



April 23, 2009

Mr. Mike Chapa
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Mr. Chapa:

This letter is in response to the questions that have arisen for the Camp Stanley samples that were collected in March 2007.

Pertaining to the holding times for the AOC 63 samples in GCAL SDG 207040495, these samples were not analyzed out of hold time for the explosive analysis performed by method SW-846 8330. According to our records, these samples were collected on March 24, 2007, prepped on April 5, 2007, and analyzed on April 12, 2007. As per the method and the 40 CFR Part 136, the holding time for solid explosive samples is 14 days from collection to prep the samples. Once prepped, the lab is allowed up to 40 days to analyze the sample. These samples were prepped on day 12 following collection and were analyzed on day 7 following the extraction. However, if we had missed the holding time, we would have no way of estimating the bias for the results. This would require an extensive study to determine.

Pertaining to the VOC and SVOC constituents in GCAL SDG's 207032703, 207033131, 207033132, 207040313, and 207040495, these reports were all reported to the SQL, which is nothing more than the MDL adjusted for moisture content and any dilution factors. The requested MDL's are provided in the hardcopy reports on the Form 1's in the column next to the SQL. There are no industry standards for MDL's or PQL's. However, the GC/MS's that were used to analyze these samples are fairly new pieces of equipment. They were purchased and placed in service toward the end of 2005. Also, our MDL's that were in effect in 2007 for the VOC and SVOC constituents are reasonable when compared to historical MDL data.

If you have any questions or additional comments, please feel free to contact me by email at jimmy.turner@gcal.com or by phone at (225) 769-4900.

Sincerely,

James D. Turner
QA/QC Director
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9. Ecological Risk Assessment

9.1 EXECUTIVE SUMMARY

Weston Solutions, Inc. (WESTON®) performed this Tier 2 Screening Level Ecological Risk Assessment (SLERA) to support the Affected Property Assessment (APA) for Area of Concern (AOC) 63 located at Camp Stanley Storage Activity (CSSA), Bexar County, Texas. The APA is being performed in response to a potential release to soil at the site. The United States Army Corps of Engineers (USACE), Fort Worth District (CESWF), contracted WESTON under the Comprehensive Environmental Contract (CEC) No. W912BV-04-2026, Delivery Order (DO) DY01, dated 29 September 2006, to perform additional site investigation activities at Camp Stanley. The tasks and services discussed herein are based on the USACE Statement of Work (SOW), dated September 2006, which provides for the assessment of environmental conditions at AOC 63, AOC 64 and SWMU B-71. The APA is being performed according to the Texas Risk Reduction Program (TRRP), promulgated under Title 30, Chapter 350 of the Texas Administrative Code (30 TAC 350).

This SLERA presents an assessment of the potential for adverse impact to ecological receptors that may be exposed to contaminants found at AOC 63. It focuses on the potential links between mammalian and avian wildlife, and soil at the site. As part of the SLERA, WESTON used the analytical data collected during the APA to compare to ecological screening benchmarks provided by TCEQ and site-specific background concentrations for metals developed for CSSA. The screening assessment was conducted to identify any chemicals of potential ecological concern (COPECs) in soil. A summary of the screening is provided below:

- Ten COCs were reported above the laboratory reporting limit in soil samples collected from 0-5 feet below ground surface.
- No inorganic COCs exceeded their respective site-specific background concentration.
- No COCs exceeded their respective ecological screening benchmark value.
- None of the COCs identified as bioaccumulative were reported above the site-specific background concentration.

Based on the screening assessment, no reported COC concentrations in surface soil exceeded the screening criteria. Therefore, no COPECs were selected. As a result, the potential for risk to ecological receptors from COCs reported in the surface soil of AOC 63, is not expected to be present, and the development of ecological PCLs is not necessary for the protection of wildlife species.

9.2 INTRODUCTION

The United States Army Corp of Engineers (USACE) Ft Worth district retained Weston Solutions, Inc. (WESTON®) to perform this Tier 2 Screening Level Ecological Risk Assessment (SLERA) to support development of the Affected Property Assessment Report (APAR) for AOC 63 at Camp Stanley, Bexar County, Texas. This Tier 2 SLERA evaluates potential impacts to invertebrates, birds, and mammals due to the presence of affected soil on and near the site. This Tier 2 SLERA has been prepared in accordance with *Guidance for Conducting Ecological Risk Assessment at Remediation Sites in Texas* (TCEQ, 2001).

9.2.1 Background

An Administrative Order was issued to CSSA by the EPA in May 1999 in response to chlorinated solvent contamination of groundwater identified in water supply wells located at the installation. In addition to other corrective actions related to the groundwater solvent contamination, the Order required CSSA to conduct an RFI to evaluate all potential sources of contaminant releases at the installation. Facility-wide surveys of known or suspected waste disposal sites identified AOC 63 for additional investigation based on the presence of discarded drums observed at the ground surface in close proximity to an area of disturbed soil and limestone rubble; however, the site is not suspected to be a contributor to solvent-impacted groundwater supply wells.

Assessment for the presence of buried waste and residual site contamination has included a soil vapor survey, an electrical conductivity geophysical survey, a trenching investigation to assess anomalies identified during the geophysical survey, and the collection of soil samples throughout the area of investigation.

9.2.2 Objectives

The primary objective of this Tier 2 SLERA is to assess whether the contaminants of concern (COCs) at the Camp Stanley AOC 63 are likely to cause adverse effects to the ecological receptors. This report includes the following elements:

- Identification of the area(s) of interest.
- Identification of COCs present at detectable levels using methodologies specified in 30 TAC §350.71(k).
- Identification of bioaccumulative COCs.
- Identification of the established ecological screening benchmarks.
- Comparison of the representative concentrations with the ecological benchmarks.

9.2.3 Report Organization

This Tier 2 SLERA was prepared following recommended guidelines published by the TCEQ for conducting screening-level ecological risk assessments. This report consists of the following sections:

- Section 9-2: Introduction – This section gives an introduction to the site. Background, objectives, and the organization of the report are presented here.
- Section 9-3: Site Description – This section presents the site description, history, land use, geology, hydrogeology, and details about previous field investigations.
- Section 9-4: Problem Formulation – This section presents the first four required elements of SLERA as per 30 Texas Administrative Code (TAC) §350.77(c): the COC screening analysis, an exposure pathway analysis, a conceptual exposure model, and a COC fate and transport analysis.
- Section 9-5: Conclusions and Recommendations.

All tables and figures presented in this report are located at the end of each respective section.

9.3 SITE DESCRIPTION

9.3.1 Site Location

Situated in northern Bexar County, CSSA is a 4,008 installation located in northwestern San Antonio, Bexar County, Texas. The primary mission of Camp Stanley is receipt, storage, and issuance of ordnance material, as well as quality assurance testing and maintenance of military weapons and ammunition. AOC 63 is an approximately 1-acre area of largely undeveloped land

located in the east-central portion of the Camp Stanley property in an area referred to as the east pasture. Maps showing the locations of CSSA and AOC 63 are provided as Figures 1A-1 and 1A-2 of this APAR.

9.3.2 Environmental Setting

CSSA is located in south central Texas on the Balcones Escarpment. Northwest of the installation, the terrain generally slopes upward to the Edwards Plateau; to the southeast, the terrain slopes downward to the Gulf Coastal Plains. CSSA is characterized by a rolling terrain of hills and valleys in which nearly flat-lying limestone formations have been eroded and dissected by northeast to southwest trending faults and by streams draining primarily to the east and southeast. Topographic relief across CSSA ranges from about 1,100 feet (ft) to 1,500 ft above mean sea level. Soil cover at CSSA is generally thin (0 to 4 ft in thickness), and outcrops of porous or fractured limestone formations are common.

Because CSSA is located on the southern edge of the Edwards Plateau, it is situated in a karst terrain characterized by limestone bedrock, thin surface soils, sinking streams, subsurface drainage, and spring resurgences. The landscape is hilly and dominated by oak-juniper woodlands. Most of Camp Stanley is undeveloped. As shown in the aerial photo (Figure 1A-2), the land surrounding AOC 63, and within most of Camp Stanley, is generally undeveloped woodlands with small areas of limited development and roadways. AOC 63 is vegetated, and is consistent other undeveloped areas of Bexar County both in and outside of Camp Stanley. The area outside of the Camp Stanley boundary is part of the metropolitan area of San Antonio. Rapid development of the area has been prevalent in recent years.

The oak-juniper woodland is typical of the shallow-soiled slopes of the Balcones Escarpment and the Edwards Plateau. Drier portions of this habitat site may include open shrubland, including midgrasses and xeromorphic shrubs. Typically, the association between Live Oak and Ashe Juniper Woods occurs along the Balcones escarpment and in a few hilly regions of the eastern Edwards Plateau (Goetze, 1998). Other dominant plants in this association include cedar elm (*Ulmus crassifolia*), black cherry (*Prunus serotina*), mesquite (*Prosopis glandulosa*), and little bluestem (*Schizachyrium scoparium*). This woodland habitat is broken by patches of grass and shrublands

throughout CSSA. Photos of the habitat are provided in the photolog as Appendix 13 of this APAR.

Karst habitat is common throughout the Edwards Plateau, and a number of endemic species are present in the various karst features. Because the habitat is limited and isolated, several of the endemic species are given special status as state- or federally listed protected species.

A list of federal- and state protected species for Bexar County, Texas is presented in at the end of Section 9. The list was prepared by Texas Parks and Wildlife, Wildlife Assessment Program (May 2007). The Wildlife Assessment Program systematically collects, maintains, and disseminates information on the rare and endangered plants, animals, and plant communities of Texas.

Much of CSSA is potential habitat for the Black-capped Vireo (BCV) and the Golden-cheeked Warbler (GCW), both state- and federally listed endangered birds. Habitat surveys and field surveys for both the BCV and the GCW are performed bi-annually. The results of these surveys indicate the presence of BCV and GCW throughout portions of Camp Stanley including AOC 63. A map of the habitat designated for both the GCW and BCV is provided as Figure 9.

No other threatened or endangered species listed for Bexar County, or habitats for the listed species, were identified during the endangered species habitat evaluations and site surveys. The American and Artic Peregrine Falcons and the Bald Eagle are state-listed migratory birds. Although they may migrate through Bexar County, based on their migratory habits and large ranges, they are not expected to utilize AOC 63 area for significant foraging. No individuals of these species were observed on the site. Several of the listed species are migratory birds that prefer coastal areas, streams, and associated wetlands. These species include the White-faced Ibis, Whooping Crane, and Wood Stork. Neither individuals of these species, nor suitable habitat, were observed at AOC 63. Based on the lack of aquatic habitat at or near AOC 63, these species are not expected to utilize the area.

The Texas Horned Lizard is found in more open areas typically having loose soils that facilitate burrowing. Feeding almost exclusively on ants, horned lizards prefer open arid or semi-arid

regions with sparse vegetation including grass/forb-dominated areas with high populations of harvester ants. The Texas Horned Lizard is listed by the State of Texas as threatened, but is not listed by the Federal government. Individuals of this species were not observed during site visits, although suitable habitat could be present.

9.3.3 Site History and Land Use

AOC 63 consists of approximately 1 acre of undeveloped land in the CSSA East Pasture identified for environmental investigation primarily due to the presence of three partially buried metal drums visible at the ground surface. The disposal history and past contents of the drums are unknown; however, they currently contain limited amounts of apparently clean gravel. The individual drums are located on, and in proximity to, a pile of disturbed soil and rock in the approximate center of the site.

A soil gas survey was performed at AOC 63 in 2001. Two sample points were advanced in the general area of the drums to a depth of approximately 4 feet below ground surface (bgs). Soil vapor samples were analyzed by an on-site mobile lab equipped with a gas chromatograph. The laboratory tested each sample for benzene, toluene, ethylbenzene, xylenes (BTEX), vinyl chloride, tetrachloroethene (PCE), trichloroethene (TCE), trans-1,2-dichloroethene (DCE), and cis-1,2-DCE. The soil gas survey found no significant volatile organic compound (VOC) contamination present at the locations sampled.

Aerial photographs dated 1934, 1945, 1962, 1966, 1978, 1985, 1991, and 1996 were reviewed for visual indications of activity at the site associated with a potential for hazardous waste generation, storage, or disposal (e.g., disposal trenches, above-ground storage tanks [ASTs], evaporation ponds, etc.). The 1957 photo indicates an area with denuded vegetation at the approximate location of the soil pile currently at the site (see Appendix 13, Figure A13-1); however, none of the other aerial photos reviewed provided any indication of potential waste disposal related activities at AOC 63.

9.3.4 Site Investigation

An APA is being performed at AOC 63 in response to the presence of discarded drums and disturbed soils visible at the ground surface. WESTON performed site investigations in 2007 including a geophysical survey, exploratory trenching, and soil sampling at the suspected source.

area of the site. Examination of the subsurface during the trenching investigation indicated no signs of historical subsurface disposal or residual contamination at AOC 63. Of the 19 samples collected at the site from March to December 2007, a total of 10 surface soil samples from six different locations were collected from a depth of 0 to 6 inches. Although there is no known or indicated source of contaminants at the site, analytical results for the surface soil samples indicated the presence of benzene above the default Tier 1 ^{GW}Soil_{ing} PCL established by the TRRP. All other VOC, SVOC, metals, and explosives constituents evaluated as part of the APA were either below Tier 1 PCLs, within an expected range of background concentrations, or below laboratory SQLs. Calculation of a site-specific Tier 2 ^{GW}Soil_{ing} PCL for benzene indicated site conditions are protective of human health and groundwater resources. All COCs in soil were horizontally and vertically delineated during the 2007 sampling events. The results of each of these soil sampling events are used for this ecological risk evaluation.

9.3.5 Site Geology/Sratigraphy

CSSA is situated on the Balcones Escarpment along the eastern edge of the Edwards Plateau. Cretaceous limestones of the Glen Rose Formation are exposed at the ground surface of CSSA. The most significant aspects of the area geology are widespread karst features, faults and fracturing, and abundant groundwater within the limestone formations present. “Karst” is a type of terrain in which the rock is dissolved by water so that much of the drainage occurs into the subsurface rather than as runoff. The subsurface drainage leads to passages or other openings within the underground rock formations, with subsurface infiltration and flow facilitated by fault lines and fractures within the stratigraphic profile. Some of the features that develop in karst areas include cave openings, holes in rocks, cracks, fissures, and sinkholes. CSSA overlies and contains outcroppings of the upper-most water-bearing member of the Middle Trinity Aquifer, a widely utilized regional drinking water resource.

Groundwater was not encountered during any of the investigations conducted to date at AOC 63. Review of the CSSA stratigraphic profile indicates that the site is located on an outcropping of the UGR limestone. Groundwater within the UGR member present at CSSA generally consists of discontinuous, perched water associated with direct infiltration of precipitation and intermittent surface water flow. However, the UGR is hydraulically connected to more prolific groundwater-

producing members of the Middle Trinity Aquifer. A more detailed discussion of CSSA hydrogeology can be found in Section 1 of this APAR.

9.3.6 Site Soils

Soils present in the vicinity of AOC 63 include the Crawford and Bexar Stony Soils group (Cb) and the Krum Complex (Kr). The Cb group is characterized by very dark gray to dark reddish-brown, non-calcareous, loamy and clayey soils which are predominantly shallow and stony. The Kr soils are calcareous, dark grayish-brown or very dark grayish-brown soils which develop from sediment and runoff received from higher elevation soil (CSSA, 2006a). Based on observations at the site, Kr soils are present in the southern portion of the site in association with a topographic low drainage feature which runs down-slope from west to east, with a trend to the thinner Cb group on the northern portion of AOC 63.

9.3.7 Surface Water

There is no surface water within the boundaries of AOC 63. Stormwater in the vicinity of the area investigated flows into a topographic low drainage feature which runs west to east along the southern portion of the site. The water flows of this drainage discharge to an unnamed, intermittent flow feeder branch of Salado Creek approximately 500 feet to the east of AOC 63. The branch discharges to the main channel of Salado Creek (also a usually dry intermittent stream in the area of CSSA) approximately 1 mile to the south of AOC 63. There are no other surface water bodies within a 1/2-mile of the affected property.

9.4 PROBLEM FORMULATION

Problem formulation is the phase of a SLERA that identifies the exposure setting, distribution of COCs, and potential ecological receptors. This problem formulation addresses the following issues:

- Data reduction using TRRP COC screening;
- Identification of bioaccumulative COCs;
- COCs screening analysis;

The information for this section was obtained from available literature or collected during site visits.

9.4.1 Site Visit

Several site visits were made in 2007 in association with the preparation of the AOC 63APAR and other technical documents. The visits were primarily for media sampling, but during these events the general habitat types, both surrounding and on the area, were noted and site photos were taken. The site photos are presented as Appendix 13 of this APAR.

9.4.2 TRRP Tier 2 COC screening analysis

Chemical screening was performed for surface soil on the site. Chemical concentrations in surface soil were compared to soil ecological benchmarks to select COPECs for further evaluation. Chemicals with a maximum concentration exceeding the selected benchmark were identified as COPECs.

A TRRP COC screening was performed in accordance with the procedures in the TCEQ Ecological Risk Assessment Guidance Document (2001) using the analytical data collected by WESTON during sampling events conducted in 2007. The soil samples were analyzed for Resource Conservation and Recovery Act (RCRA) metals, explosives, volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs). Based on the TCEQ screening guidance, chemicals would be selected as COPECs and retained for further risk assessment based on the following criteria:

- A detected chemical considered by TCEQ to be bioaccumulative.
- A chemical detected above an ecological benchmark and the site-specific background concentration.

The maximum of all reported COC concentrations were compared to TCEQ's preferred ecological benchmarks (the lower of the plant or earthworm benchmark) in order to establish the COPECs for the ecological risk assessment. For chemicals with no reported concentrations above the reporting limit, the maximum reporting limit was compared to the TCEQ ecological screening benchmark or to USEPA Region 5 screening values, if available. If a benchmark was not available from either of these sources, the chemical was not retained for further evaluation. Ecological benchmarks represent chemical concentrations shown in the literature to pose no significant ecological risk to lower-trophic-level species; hence, COCs with concentrations below the ecological benchmarks are

excluded from further evaluation as COPECs, unless the COC has been identified as being bioaccumulative.

Background soil conditions established by the CSSA report title *Evaluation of Background Metals Concentrations in Soils and Bedrock* (CSSA, 2002) also were considered during COC screenings. A copy of TCEQ correspondence approving the background metals report and a table obtained from the report presenting 95% UCL concentrations for the CSSA metals list are provided in Appendix 8. Metals with maximum reported concentrations less than the site-specific background concentrations were not retained as a COPEC, regardless of whether the concentration exceeded the ecological benchmark or is considered bioaccumulative. None of the reported metal concentrations exceeded the corresponding CSSA site-specific background concentrations.

9.4.2.1 Identification of Bioaccumulative COCs

Detected chemicals identified as bioaccumulative COCs would conservatively be retained as COPECs for further evaluation in the SLERA regardless of whether the maximum concentration exceeded the benchmark. This is done because bioaccumulative COCs tend to increase in concentration within some organisms relative to their concentration measured in environmental media. None of the bioaccumulative COCs identified in surface soil exceeded the site specific background concentration. Therefore no COCs were retained based on bioaccumulation.

9.4.2.2 Ecological Screening Benchmarks

As discussed in Section 9.2, the maximum measured COC concentrations in surface soil were conservatively considered to be the representative concentrations for the screening. A comparison of the maximum reported concentrations in soil to ecological benchmarks is presented in Table 9A. The ecological benchmarks were primarily obtained from the TRRP Ecological Guidance Document (TCEQ, 2001). Benchmarks were not available for many of the COCs that were not reported above the laboratory reporting limit. The lack of benchmark to compare to the reporting limit provides uncertainty in the screening analyses. Based on the benchmarks available for SVOCs and VOCs, most of the COCs reporting limits were orders of magnitude below their benchmarks. The uncertainty resulting from the lack of benchmarks is

expected to be minimal because the COCs not reported in any sample, and because the benchmarks for other similar COCs were well above the reporting limits.

9.4.2.3 Summary of Soil Screenings

Eleven soil samples were collected from the site and surrounding area from the 0-to 5-foot interval. Sample locations are shown on Figure 4A. The soil samples were analyzed for the eight RCRA-listed metals, explosives, VOCs, and SVOCs. Details from the soil sampling are provided in Section 4 of this APAR. Only ten of the COCs had reported concentrations above the laboratory reporting limit in any of the soil sample locations. The COCs included eight metals (arsenic, barium, chromium, copper, lead, mercury, nickel and zinc) and two VOCs (benzene and toluene). None of the COCs exceeded the corresponding ecological benchmark. The results of the soil screening are:

- Ten COCs were reported above the laboratory reporting limit in surface soil
- No inorganic COCs exceeded their applicable site-specific background concentration
- No COCs exceeded the ecological screening benchmark.
- None of the COCs identified as bioaccumulative were reported above the site specific background concentration.

Based on the above surface soil screening analyses, no COCs were carried forward for hazard analyses and PCL development. As shown by the screening analyses, risk to ecological receptors from COC concentrations in the surface soil of AOC 63 is not expected to be present.

9.5 CONCLUSIONS AND RECOMMENDATIONS

9.5.1 SUMMARY

This SLERA assessed the potential for adverse impact to the ecological receptors at the CSSA AOC 63. This SLERA focused on the potential link between wildlife, and soil at AOC 63. As part of this SLERA, WESTON used analytical data collected during the Affected Property Assessment to screen COC concentration in the soil against TCEQ ecological screening benchmarks and calculated site specific background concentrations.

A summary of the screening level evaluation is provided as follows:

- Ten COCs were reported above the laboratory reporting limit in surface soil

- No COCs exceeded the site specific background concentration
- No COCs exceeded the ecological screening benchmark.
- None of the COCs identified as bioaccumulative were reported above the site specific background concentration.

9.5.2 CONCLUSIONS

Reported chemical concentrations in the surface soil associated with AOC 63 are not above the ecological screening benchmarks or site specific background concentration. Based on the screening results, the potential for risk to ecological receptors is not expected to be present, and the development of ecological PCLs is not necessary for the protection of wildlife species in the area of AOC 63.

9.5.3 RECOMMENDATIONS

No recommendations are necessary for the protection of wildlife species at the AOC 63 of CSSA.

9.6 REFERENCES

TCEQ (Texas Commission on Environmental Quality). December Revision 2001. *Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas*. RG-263.

Texas Parks and Wildlife. 2003. *Annotated County Lists of Rare Species*. November 2003 Revision. n.p., n.p..