under Risk Reduction Standard 2 include certain soils, sediments, and surface water solid waste management units. Approximately 130 release sites are anticipated to require the complete Resource Conservation and Recovery Act corrective action process to achieve closure under Risk Reduction Standard 3. These release sites include inactive landfills; ditches that were previously used for wastewater transport; several areas of concern that have been linked to contamination of perched groundwater; and unit(s) associated with previous discharges of wastewater containing high explosives.

Release sites at Pantex closed under Risk Reduction Standard 2 will primarily be cleaned up to levels that restrict, by implementation of deed restrictions, the future use of the site to activities that are allowed for property zoned for industrial use. It is currently planned that contaminated perched groundwater within the Pantex Plant property boundaries will be remediated to approved Risk Reduction Standard 3 residual concentration levels (alternate concentration levels) that result in contaminant concentrations that meet residential cleanup levels at the property boundary. Cleanup levels for off-site perched groundwater will depend on technical limitations for remediating the groundwater and negotiations with off-site landowners. Release sites closed under Risk Reduction Standard 3 will have institutional and engineered controls that limit the future use of the release site on a site-specific basis.

Generally, when closed under Risk Reduction Standard 3, the future use of the release site will be restricted to activities allowed in areas zoned for industrial activities. However, in some Risk Reduction Standard 3 closures, post closure care requirements and residual contamination will limit future use of the release site to activities associated with monitoring and maintenance of the engineered control or activities allowed by institutionalized access control.

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table

### Potential Human Receptors (Under Current Conditions)

"Contaminated" Media	Residents	Workers	Day-Care	Construction	Trespassers	Recreation	Food <sup>3</sup>
Groundwater	No	No	No	Yes	-		No
Air (indoors)							
Soil (surface, e.g., <2 ft)	No	Yes	No	Yes	No	No	No
Surface Water							
Sediment	No	Yes			No	No	No
Soil (subsurface e.g., >2 ft				Yes			No
Air (outdoors)							

<sup>3</sup> Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc.)

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated") as identified in #2 above.

2. enter "yes" or "no" for potential "completeness" under each "Contaminated" Media -- Human Receptor combination (Pathway).

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) do not have check spaces ("\_\_\_\_"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

- \_\_\_\_\_ If no (pathways are not complete for any contaminated media-receptor combination) skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g., use optional <u>Pathway Evaluation Work Sheet</u> to analyze major pathways).
- X If yes (pathways are complete for any "Contaminated" Media Human Receptor combination) continue after providing supporting explanation.
- If unknown (for any "Contaminated" Media Human Receptor combination) skip to #6 and enter "IN" status code.

Rationale and Reference(s):

Perched groundwater that exhibits contaminants at concentrations above "risk based values" both at the Pantex Plant and adjacent off-site property located east and southeast of the Plant is not used for domestic purposes; therefore, this pathway is not complete. Neither soil or sediment contamination has been identified outside of property controlled by the Department of Energy. Contact with contaminants in surface and subsurface soil at some locations that exhibit concentrations above "risk based values" by Pantex employees is possible but at durations that would not result in significant exposure as most work is conducted indoors at the Pantex facility. In addition, in those areas with surface soil contamination where\_workers do spend longer periods of time during the work day, hot-spot removals and soil covering activities

have been implemented to reduce exposure. Soil and sediment areas at Pantex that are contaminated are controlled by use of administrative controls such as Solid Waste Management Unit Interference

Notifications, Excavation Permits, and/or limitations associated with task specific activities. Potential contact with contaminated perched groundwater during well construction activities is controlled through project specific safety plans. Security fencing and the on-site security force limit non-employee access to Plant property.

- 4 Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**<sup>4</sup> (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?
  - X If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."
  - If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."
    - \_ If unknown (for any complete pathway) skip to #6 and enter "IN" status code.

<sup>4</sup> If there is any question on whether the identified exposures are "significant" (i.e., potentially "unacceptable") consult a human health Risk Assessment specialist with appropriate education, training and experience.

### Rationale and Reference(s):

The Risk Reduction Standard 2 used for comparison is based on calculation of risk to an industrial receptor that works in an outdoor area 8 hours per day, 250 days per year, for 25 years. The primary mission of the Pantex facility requires work to be conducted indoors. Support operations require some outdoor work; however, the outdoor work is limited. The only workers that are confined to a smaller work area (approximately 6 acres) for any significant durations (on a daily basis), occur at the Burning Ground at Pantex Plant. These workers can reasonably be expected to work outdoors for a half-day duration on a regular basis. Remediation in the form of soil cover and soil removal has been conducted in work areas to reduce exposure. All other outdoor workers at Pantex would occur in the SWMUs on an infrequent basis (4-20 days per year).

- 5 Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?
  - If yes (all "significant" exposures have been shown to be within acceptable limits) continue and enter "YE" after summarizing <u>and</u> referencing documentation justifying why all "significant" exposures to "contamination" are within acceptable limits (e.g., a site-specific Human Health Risk Assessment).
  - If no (there are current exposures that can be reasonably expected to be "unacceptable")continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.
  - \_\_\_\_\_ If unknown (for any potentially "unacceptable" exposure) continue and enter "IN" status code

Rationale and Reference(s):\_\_\_\_\_

- 6. Check the appropriate RCRIS status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):
  - X YE Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the <u>U.S. Department of Energy/National Nuclear</u> <u>Security Administration, Pantex Plant, EPA ID # TX4890110527</u>, located at <u>955</u> <u>FM2373 (HWY 60 & FM2373), Carson County, Texas</u> under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.
  - \_\_\_\_\_ NO "Current Human Exposures" are NOT "Under Control."
  - IN More information is needed to make a determination.

(signature)	Date	
(print)	Robert Musick	
(title)	Project Manager	
(signature)		Date
(print)	Don Boothby	
(title)	Team Leader	
<u>Texas Commi</u>	ssion on Environmental Quality	
	(signature) (print) (title) (signature) (print) (title) <b>Texas Commis</b>	(signature)(print)Robert Musick(title)Project Manager(signature)(print)(print)Don Boothby(title)Team LeaderTexas Commission on Environmental Quality

Locations where References may be found:

TCEQ Central Records, Austin, Texas TCEQ Region 1 Office, Amarillo, Texas Pantex Plant Administrative Record

TCEQ's contact telephone and e-mail numbers:

Robert Musick, Project Manager <u>rmusick@tceq.state.tx.us</u> Telephone: 512/239-2243

Ata-ur-Rahman, Section Manager arahman@tceq.state.tx.us Telephone: 512/239-2340

Final Note: The purpose of the Human Exposures EI is to qualitatively screen exposures based on current land and groundwater use. A "YE" determination does not constitute a screening tool that ends the corrective action process. The "YE" determination may be changed at any time as new information becomes available.

### DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

# RCRA Corrective Action Environmental Indicator (EI) RCRIS code (CA750)

### Migration of Contaminated Groundwater Under Control

Facility Name:	U.S. Department of Energy, National Nuclear Security Administration, Pantex Plant
Facility Address:	955 FM2373 (HWY 60 & FM2373), Amarillo, Carson County, Texas 79120-0030
Facility EPA ID #:	<u>TX4890110527</u>

- 1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?
  - X If yes check here and continue with #2 below.
    - \_\_\_\_ If no re-evaluate existing data, or
  - \_\_\_\_\_ if data are not available, skip to #8 and enter "IN" (more information needed) status code.

# BACKGROUND

# Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

# Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

### **<u>Relationship of EI to Final Remedies</u>**

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

### **Duration / Applicability of EI Determinations**

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

- 2. Is **groundwater** known or reasonably suspected to be **"contaminated"**<sup>1</sup> above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?
  - X If yes continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.
  - If no skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."
    - \_\_\_\_ If unknown skip to #8 and enter "IN" status code.

RCRA Facility Investigation has shown that perched groundwater at the Pantex Plant has contaminant concentrations above protective "risk-based values". Contaminants include High Explosives, Hexavalent Chromium, Volatile Organic Compounds, and Semi-Volatile Organic Compounds.

# **Key Contaminants**

Media	Contaminant	Max Detected	RRS2 <sup>A</sup>	Reference
Perched Groundwater	RDX	2,650 ug/l	26 ug/l	*
Perched Groundwater	HMX	418 ug/l	5,100 ug/l	*
Perched Groundwater	2,4-Dinitrotoluene	30 ug/l	1 ug/l	*
Perched Groundwater	Trichloroethene	224 ug/l	5 ug/l	*
Perched Groundwater	Hexavalent Chromium	14,000 ug/l	100 ug/l	*
Perched Groundwater	Perchlorate	343 ug/l	12 ug/l	*

<sup>A</sup> RRS2 refers to the State of Texas Risk Reduction Standard Number 2 industrial clean-up level. The definition of Risk Reduction Standard 1, Risk Reduction Standard 2 and Risk Reduction Standard 3 can be viewed in Title 30 of the Texas Administrative Code, Chapter 335, Sections 335.551-569.

\* Final Resource Conservation and Recovery Act Facility Investigation (RFI) Report (RFIR) and Independent Sites Final RFIR, U.S. DOE/NNSA Pantex Plant, March 2004.

Rationale and Reference(s): The Texas Commission on Environmental Quality (TCEQ) is the regulatory oversight agency for environmental cleanups in Texas. Closure of sites associated with releases from solid waste management units or other areas is classified in the State of Texas by residual contaminant levels that correspond to one of three Risk Reduction Standards. Risk Reduction Standard 1 represents release site closure where no residual contaminant concentration levels remain that are above established background levels. Risk Reduction Standard 2 represents release site closure where residual contaminant of post-closure care. Risk Reduction Standard 3 represents release site closure where residual contaminant concentration levels in environmental media require post-closure care in the form of administrative, institutional controls, and/or engineering controls in order to protect human health and the environment.

### Footnote:

<sup>1</sup>"Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

Once a release site has been approved by the State for closure under Risk Reduction Standard 1, no additional activities are required. Release sites approved for closure under Risk Reduction Standard 2 require deed recordation that limits the future use of the site depending on closure to residential or industrial cleanup levels. Release sites approved for closure under Risk Reduction Standard 3 require post -Closure care in the form of continued remedial actions until approved cleanup levels are met and/or it can be demonstrated that residual contamination does not represent risk to human health and the environment above approved cleanup levels in the absence of post-closure care. Release sites closed under Risk Reduction Standard 3 generally require corrective action monitoring and maintenance until the post-closure care period is complete.

Perched groundwater that exhibits contaminants at concentrations above "risk based values" (Risk Reduction Standard 2) both at the Pantex Plant and adjacent off-site property located east and southeast of the Plant is not used for domestic purposes; therefore, this pathway is not complete based on RCRA Facility Investigations conducted at Pantex. Perched groundwater at Pantex ranges from approximately 230 feet to 270 feet below surface grade. The Ogallala Aquifer, which is the primary drinking water aquifer in the area of the Pantex Plant ranges from approximately 375 feet to 475 feet below surface grade. Based on RCRA Facility Investigations and on-going groundwater monitoring, industrial impacts to the Ogallala Aquifer have been demonstrated, but the impacts are sporadic and generally below health based values.

Perched groundwater remediation activities conducted at Pantex to date include: Treatability Studies and installation of a full-scale pump and treat system, implementation of bioremediation and barrier pilot studies, and reduction of hydraulic head on the aquifer by reduction of discharge of domestic/industrial wastewater generated at Pantex to an onsite playa. The referenced wastewater is regulated pursuant to a Texas Pollutant Discharge Elimination System Permit. In 2003, a Texas Land Application Permit was issued to Pantex by the Texas Commission on Environmental Quality. This permit authorizes discharge of treated domestic/industrial wastewater for beneficial agricultural use via a subsurface fluid distribution system. These activities have been implemented to reduce contamination of groundwater and stabilize off-site migration. The primary contaminants identified in perched groundwater above "risk based levels" are high explosives, hexavalent chromium, and TCE. It is currently planned that contaminated perched groundwater within the Pantex Plant property boundaries will be cleaned up to approved Risk Reduction Standard 3 residual concentration levels (alternate concentration levels) that result in contaminant concentrations that meet residential cleanup levels at the property boundary. Cleanup levels for off-site perched groundwater will depend on technical limitations for remediating the groundwater and negotiations with off-site landowners.

- 3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"<sup>2</sup> as defined by the monitoring locations designated at the time of this determination)?
  - **\_\_X\_\_** If yes continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"<sup>2</sup>).

- If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"<sup>2</sup>) skip to #8 and enter "NO" status code, after providing an explanation.
- \_ If unknown skip to #8 and enter "IN" status code.

<sup>2</sup> "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

Rationale and Reference(s): The nature and extent of contaminated perched groundwater has been delineated and reported in the Final Groundwater Resource Conservation and Recovery Act Facility Investigation (RFI) Report (RFIR) and Independent Sites Final RFIR, U.S. DOE/NNSA Pantex Plant, March 2004. The perched groundwater pump and treat system is an interim stabilization measure installed and operated to mitigate migration of the contaminated perched groundwater caused by past industrial wastewater discharges. In addition, pilot studies are underway to determine if bioremediation and barrier technologies are applicable stabilization measures. To reduce hydraulic head on the perched aquifer, reduction of discharge of domestic/industrial wastewater generated at Pantex to an onsite playa has been implemented via authorization by the Texas Commission on Environmental Quality for discharge of treated domestic/industrial wastewater through a subsurface fluid distribution system designed to beneficially reuse the water for agricultural purposes. Silts and clays, referred to as the fine-grained zone, impede vertical migration of infiltrating storm water and wastewater discharges and recent evaluation of the perched groundwater indicate that the vertical flux into the fine-grained zone and the horizontal flux at the extent of the perched groundwater are equilibrating. However, at this time monitoring data suggest that perched groundwater is migrating to the south and southeast. Baseline risk assessment and associated modeling, and corrective measure study will identify any appropriate changes to previous determinations and will define the appropriate final remedy to address contaminated perched groundwater at Pantex. Groundwater monitoring/measurement will continue per the requirements of the Pantex Groundwater Compliance Plan CP-50284. Data obtained from this monitoring/measurement will be utilized to determine the effectiveness of hydrodynamic controls of the contaminated zone influenced by the operation of the interim stabilization measure.

- 4. Does "contaminated" groundwater **discharge** into **surface water** bodies?
  - \_\_\_\_\_ If yes continue after identifying potentially affected surface water bodies.
  - **\_\_X\_\_** If no skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.
  - \_\_\_\_\_ If unknown skip to #8 and enter "IN" status code.

Rationale and Reference(s):\_\_\_Groundwater underlying Pantex occurs at great depth, perched groundwater exists at a depth of more than 200 feet and the Ogallala Aquifer exists a depths greater that 375 feet. There are no springs or artesian wells at Pantex and the contaminated groundwater is not used for domestic, industrial, or agricultural purposes at Pantex. This information is documented in the Groundwater RFIR, March 2004.

- 5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration<sup>3</sup> of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?
  - **\_\_\_NA\_\_** If yes skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration<sup>3</sup> of <u>key</u> contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.
  - **\_\_NA\_\_** If no (the discharge of "contaminated" groundwater into surface water is potentially significant) continue after documenting: 1) the maximum known or reasonably suspected concentration<sup>3</sup> of <u>each</u> contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations<sup>3</sup> greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.
  - \_\_\_NA\_\_\_If unknown enter "IN" status code in #8.

Rationale and Reference(s):\_\_\_\_\_

<sup>&</sup>lt;sup>3</sup> As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

- 6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be "**currently acceptable**" (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented<sup>4</sup>)?
  - **\_\_NA** \_ If yes continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,<sup>5</sup> appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bioassays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.
  - \_\_\_NA\_\_ If no (the discharge of "contaminated" groundwater can not be shown to be "**currently acceptable**") skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.
  - \_NA\_\_ If unknown skip to 8 and enter "IN" status code.

Rationale and Reference(s):\_\_\_\_\_

<sup>&</sup>lt;sup>4</sup> Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

<sup>&</sup>lt;sup>5</sup> The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

- 7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"
  - **\_\_X\_\_** If yes continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."
  - \_\_\_\_\_ If no enter "NO" status code in #8.
  - \_\_\_\_\_ If unknown enter "IN" status code in #8.

Rationale and Reference(s): Groundwater monitoring/measurement will continue per the requirements of the Pantex Groundwater Compliance Plan CP-50284. Data obtained from this monitoring/measurement will be utilized to determine the effectiveness of hydrodynamic controls of the contaminated zone influenced by the operation of the interim stabilization measure. In addition, Pantex will continue to implement interim stabilization measures and voluntary corrective actions designed to mitigate perched groundwater contamination. Pursuant to CP-50284, Pantex is continuing the RCRA corrective action process that consists of baseline risk assessment, corrective measure study and corrective measure implementation in accordance with schedules approved by the Texas Commission on Environmental Quality.

- 8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).
  - \_\_X\_\_\_YE Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the U.S. Department of Energy/National Nuclear Security Administration, Pantex Plant, EPA ID # TX4890110527, located at 955 FM2373 (HWY 60 & FM2373), Carson County, Texas. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater". This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.
    - \_\_\_\_\_ NO Unacceptable migration of contaminated groundwater is observed or expected.
    - IN More information is needed to make a determination.

Completed by	(signature)		Date
	(print)	Robert Musick	
	(title)	Project Manager	
Supervisor	(signature)		Date
•	(print)	Don Boothby	
	(title)	Team Leader	
	Texas Comm	<u>ission on Environmental Quality</u>	

Locations where References may be found:

TCEQ Central Records, Austin, Texas TCEQ Region 1 Office, Amarillo, Texas Pantex Plant Administrative Record

TCEQ's contact telephone and e-mail numbers:

Robert Musick, Project Manager rmusick@tceq.state.tx.us Telephone: 512/239-2243

Ata-ur-Rahman, Section Manager arahman@tceq.state.tx.us Telephone: 512/239-2340

Final Note: The purpose of the Migration of Contaminated Groundwater EI is to verify that the groundwater plume is stable. A "YE" determination does not constitute a screening tool to end the corrective action process. The "YE" determination may be changed at any time as new information becomes available.