

# **APPENDIX A**

## **DATA QUALITY OBJECTIVES**

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**DATA QUALITY OBJECTIVES  
MISCELLANEOUS SITE  
INVESTIGATIONS  
HAMILTON ARMY AIRFIELD  
NOVATO, CALIFORNIA**

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Final Submittal

Prepared by:



**US Army Corps  
of Engineers ®**

Sacramento District  
Environmental Design Section

**January 2004**

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**TABLE OF CONTENTS**

1.0	INTRODUCTION .....	1
2.0	DQO STEPS .....	1
2.1	Spoils Pile F for Total DDTs .....	1
2.2	South of the Runway DDT Hotspot.....	2
2.3	Building 35 for Total DDTs.....	3
2.4	Unlined Perimeter Drainage Ditch for Total DDTs.....	4
2.5	Revetments 6 and 7 for Mercury .....	5
2.6	Firing-in Target Butt for Lead (ASR #19).....	6
2.7	Skeet Range for Lead and PAHs (ASR #18).....	6
2.8	Testing Area for Lead (ASR #4).....	7



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## **1.0 INTRODUCTION**

To generate data that will meet the project objectives, it is necessary to define the decisions that will be made, identify the intended use of the data, and design a data collection program. Data Quality Objectives (DQOs) are an integrated set of thought processes, which define data quality requirements based on the intended use of the data. This includes any type of information utilized to form the sampling strategy or achieve the objective, not just analytical data. The DQO process will assist in determining the appropriate sampling design, detection and quantitation limits, analytical methods, and sample handling procedures.

This sampling effort is designed to investigate 8 sites at the former Hamilton Army Airfield (HAAF) inboard area – 3 sites identified in the Archives Search Report (ASR) for Hamilton Army Airfield (HAAF) (September 2001) that have not been previously investigated and 5 sites that have been previously investigated. Historical data from the previously investigated sites has been used to determine the sampling strategy.

## **2.0 DQO Steps**

The seven steps of the DQO process are presented below for each site.

### **2.1 Spoils Pile F for Total DDTs**

State the Problem: Soil excavation was accomplished at this site. It was determined that the confirmation sampling conducted did not provide adequate coverage of the eastern edge of the excavation and the area just south of the over-excavation area. The Army agreed to collect additional confirmation samples to determine if the soils contaminated with Total DDTs (defined as the sum of DDT, DDD, and DDE) has been adequately removed from the site.

Identify the Decision: Determine if any DDT contaminated soils that would require removal from the site remain.

Identify the Inputs to the Decision: 1) Previous results from *Final Construction Report and Supplemental Construction Report for Building 41 Demolition and Soil Removal, Spoils Pile F Removal, and Revetments 6 and 7 Removal, Hamilton Army Airfield*, Shaw Environmental, Inc., May 2003; 2) action goals from *Main Airfield Parcel Record of Decision/Remedial Action Plan, Hamilton Army Airfield*, Final Final, August 2003; 3) the USFWS Biological Opinion and

amending letter, August 2003 and September 2003; and 4) data defining the concentrations of Total DDTs in soils at the Spoils Pile F area.

Define the Boundaries: The spatial boundary is the area near the highest historical concentration of Total DDTs and the limits of the Spoils Pile F excavation.

Develop Decision Rules: 1) If the Total DDTs concentration of the initial soil sample is greater than 0.024 mg/kg, samples will be collected in stepout locations both vertically and horizontally; 2) The area encompassing any Total DDTs contamination greater than 0.024 mg/kg up to stepout locations less than 0.024 mg/kg will be evaluated for excavation and disposal; 3) If the Total DDTs concentration of the initial soil sample is less than 0.024 mg/kg, no further sampling will occur and BRAC will not remove any additional soil from the Spoils Pile F area.

Specify the Consequences of Decision Errors: High bias or false positives of analytical results will result in evaluation of excavation of soil that does not pose a risk to future wetland species of the inboard area at Hamilton Army Airfield. Low bias or false negatives of analytical results would allow soil contaminated with Total DDTs to remain on site potentially impacting future wetland species.

Optimize the Sampling Design: Collect one surface sample approximately 25 feet south of the highest DDT hit from the pre-excavation samples (HBSF618) and three surface samples along the eastern edge of the excavation area. See Figure 2-1. These samples shall be sent to an off-site laboratory for analysis for Total DDTs. If results indicate residual DDTs above 0.024 mg/kg, then vertical and horizontal step-out samples will be collected and analyzed. The vertical step out shall be one foot and the horizontal step out shall be five feet.

## 2.2 South of the Runway DDT Hotspot

State the Problem: Samples collected by the USACE, San Francisco District, for the California Coastal Conservancy contained concentrations of Total DDTs above the ROD/RAP concentration for soil removal (1 mg/kg) up to 2 feet bgs at a sample location on the south runway (Sample Location HAA-2003-SO-36). See Figure 2-2.

Identify the Decision: Determine the extent of the Total DDTs contamination above the ROD/RAP removal action goal of 1 mg/kg.

Identify the Inputs to the Decision: 1) Previous results from *Results of the Area-Wide DDT Site Investigation, Hamilton Wetlands Restoration Project*, USACE, Final, May 2003; 2) action goals from the *Main Airfield Parcel Record of Decision/Remedial Action Plan, Hamilton Army Airfield*, Final, August 2003; 3) the USFWS Biological Opinion and amending letter, August 2003 and September 2003; and 4) data defining the lateral and vertical extent of Total DDTs above the removal action goal surrounding the previous DDT hotspot.

Define the Boundaries: The spatial boundary is the area surrounding the previous Total DDTs hotspot extending to the runways and the previous sample locations HAA-2003-SO-35 and HAA-2003-SO-37.

Develop Decision Rules: 1) If the Total DDTs concentration of the initial soil samples is greater than 1 mg/kg, samples will be collected in stepout locations both vertically and horizontally; 2) The area encompassing any Total DDTs contamination greater than 1 mg/kg up to stepout locations less than 1 mg/kg will be excavated and taken off-site for disposal; 3) If the Total DDTs concentration of the initial soil samples is less than 1 mg/kg, step in samples may be

collected or no further sampling will occur and the extent of contamination will have been defined.

Specify the Consequences of Decision Errors: High bias or false positives of analytical results will result in excavation of soil that does not pose a risk to future wetland species of the inboard area at Hamilton Army Airfield or that could be mitigated by clean cover. Low bias or false negatives of analytical results would allow soil contaminated with Total DDTs to remain on site potentially impacting future wetland species.

Optimize the Sampling Design: Collect one sample approximately 3 feet bgs immediately adjacent to Sample HAA-2003-SO-36 and four surface samples 25 feet surrounding HAA-2003-SO-36. See Figure 2-2. Analyze the samples for Total DDTs with an immunoassay field test kit compared to the 1.0mg/kg standard concentrations. If the field test kit results are greater than 1.0 mg/kg, then soil samples from stepout locations both vertically (at 6-inch intervals) and horizontally (at 25-foot intervals) shall be collected and analyzed using the field test kits. Samples from the extent of the Total DDTs-contaminated soil (< 1 mg/kg) and at least one from within the DDT hotspot area shall be sent to an off-site laboratory for analysis for Total DDTs to verify the field testing results. Sample locations and selection of stepout locations may be adjusted based upon the topography of the area along with the probable accumulation of DDT runoff. Nonetheless, sampling will continue until the extent of Total DDTs above the 1 mg/kg action goal has been reached.

### **2.3 Building 35 for Total DDTs**

State the Problem: Following the excavation east of Building 35, confirmation samples contained concentrations of Total DDTs above the ROD/RAP concentration for soil removal at one location under a discharge pipe. See Figure 2-3.

Identify the Decision: Determine the extent of any DDT contamination above the ROD/RAP and Biological Opinion action goals of 0.024 mg/kg and 1 mg/kg.

Identify the Inputs to the Decision: 1) Previous results from *1999 Interim Removal Action Data Report, BRAC Property, Hamilton Army Airfield*, IT Corporation, April 2000; 2) action goals from *Main Airfield Parcel Record of Decision/Remedial Action Plan, Hamilton Army Airfield*, Final, August 2003; 3) the USFWS Biological Opinion and amending letter, August 2003 and September 2003; and 4) data defining the extent of Total DDTs above the ROD/RAP action goals under the pipeline east of Building 35.

Define the Boundaries: The spatial boundary is the area under the pipeline (minimum depth 4 ½ feet) between Sample Number B35E-CS-001 and Sample Number B35E-CS-002 (the hotspot) east to the levee and the area surrounding the pipeline.

Develop Decision Rules: 1) If the Total DDTs concentration of the initial soil samples is greater than 1 mg/kg, samples will be collected in stepout locations both vertically and horizontally; 2) The area encompassing any Total DDTs contamination greater than 1 mg/kg up to stepout locations less than 1 mg/kg will be excavated and taken off-site for disposal; 3) If the Total DDTs concentration of the initial soil samples is less than 0.024 mg/kg, no further sampling will occur and the extent of contamination will have been defined.

Specify the Consequences of Decision Errors: High bias or false positives of analytical results will result in excavation of soil that does not pose a risk to future wetland species of the inboard

area at Hamilton Army Airfield or that could be mitigated by clean cover. Low bias or false negatives of analytical results would allow soil contaminated with Total DDTs to remain on site potentially impacting future wetland species.

Optimize the Sampling Design: Collect one sample at 5 feet bgs immediately adjacent to the previous sample B35E-CS-002 hotspot and three samples at 4 ½ feet bgs spaced 5 feet from and surrounding the hotspot, two along the pipeline and the third south of the pipeline. See Figure 2-3. Analyze the samples for Total DDTs with an immunoassay field test kit compared to the 1.0 mg/kg standard concentration. If the field test kit results are greater than 1.0 mg/kg, then soil samples from stepout locations both vertically and horizontally shall be collected and analyzed using the field test kits. Continue with stepout or stepin sampling until the extent of Total DDTs contamination above the 1 mg/kg action goal is met. Samples from the extent of the Total DDTs-contaminated soil (< 1 mg/kg) and at least one from within the high DDT concentration area shall be sent to an off-site laboratory for analysis for Total DDTs to verify the field testing results.

## 2.4 Unlined Perimeter Drainage Ditch for Total DDTs

State the Problem: Confirmation samples collected along the bottom and sides of the Perimeter Drainage Ditch (PDD) along the northwest corner of the panhandle contained concentrations of Total DDTs above the ROD/RAP concentration for soil removal. See Figure 2-4.

Identify the Decision: Determine the extent of the Total DDTs contamination above the ROD/RAP and Biological Opinion action goals of 0.024 and 1 mg/kg in the sediment of the PDD at the location of the DDT hotspots.

Identify the Inputs to the Decision: 1) Previous results from *1998 Interim Removal Action Data Report, BRAC Property, Hamilton Army Airfield*, Final, IT Corporation, April 2000; 2) action goals from the *Main Airfield Parcel Record of Decision/Remedial Action Plan, Hamilton Army Airfield*, Final, August 2003; 3) the USFWS Biological Opinion and amending letter, August 2003 and September 2003; and 4) data defining the lateral and vertical extent of Total DDTs within the ditch surrounding the DDT hotspots.

Define the Boundaries: The spatial boundary is the area surrounding the previous Total DDTs hotspots within the ditch (bottom and sides) extending to the sample locations SS-PDUL-S35E and SS-PDUL-B35 to the southeast.

Develop Decision Rules: 1) If the Total DDTs concentration of the initial soil samples is greater than 1 mg/kg, samples will be collected in stepout locations both vertically and horizontally along the ditch; 2) The area encompassing any Total DDTs contamination greater than 1 mg/kg up to stepout locations less than 1 mg/kg will be excavated and taken off-site for disposal; 3) If the Total DDTs concentration of the initial soil samples is less than 1 mg/kg, stepin samples may be collected or no further sampling will occur and the extent of contamination will have been defined.

Specify the Consequences of Decision Errors: High bias or false positives of analytical results will result in excavation of sediment that does not pose a risk to future wetland species of the inboard area at Hamilton Army Airfield or that could be mitigated by clean cover. Low bias or false negatives of analytical results would allow soil contaminated with Total DDTs to remain on site potentially impacting future wetland species.

**Optimize the Sampling Design:** Collect a total of 15 samples at three locations – five samples at each location (floor sample approximately 1 foot below the floor of the ditch and centered on its midline; 2 surface samples halfway up the walls on either side of the ditch; 2 surface samples one foot from either edge of the ditch). The three locations are one at the curve of the ditch at the northwest corner of the panhandle and 2 other locations 100 feet on either side along the ditch from the initial sample location. See Figure 2-4. Analyze the samples for Total DDTs with an immunoassay field test kit compared to both the 0.2 mg/kg and 1.0mg/kg standard concentrations. If the field test kit results are greater than 1.0 mg/kg, then samples from stepout locations both vertically (6-inch intervals) and horizontally (50-foot intervals, 1-foot intervals laterally from the edge of the ditch) shall be collected and analyzed using the field test kits. If the field test kit results are less than 1.0 mg/kg, then samples from stepin locations horizontally (1/2 the sampling interval) shall be collected and analyzed using the field test kits. Samples from the extent of the Total DDTs-contaminated sediment (< 1 mg/kg) and at least one from within the high Total DDTs area shall be sent to an off-site laboratory for analysis for Total DDTs to verify field testing results. Continue with stepout or stepin sampling until the extent of Total DDTs contamination above the 1 mg/kg action goal is met.

## **2.5 Revetments 6 and 7 for Mercury**

**State the Problem:** Mercury was detected above ROD/RAP action goals in samples for soil excavated from Revetments 6 and 7. See Figures 2-5a and 2-5b.

**Identify the Decision:** Determine if mercury concentrations exceed ROD/RAP action goals in the soil remaining on the site.

**Identify the Inputs to the Decision:** 1) Mercury concentrations in waste characterization data from *Final Construction Report and Supplemental Construction Report for Building 41 Demolition and Soil Removal, Spoils Pile F Removal, and Revetments 6 and 7 Removal, Hamilton Army Airfield*, Shaw Environmental, Inc., May 2003; 2) action goals from the *Main Airfield Parcel Record of Decision/Remedial Action Plan, Hamilton Army Airfield*, Public Comment Final, May 2003; 3) mercury concentrations in soils remaining on site.

**Define the Boundaries:** The spatial boundary for each excavated area is illustrated in the document specified in 1) above. See Figure 2-5.

**Develop Decision Rules:** If the mercury concentration is greater than the inboard area Action Goal of 0.43 mg/kg, then further action to determine the source will be discussed.

**Specify the Consequences of Decision Errors:** High bias or false positives of analytical results will result in further action or discussion of the source of the mercury. Low bias or false negatives of analytical results would allow soil contaminated with mercury to remain on site without any mitigation (cover) potentially impacting future wetland species.

**Optimize the Sampling Design:** Composite samples will be collected from each excavated area of differing depth from both Revetments 6 and 7. See Figure 2-5a and 2-5b. Composites will include at least 4 discrete samples from the excavation.

## 2.6 Firing-in Target Butt (ASR #19) for Selected Metals

State the Problem: A Firing-in Target Butt (FITB) was identified on aerial photos from 1943 and 1946 and documented in the Archives Search Report. See Figure 2-6. The butt was removed in 1947; however, any residual contamination has not been investigated.

Identify the Decision: Determine whether residual contamination from the FITB exists.

Identify the Inputs to the Decision: 1) Historical information documented in *U.S. DoD BRAC Ordnance, Ammunition, and Explosives Archives Search Report, Conclusions and Recommendations, Hamilton Army Airfield*, Final, USACE, September 2001 and associated correspondence; 2) action goals from the *Main Airfield Parcel Record of Decision/Remedial Action Plan, Hamilton Army Airfield*, Final, August 2003; 3) the USFWS Biological Opinion and amending letter, August 2003 and September 2003; 4) concentration of constituents indicative of the presence of residual contamination from ammunition used by DoD at the FITB; and 4) presence or absence of ammunition fragments.

Define the Boundaries: The spatial boundary is identified from aerial photos; features present in the aerial photos and currently known will be used to locate the site for sampling.

Develop Decision Rules: 1) If the concentration of antimony, arsenic, cadmium, chromium, copper, lead, nickel, or zinc is greater than the ROD/RAP or Biological Opinion action goals and ammunition or ammunition fragments are found, further investigation will be undertaken to identify the extent of contamination. 2) If the concentration of antimony, arsenic, cadmium, chromium, lead, nickel, or zinc is greater than the ROD/RAP and Biological Opinion action goals and no ammunition fragments are found, further action to verify that the source of the contamination is the FITB will be recommended. 3) If the concentrations of antimony, arsenic, cadmium, chromium, copper, lead, nickel, and zinc are less than the ROD/RAP and Biological Opinion action goals, no further action will be taken.

Specify the Consequences of Decision Errors: High bias or false positives of analytical results will result in further investigation or discussion of the source of the lead. Action may include further sampling of soil surrounding the soil sample locations to determine extent of contamination of all associated constituents (and subsequent mitigation or excavation) and/or sampling in areas not impacted by the FITB to determine ambient concentrations of lead. Low bias or false negatives of analytical results would allow soil contaminated with constituents associated with ammunition to remain on site without any mitigation (cover) potentially impacting future wetland species.

Optimize the Sampling Design: Five soil samples will be collected immediately in front of and to the sides of the FITB and analyzed for antimony, arsenic, cadmium, chromium, copper, lead, nickel, and zinc. Soil from four locations beneath the FITB will be collected and sieved to isolate any bullets or bullet fragments. See Figure 2-6.

## 2.7 Skeet Range for (ASR #18) Selected Metals and PAHs

State the Problem: A Skeet Range was identified on a 1941 aerial photo and documented in the Archives Search Report. See Figure 2-6. The Range was removed before 1946; however, any residual contamination has not been investigated.

Identify the Decision: Determine whether residual contamination from the Skeet Range exists.

Identify the Inputs to the Decision: 1) Historical information documented in *U.S. DoD BRAC Ordnance, Ammunition, and Explosives Archives Search Report, Conclusions and Recommendations, Hamilton Army Airfield*, Final, USACE, September 2001 and associated correspondence; 2) action goals from the *Main Airfield Parcel Record of Decision/Remedial Action Plan, Hamilton Army Airfield*, Final, August 2003; 3) the USFWS Biological Opinion and amending letter, August 2003 and September 2003; 4) concentration of constituents indicative of the presence of residual contamination from ammunition and clay pigeons (polynuclear aromatic hydrocarbons [PAHs]); and 5) presence or absence of ammunition or clay pigeon fragments.

Define the Boundaries: The boundary of the Skeet Range is hypothetical and was derived from aerial photos, knowledge of other similar sites, and the range of ammunition from shotguns used on such ranges.

Develop Decision Rules: 1) If the concentration of antimony, arsenic, cadmium, chromium, copper, lead, nickel, zinc or Total PAHs is greater than the ROD/RAP and Biological Opinion action goals and ammunition, ammunition fragments, or fragments of clay pigeons are found, further investigation will be undertaken to identify the extent of contamination. 2) If the concentration of antimony, arsenic, cadmium, chromium, copper, lead, nickel, zinc, or total PAHs is greater than the ROD/RAP and Biological Opinion action goals and no ammunition or clay pigeon fragments are found, further action to verify that the source of the contamination is the Skeet Range will be recommended. 3) If the concentrations of antimony, arsenic, cadmium, chromium, copper, lead, nickel, zinc, and PAHs are less than the ROD/RAP and Biological Opinion action goals, no further action will be taken.

Specify the Consequences of Decision Errors: High bias or false positives of analytical results will result in further investigation or discussion of the source of the lead and/or PAHs. Action may include further sampling of soil surrounding the soil sample locations to determine extent of contamination of all associated constituents (and subsequent mitigation or excavation) and/or sampling in areas not impacted by the Skeet Range to determine ambient concentrations of metals or PAHs. Low bias or false negatives of analytical results would allow soil contaminated with constituents associated with ammunition and skeet to remain on site without any mitigation (cover) potentially impacting future wetland species.

Optimize the Sampling Design: Five discrete samples will be collected at two distances from the firing line – two at 250 feet and three at 350 feet. These locations are based upon estimated distances of the range of ammunition from shotguns. See Figure 2-7. The samples will be analyzed for antimony, arsenic, cadmium, chromium, copper, lead, nickel, zinc and PAHs. Soil will also be collected from four locations within the range and sieved to isolate ammunition, ammunition fragments, and/or clay pigeon fragments.

## **2.8 Testing Area (ASR #4) for Selected Metals**

State the Problem: A Testing Area was identified on an aerial photo from 1946 along the levee and documented in the Archives Search Report. See Figure 2-7. Any residual contamination from activities at the Testing Area has not been investigated.

Identify the Decision: Determine whether residual contamination from the Testing Area exists.

Identify the Inputs to the Decision: 1) Historical information documented in *U.S. DoD BRAC Ordnance, Ammunition, and Explosives Archives Search Report, Conclusions and Recommendations, Hamilton Army Airfield*, Final, USACE, September 2001 and associated correspondence; 2) action goals from the *Main Airfield Parcel Record of Decision/Remedial*

*Action Plan, Hamilton Army Airfield, Final, August 2003; 3) the USFWS Biological Opinion and amending letter, August 2003 and September 2003; 4) concentration of constituents indicative of the presence of residual contamination from ammunition; and 5) presence or absence of ammunition or ammunition fragments.*

Define the Boundaries: The spatial boundary is identified from aerial photo; features present in the aerial photo and currently known will be used to locate the site for sampling.

Develop Decision Rules: 1) If the concentration of antimony, arsenic, cadmium, chromium, copper, lead, nickel, or zinc is greater than the ROD/RAP and Biological Opinion action goals and ammunition or ammunition fragments are found, further investigation will be undertaken to identify the extent of contamination. 2) If the concentration of antimony, arsenic, cadmium, chromium, copper, lead, nickel, or zinc is greater than the ROD/RAP and Biological Opinion action goals and no ammunition fragments are found, further action to verify that the source of the contamination is the FITB will be recommended. 3) If the concentrations of antimony, arsenic, cadmium, chromium, copper, lead, nickel, and zinc are less than the ROD/RAP and Biological Opinion action goals, no further action will be taken.

Specify the Consequences of Decision Errors: High bias or false positives of analytical results will result in further investigation or discussion of the source of the lead. Action may include further sampling of soil surrounding the soil sample locations to determine extent of contamination of all associated constituents (and subsequent mitigation or excavation) and/or sampling in areas not impacted by the Testing Area to determine ambient concentrations of lead. Low bias or false negatives of analytical results would allow soil contaminated with constituents associated with ammunition to remain on site without any mitigation (cover) potentially impacting future wetland species.

Optimize the Sampling Design: Five samples will be collected along the inboard side of the levee equally spaced the length of the Testing Area. See Figure 2-8. The soil samples will be collected from 0 to 6 inches bgs, between the toe and top of the levee, and analyzed for antimony, arsenic, cadmium, chromium, copper, lead, nickel, and zinc based upon the assumption that the testing was for ammunition and the levee was used as a backstop. Soil from the five locations will also be collected and sieved to isolate any bullets or bullet fragments.

### 3.0 REFERENCES

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