

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 the Army, Lone Star Army Ammunition Plant
Facility Address: Highway 82 West, Texarkana, Bowie County, TX, 75505-9101
Facility EPA ID #: TX7213821831

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?

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 risk-based 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).

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2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be **“contaminated”**¹ 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)?

	<u>Yes</u>	<u>No</u>	<u>?</u>	<u>Rationale / Key Contaminants</u>
Groundwater	<u>_x_</u>	<u>___</u>	<u>___</u>	<u>Plumes are stable/VOCs PAHs metals, explosives and perchlorate.</u>
Air (indoors) ²	<u>___</u>	<u>_x_</u>	<u>___</u>	<u>Assessment conducted to date indicates that exposure route is not a significant pathway</u>
Surface Soil (e.g., <2 ft)	<u>_x_</u>	<u>___</u>	<u>___</u>	<u>Under cover, and/or MSC, ACL or PCL, VOCs PAHs metals, explosives and perchlorate.</u>
Surface Water	<u>_x_</u>	<u>___</u>	<u>___</u>	<u>Potential risk associated w/ exposure to surface water, metals and explosives</u>
Sediment	<u>_x_</u>	<u>___</u>	<u>___</u>	<u>Potential risk associated w/exposure to sediments/ metals, explosives and perchlorate</u>
Subsurf. Soil (e.g., >2 ft)	<u>_x_</u>	<u>___</u>	<u>___</u>	<u>Under cover, and/or MSC, ACL or PCL, VOCs PAHs metals, explosives and perchlorate.</u>
Air (outdoors)	<u>___</u>	<u>_x_</u>	<u>___</u>	<u>Evaluation conducted to date indicates inhalation exposure route is not a significant pathway</u>

 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.

Rationale and Reference(s): *Lone Star has completed HSWA corrective action requirements for nineteen (19) Solid Waste Management Units (SWMUs) listed in the Compliance Plan CP-50292 for which a RCRA Facility Investigation or Affected Property Assessment and/or necessary corrective action are required as result of release or potential release from SWMUs. Site investigations and/or response actions and closure activities have been completed for the Painter Filter Disposal Site No. 2, Cisterns II - VIII, RDX Pit K-2, Building G-29 under Risk Reduction Standard (RRS) No. 1 (background or PQL/MQL); the Road Oil Burial Site, B-8 Battery Wash Down Sump, Area W-Wells, Area W Landfill No. 3 under RRS No. 2 (MCLs or MSCs); the Area W Landfill No. 2 under RRS No. 3 (ACLs); the RDX Settling Pits, P& O Settling Pits (units 68-72, 74-93, 201-248); the Industrial Sewer System No. 499E, RDX/TNT sumps and Tanks Area B (Tank B-67 & B-68), E (Tanks E-66, E-68, E-76, E-77, E-97 & E-98,), O (Tank O-39) and R (Tank R-39) under Texas Risk Reduction Program (TRRP) Remedy Standard A [Protective Concentration Limits, (PCLs)]; and the Eastern Inactive Sanitary Landfill (EISL) under Remedy Standard B PCLs. For the above units, investigation results indicate impacts to surface and subsurface soils in which COC concentration either met the proposed action limit, or a response action (e.g. soil removal via excavation,) was needed to meet the action limit and, thus limiting exposure of soils and subsurface soils to site workers. Upon verification that the action limit was achieved, the “no further action” recommendation was approved by the TCEQ for the above referenced SWMUs with the exception of EISL. A soil cover/cap has been placed over EISL at the time of closure as an engineering control thus limiting site worker exposures to affected soil. There were also no impacts to groundwater based on results of Affected Property Assessment Report (APAR). The Compliance Plan CP-50292 requires that Lone Star submit annual activity reports to verify the engineering control (cap/cover maintenance) and institutional controls are maintained for the EISL during post closure care.*

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For SWMUs Western Sanitary Inactive Landfill (WISL) and XX Test Pits, the investigation results indicate impacts to soils and groundwater at both units, as well as impacts to sediments and surface water only at the XX-Test Pits. Concentration of COCs (metals and explosives) were detected in the groundwater. However for WISL, the COCs exceeding their respective GWPS (critical PCL) include benzene, cis-1,2-Dichloroethylene (DCE), and vinyl chloride. For XX-Test Pits, the only COC exceeding the GWPS is beryllium. Groundwater monitoring results included in the APAR and January 2004 semiannual report document that COC concentrations in the groundwater monitoring wells are declining over time indicating the plume has stabilized. Surface water and sediments samples collected in areas where surface water ponds in small drainage pools along several of the drainage channels near XX-Test Pits are characterized as intermittent. Lone Star believes the intermittent drainage features are not indirect contact with waters of the state. Results of XX-Test Pits interim risk assessment indicate that lead, cadmium and perchlorate have impacted sediments and surface water, but the exposure to human and ecological receptors from impacted sediments and surface water are below the acceptable risk range [e.g. PCLs, Hazard quotients of less than one, pursuant to TRRP 30 TAC 350.72(a)(2), Hazard Index less than one and potential excess lifetime cancer risk of 1.0×10^{-4} , TRRP 30 TAC 350.72 (c)]. The risk assessment for both the WISL and XX-Test Pits also indicates that due to interim control measures implemented at the units (e.g., surface cover for WISL only, access restrictions(fencing), deed recordation and groundwater monitoring), no human exposures to affected soil or groundwater presently occur for the SWMUs. For closure of WISL under TRRP Remedy Standard B, a Response Action Plan (RAP) was submitted to TCEQ which included cap maintenance, access restrictions, deed recordation, continued groundwater monitoring under the Compliance Plan CP-50292 dated 09-15-2003. The corrective measures/response action to achieve Remedy Standard B closure for these XX-Test Pits shall include access restrictions(fencing), removal of affected soils, deed recordation, continued groundwater and surface water monitoring under the Compliance Plan CP-50292

Investigation results for RCRA-regulated unit G-Ponds Area indicate COCs such as phenols, chloroform, 1,1,1-trichloroethane, trichloroethylene, perchlorate and metals were detected in soil and groundwater. However, only metals were detected in sediments and surface water samples collected in the small intermittent drainage ditches north of G-Ponds which flows north to an unnamed tributary of Jones Creek. Lone Star believes the intermittent drainage features are not indirect contact with waters of the state and assessment results confirm no off-site contamination. An interim risk assessment was conducted as part of the affected property assessment indicating that due to interim control measures implemented at the G-Ponds Area (e.g., surface cover/cap for G-Ponds, soil removal (via excavation) near Buildings G-1 & G-2, access restrictions(fencing), and continued groundwater monitoring), no human exposures to affected soil or groundwater presently occur for the area and no offsite impacts. Results of the semiannual groundwater monitoring as required by the Compliance Plan CP-50292 verify the plumes have stabilized and the concentration of COCs continue to show decreasing trends. Results of the interim risk assessment also indicate that the exposure to human and ecological receptors from impacted sediments and surface water at G-Ponds area are below the acceptable risk range. For closure of this area under TRRP Remedy Standard B, a Response Action Plan (RAP) for G-Ponds Area dated 01/17/02 was submitted to the TCEQ which included continued cap maintenance, access restrictions deed recordation continued groundwater and surface water monitoring under the Compliance Plan CP-50292.

For RCRA-regulated unit High Explosives Burning Ground (HEBG), investigation results indicate: explosives, PAHs, perchlorate and metals were detected in soil; perchlorate and metals were detected in the groundwater; and, metals, 2,4,6-Trinitrotoluene (TNT) and perchlorate were detected in sediments and surface water samples collected in the small intermittent drainage ditches near HEBG. Surface water when present in the ditch flows south to intermittent channel of the East Fork of Elliot Creek. Lone Star also believes the intermittent features are not indirect contact with waters of the state and assessment results confirm no off-site impacts. The interim risk assessment results indicate that metals exceed the critical PCLs in surficial soils at the former pits HEBG. Interim risk assessment results also indicate that the exposure to human and ecological receptors from impacted sediments and surface water at HEBG area are less than the critical human health and ecological PCLs, for majority of COCs. Even though concentrations of copper, lead and zinc in surface water and concentration of antimony in sediments exceed the critical ecological PCLs which were calculated for those COCs with hazard quotients greater than one. The COCs in surface water do not pose an unacceptable

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ecological risk. The impacts to surface soils and sediments at HEBG do not appear to be significant threat to receptors, but a response action (soil removal via excavation , deed recordation, etc) is needed to achieve TRRP Remedy Standard B closure. Results of the groundwater monitoring conducted as part of the investigation/assessment verify the plume has stabilized, and there is no offsite groundwater contamination. As part of the closure TRRP Remedy Standard B, a response action shall also include continued groundwater and surface water monitoring under the Compliance Plan CP-50292.

For RCRA- regulated unit High Explosives Demolition Ground (HEDG) investigation results indicate: explosives, volatile organic compounds (VOCs), perchlorate and metals were detected in soil; explosives, perchlorate and metals were detected in the groundwater; and, metals, TNT, HMX and perchlorate were detected in sediments and surface water samples collected in the small intermittent drainage ditches near HEDG. Lone Star believes the intermittent features are not indirect contact with waters of the state and assessment results confirm no off-site contamination. Interim risk assessment results indicate that metal and explosives exceed critical PCLs in surficial soils at the HEDG. Interim risk assessment results also indicate that the exposure to human and ecological receptors from impacted surface water within close proximity to HEBG area are less than the critical human health and ecological PCLs, for majority of COCs. Although concentrations of copper and HMX exceeded the critical ecological PCLs which were calculated for those COCs with hazard quotients greater than one, the COCs in surface water do not pose an unacceptable risk. The impacts to surface soils at HEBG do not appear to be significant, but a response action (soil removal via excavation , deed recordation, etc) is needed to achieve TRRP Remedy Standard B closure. Results of the groundwater monitoring conducted as part of the investigation/assessment verify the plume has stabilized, and there is no offsite groundwater contamination. As part of the closure TRRP Remedy Standard B, a response action shall also include continued groundwater and surface water monitoring under the Compliance Plan CP-50292.

References:

- Revised-Final Affected Property Assessment Report- Abandoned Construction Landfill (Unit 9) and addendum, dated 06-25-2003 and 03-11-2003, respectively.*
- RCRA Facility Investigation Road Oil Burial Site, Landfill Near Area W2 and Landfill Near Area W3. Vol I-II, dated 06-29-2001, and Addendum dated 04-25-2000.*
- RCRA Facility Investigation Report dated 06-28-1999, and addendums dated 04-23 and 09-18-2000.*
- Deed Certification for Road Oil Burial Site, Landfill Near Area W2 and Landfill Near Area W3, dated 03-13-2002*
- Affected Property Assessment Report, Areas P&Q Former Pits & Sumps, dated 12-10-2001.*
- RFI Report - Risk Reduction Standard No. 2 and Deed Certification - Abandoned Landfill No. 2, dated 01-22-2003*
- RFI Reports for Cistern VII, I, III, IV, V, VI and VII dated 11-23-1998 and Addendums dated 05-09-2000.*
- Affected Property Assessment Report/Response Action Completion Report dated 09-26-2001 and Proof of Deed Recordation for Eastern Inactive Sanitary Landfill dated 04-30-2002.*
- Affected Property Assessment Report dated 12-10-2001 and Proof of Deed Certification dated 04-30-2002 for Areas P&Q RDX Pits and Sumps 60-72, 74-93, 201-203, 235-237, 239-243, 245-248.*
- RFI Report for Bldg. B-8 Battery Wash down Sump RRS No. 2 Closure, dated 06-22-1999 and addendums dated 02-08-2002 and 09-09-2002.*
- Affected Property Assessment Report for RFI Unit 499E Industrial Sewer Lift Station in Areas P&Q, dated 06-18-2001 and revision dated 03-11-2002.*
- Closure Report Risk Reduction Standard No. 1 for Paint Filter Disposal Site No. 2 dated 08-09-2000.*
- Self Implementation Notice to conduct response action at RDX/TNT Sumps and Tanks Area E-66 and E-77, dated 03-15-2004.*
- Affected Property Assessment Report - G-Ponds Area, dated 10-17-2001*
- Response Action Plan G-Ponds Area, dated 01-17-2002.*
- Affected Property Assessment Report - High Explosives Burning Ground, dated 11-16-2001.*

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- Affected Property Assessment Report - RDX/TNT Sumps and Tanks Area E Bldg. E-64, Tanks E-66 & E-69, dated 10-22-2003*
- Affected Property Assessment Report - XX-Test Pits Area, dated 06-20-2001.*
- Affected Property Assessment Report - High Explosives Demolition Ground, dated 08-31-2001.*
- Affected Property Assessment Report - BB-15 Area, dated 11-14-2001.*
- Affected Property Assessment Report - RFI K-15 Area North and South, dated 08-29-2001.*
- Affected Property Assessment Report - RDX/TNT sumps and Tanks Area B (Tanks B-67 & B-68), E (Tanks E-68, E-76, E-77, E-97 & E-98), O (Tank O-39)and R (Tank R-39) dated 11-01-2001.*
- Affected Property Assessment Report - Abandoned Construction Landfill, dated 11-05-2002.*
- Response Action Plan and Deed Recordation for the Western Inactive Sanitary Landfill, dated 07-23-2003*
- Monitored Natural Attenuation Demonstration for Western Inactive Landfill, dated 07-18-2003.*
- Semiannual Ground-Water Monitoring Reports dated January 14 & 20, 2004.*
- Compliance Plan recently renewed on September 12, 2003.*

Footnotes:

¹ “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).

² 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.

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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 ³
Groundwater	<u>No</u>	<u>Yes</u>	<u>No</u>	<u>No</u>			<u>No</u>
Air (indoors)	—	—	—				
Soil (surface, e.g., <2 ft)	<u>No</u>	<u>Yes</u>	<u>No</u>	—	<u>No</u>	<u>No</u>	<u>No</u>
Surface Water	<u>No</u>	<u>Yes</u>			<u>No</u>	<u>No</u>	<u>No</u>
Sediment	<u>No</u>	<u>Yes</u>			<u>No</u>	<u>No</u>	<u>No</u>
Soil (subsurface e.g., >2 ft)				<u>No</u>			<u>No</u>
Air (outdoors)	—	—	—	—	—		

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.

- X 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 Pathway Evaluation Work Sheet to analyze major pathways).
- ___ 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): *The RCRA regulated units and SWMUs are located within the Lone Star installation boundary, and are a minimum of 1000 feet from the facility boundary. Groundwater investigation and semiannual groundwater monitoring reports indicated that the plumes at the G-Ponds, O-Ponds, HEDG, HEBG, WISL and XX Test Pit area are stable or shrinking; consequently, there is no apparent potential for off-site impacts. There are no drinking water wells within these areas of where releases occurred and there are deed restrictions. Affected soils are capped or removed via excavation. These areas are fenced in and workers are restricted from working in affected areas. In place controls and deed restriction prevent workers exposure to surface and subsurface soils. As described in response to question No. 2 assessment results indicate there are impacts to surface water and sediments at some units but impacts do not appear to be significant threat to receptors.*

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

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4 Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **“significant”**⁴ (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)?

_____ 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

Rationale and Reference(s): _____

⁴ 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.

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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):

- Y** - 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.S. Department of the Army, Lone Star Army Ammunition Plant facility, EPA ID # TX07213821831, located at Texarkana, Bowie County, TX 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.

Completed by (signature) Maureen Hatfield Date: April 29, 2004
(print) Maureen Hatfield
(title) Project Manager

Supervisor (signature) Donald Boothby Date: April 29, 2004
(print) Donald Boothby
(title) Supervisor
Texas Commission on Environmental Quality

Locations where References may be found:

TCEQ Central Records, Austin, Texas

Contact telephone and e-mail numbers

Project Manager listed above
(512) 239-2343
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Final Note: The purpose of the Human Exposures EI is to qualitatively screen exposures based on current land and groundwater use. A "YF" determination does not constitute a screening tool that ends the corrective action process. The "YF" determination may be changed at any time as new information becomes available.