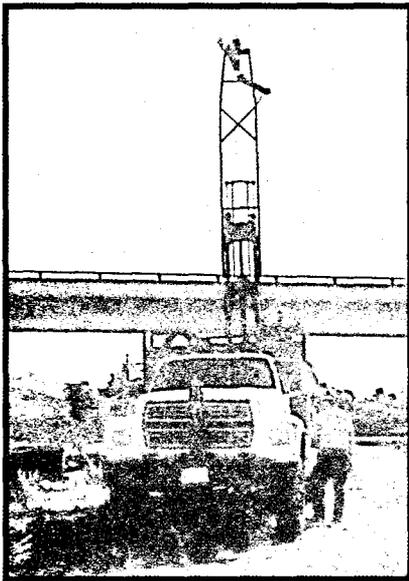


**HISTORICAL RECORDS REVIEW  
MARICOPA COUNTY SHERIFF'S SHOOTING RANGE  
NEAR MCMICKEN DAM  
SURPRISE, ARIZONA  
CONTRACT FCD 2004C029  
WORK ASSIGNMENT NO. 3**

Property of  
District of MC Library



**Geotechnical  
and  
Environmental  
Sciences  
Consultants**

***Ninyo & Moore***

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MARICOPA COUNTY SHERIFF'S SHOOTING RANGE  
NEAR MCMICKEN DAM  
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CONTRACT FCD 2004C029  
WORK ASSIGNMENT NO. 3**

Property of  
Flood Control District of MC Library  
Please Return to  
2801 W. Durango  
Phoenix, AZ 85009

**PREPARED FOR:**  
Flood Control District of Maricopa County  
2801 West Durango Street  
Phoenix, Arizona 85009

**PREPARED BY:**  
Ninyo & Moore  
Geotechnical and Environmental Sciences Consultants  
3001 South 35th Street, Suite 6  
Phoenix, Arizona 85034

January 24, 2006  
Project No. 600996003

January 24, 2006  
Project No. 600996003

Mr. Michael Greenslade, P.E.  
Flood Control District of Maricopa County  
2801 West Durango Street  
Phoenix, Arizona 85009

Subject: Historical Records Review  
Maricopa County Sheriff's Shooting Range  
Near McMicken Dam  
Contract FCD 2004C029  
Work Assignment No. 3

Dear Mr. Greenslade:

In accordance with your authorization, Ninyo & Moore is pleased to provide this historical records review regarding the Maricopa County Sheriff's Shooting Range located near the McMicken Dam in Surprise, Arizona. The activities were performed under Flood Control District of Maricopa County Contract No. 2004C029, Work Assignment No. 3 and in general accordance with Ninyo & Moore's revised proposal dated June 30, 2005.

Ninyo & Moore appreciates this opportunity to be of service to Flood Control District of Maricopa County. If you have any questions or comments regarding this report, please call the undersigned at your convenience.

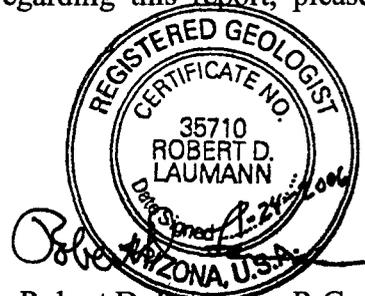
Respectfully submitted,  
**NINYO & MOORE**



Dwight H. Clark, C.H.M.M., C.E.T.  
Senior Environmental Engineer

HAL/DHC/RDL/hmm

Distribution: (1) Addressee



Robert D. Laumann, R.G.  
Principal Geologist/Division Manager

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**Figures**

Figure 1 – Site Location Map

Figure 2 – Site Layout Map

Figure 3 – Site Plan and Vicinity Map

## **EXECUTIVE SUMMARY**

Ninyo & Moore was retained by the Flood Control District of Maricopa County to perform a historical records review for the Maricopa County Sheriff's Office Shooting Range, located near McMicken Dam in Surprise, Arizona. The historical records review considered the past and present operations of the facilities. The historical records review presents a concise history of the site operations and provides a basis for future decision making for the facility.

The historical research identified that the flood control structures were developed between 1949 and 1956. The site has been used as a shooting range from approximately 1985 to present. The shooting range was initially developed by the Sheriff's Posse and transferred to the Sheriff's Office in approximately 1989. Recently the site has been reviewed by the Maricopa County Risk Management Office as a part of an environmental audit of all County owned and operated properties.

## 1. INTRODUCTION

Ninyo & Moore was retained by the Flood Control District of Maricopa County (FCDMC) to perform a historical records for the Maricopa County Sheriff's Shooting Range, located near McMicken Dam, Surprise, Arizona.

The Sheriff's Shooting Range consists of an approximately 19.72-acre area located in Section 24 of Township 4 North, Range 2 West, Gila and Salt River Meridian and is a portion of Maricopa County Assessor's Parcel Number 503-75-016 (Figure 1). The range is situated just east of McMicken Dam, north of the principal spillway. The current shooting range configuration consists of five bays (Figure 2). Bay 1 is used as a rifle range, Bay 2, Bay 3, and Bay 4 are used as pistol and shotgun ranges, and Bay 5 is used for Special Weapons and Tactics (SWAT) training. In addition, approximately four open burning treatment units (burn pits) were reportedly used for the deactivation of small arms ammunition. Additionally, a dumpster (bin) used to burn fireworks and chemical irritants, such as chloroactonphenone (CN), o-chlorobenzylidenemalononitrile (CS), and pepper spray was previously operated and remains at the site.

## 2. PURPOSE

The purpose of this Historical Records Review was to collect, evaluate, and summarize available information on the Maricopa County Sheriff's Shooting Range in support of future decisions and actions for that site. As applicable and available, operational records, personnel experience, aerial photographs, results of previous investigations, current site conditions, and other such information should be considered in assessing appropriate actions to be taken at the site. The Historical Records Review is intended to provide that information and/or list what information is available and what key information is missing.

A primary objective of the overall Maricopa County Sheriff's Shooting Range project is to reach a level of knowledge such that an assessment can be made as to whether or not constituents of concern (COCs) are present at the site in concentrations that would pose a threat to human health or the environment and to select appropriate remediation methods. It is anticipated that different areas in the Sheriff's Shooting Range will use differing remediation process parameters or tech-

nologies based on differences in COCs concentrations, and field conditions. The design of such remedial actions is a good example of how the Historical Records Review will be used. In order for the remediation effort to be efficient and cost effective, its design should incorporate what is already known about the site. Therefore, it is important to know where operations having the potential to cause environmental impact were performed. Soil assessment and remediation will correspondingly be focused on areas with relatively higher potential for environmental impact.

### **3. SCOPE OF WORK**

This Historical Records Review is limited to information on the Maricopa County Sheriff's Shooting Range. The key information sought for this effort includes the following:

- Reports from previous investigations of the site.
- Historical site use information including:
  - historical operational records,
  - personal knowledge obtained through interviews, and
  - aerial photographs.
- Review of current site operations.

As described in the document, not all information sources sought were located.

The scope of this document includes the presentation of the information found and an evaluation of its content (i.e., what does it mean and the conclusions that can be reached) as well as the associated uncertainty.

### **4. PREVIOUS INVESTIGATIONS**

Two previous investigations were reviewed by Ninyo & Moore. The investigations are noted with the following titles:

- Final Phase I / II - Environmental Site Assessments of Sheriff's Shooting Range, Surprise Arizona, EEC Project No. 203169.01, dated June 28, 2004.

- Final Phase II Environmental Site Assessment, Surprise Shooting Range Burn Units & Off-site Drainage Surprise Arizona, EEC Project No. 203169.02, dated January 31, 2005.

The first document obtained and reviewed by Ninyo & Moore consisted of a document titled *Final Phase I / II - Environmental Site Assessments of Sheriff's Shooting Range, Surprise Arizona, EEC Project No. 203169.01*, dated June 28, 2004. This Environmental Site Assessment (ESA) documented the following conclusions:

- The Phase I ESA indicated that metals and polynuclear aromatic hydrocarbons (PAHs) associated with small arms munitions used on the shooting ranges were present in soils at the site. The sampling in the Phase II ESA indicated that lead, antimony, arsenic, and the PAH benzo(a)pyrene were present in levels above the Arizona Soil Remediation Levels (SRLs).
- An open pit and small dumpster used for open burning were noted during the Phase I ESA. The open pit reportedly received small arms ammunition, and the small dumpster received fireworks and CN (chloroacetophenone), CS (o-chlorobenzylidenemalononitrile) and pepper spray (Capsaicin) chemical irritants that were confiscated during Sheriff's Department operations or that were out of specification. The Phase I ESA documented the likelihood of additional open burning pits in the vicinity. Scrap wood and starter fuel, reportedly diesel, was used in the open burning process. At the time of the Phase I ESA, the open burning units were being operated without a permit. EEC reported visibly impacted soil around the dumpster and that the open burning pits have likely impacted the surrounding soil.
- The Phase I ESA noted a water well on site. The well was identified in the Phase I ESA as meeting the requirements of a Transient Non-Community Water System (TNCWS). However, the well was not permitted, operated, or tested as required for a TNCWS. The Phase II ESA documented sampling of the well water for compliance with monitoring requirements listed in the Safe Drinking Water Act. The samples analyzed for the Phase II ESA indicated that the well water exceeded the Maximum Contaminant Level (MCL) for nitrates.
- The Phase I ESA noted that seven car batteries were present in the materials management area on the southeastern portion of the property. The batteries were inappropriately stored (on soil and exposed to the elements) but no evidence of leaking was observed.

The second document obtained and reviewed by Ninyo & Moore consisted of a document titled *Final Phase II Environmental Site Assessment Surprise Shooting Range Burn Units & Offsite Drainage, Surprise Arizona, EEC Project No. 203169.02*, dated January 31, 2005. This ESA documented the following conclusions:

“Results of analyses for Burn Pit samples indicated some concentrations of lead, copper, antimony, zinc, and arsenic above natural background, including one sample with lead and

arsenic reported above non-residential Soil Remediation Levels (nSRLs). All elevated levels were found within areas identified as anomalously high conductivity areas in the EM survey. The results indicate that contamination is spatially limited and the EM signature can reliably identify areas of concern. Based on previous experience with burn pits, significant contamination is limited to a zone in contact with a thin layer of ash on the former pit bottom. This model is supported by the fact that the only concentration of contaminants above SRLs was found in the center of a pit anomaly at the 5-foot level (Sample BPA-4-5). The lack of more samples exceeding SRLs is most likely due to missing the thin layer in other sampling locations. Although lead projectiles were observed to be intermixed with surface soils, analytical results show that leaching of lead into the soil matrix does not appear to have resulted in significant impact to soil concentrations.”

“No evidence of significant contamination by PAHs, petroleum hydrocarbons, or VOCs was noted. Sampling within the ash zone of a pit could result in detections, but the extent of contamination is not apparently significant.”

“Burn Bin analyses indicate minor surface contamination has resulted from use of the burn bin. Lead and copper in surface samples were identified significantly above natural background concentrations, while subsurface samples showed no impact. However, only one of the surface samples exceeded the residential Soil Remediation Level (rSRL) for lead. Arsenic was found in one surface sample above nSRLs. Mercury concentrations were well within natural background concentration, but surface sample concentrations were notably higher than subsurface concentrations. PAHs were detected at levels below the rSRLs in 5 of 7 surface samples collected, but were not detected in the remaining 2 surface samples or any subsurface samples. Perchlorates were detected in 4 of 7 surface samples and 3 of 5 subsurface samples. There are currently no SRLs for perchlorates. However, EEC performed risk assessments concluded that no significant risk exists from perchlorate concentrations reported. The concentration of contaminants, with the possible exception of perchlorates, does not appear to be correlated with proximity to the burn bin. Additionally, unlike samples from the Burn Pit area, high concentrations of a particular contaminant did not correlate to high concentrations of other contaminants. Deposition of contaminant particles from airborne fallout are assumed to be a significant factor in the bin area, and is likely responsible for the variable distribution of contaminants. This mode of deposition appears to be less significant in the Burn Pit area based more limited spatial distribution of contaminants.”

“The burn bin is located in an area currently used for target practice, and projectiles were observed in the area sampled. Shell casings were observed in the ash of the burn pit, suggesting the bin was also used for ammunitions disposal. Therefore, soil contamination, particularly pertaining to lead, copper, arsenic, and antimony, is assumed to have resulted both from use of the burn bin and from use of the range (a RCRA exempt activity). Concentrations of lead, copper and antimony characterized in range areas reported in the previous Phase II were significantly higher than concentrations reported here. Therefore, the primary source of the lead, copper and antimony contamination at the bin site could reasonably be from the berm. The two highest lead concentrations and the highest copper concentration

were found in samples collected from the berm wall behind the bin. However, the arsenic concentration found in one of those samples is significantly higher than any arsenic concentration identified in the previous Phase II. In any case, commingled contamination would complicate determination of what contamination is covered under RCRA and would require removal at this time.”

“Sediment was sampled in the drainage pathway identified between the ballistic berm at the Sheriff's Range and McMicken Dam where the drainage left the property boundary. Metals concentrations were consistent with natural background. PAHs were not detected”.

Several personnel interviewed for this report indicated that another study was conducted in the late 1980s or mid-1990s; however, no documentation of the study was located. The study reportedly documented the requirement to keep soil from the berms on site and to retain stormwater runoff on site.

One additional report was reviewed titled *Trilby Wash Detention Basin Environmental Site Assessment, Exceltech Project No. 5-50076-51*, dated April 1991. The report does not include the section of land containing the shooting ranges and does not discuss the shooting ranges. Therefore, although the report on the Trilby Wash Detention Basin was reviewed, it is not discussed in the current report.

## **5. HISTORICAL SITE USE**

The interview process and review of the Phase I ESA noted that the site has been used as a shooting range from approximately 1985 to present. The initial shooting range was developed by the Sheriff's Posse and transferred to the Sheriff's Office in approximately 1989. Based on interviews, the historical site operations differ little from the current operations.

The historical uses of the property by the property title indicated ranching and citrus farming in addition to flood control structures. The flood control structures were developed between 1949 and 1956. The review of the aerial photographs provided no evidence that development other than the flood control structures and Sheriff's Range improvements existed at the site.

### **5.1. Real Estate Ownership**

A title report for the subject property was obtained from All Lands of Goodyear, Arizona during the Phase I ESA performed by EEC. The report listed the FCDMC as the current owner of the site. Previous owners of the site included Maricopa County, ranching and farming concerns, private individuals and the Maricopa County Drainage District #1. Interviews with Mr. Michael Greenslade of the FCDMC indicated that the lease records were available at the FCDMC offices for the subject property.

According to the title report, no leases, VEMURs or DEURs, environmental liens, or activity and use limitations were found currently recorded against the subject property at the county recorders office.

### **5.2. Firing Records**

During the interview process Maricopa County Sheriff's Department personnel reported that they do not keep detailed records of firing operations. The Phase I ESA (EEC, 2004) documented that "[i]t is estimated that in excess of one million rounds of ammunition are fired annually."

No records for the SWAT Area were obtained during the research for the Phase I ESA or by Ninyo & Moore.

Data Gaps: Firing records were not available. Firing records may be used to assess relative levels of land deposition and whether munitions other than typical ball ammunitions have been used at the site and therefore aid in developing a list of other potential contaminants of concern.

### **5.3. Summary of Interviews**

On August 30, 2005 Ninyo & Moore interviewed Ms. Rita Neill of the Maricopa County Risk Management Office. Ms. Neill indicated that the Sheriff's Range was assessed as part of an environmental audit of all County owned and operated properties. Ms. Neill stated that

the Voluntary Remediation Program application and background document for the closure of the burn pits and burn bin was filed with the Arizona Department of Environmental Quality. Ms. Neill stated that the open burning operations have ceased by direction of her department. Ms. Neill also stated that she was not aware of environmental documentation for the site than the Phase I / II ESA and the Burn Pit and Bin Phase II ESA.

Additionally, Ms. Neill noted that the Phase II characterization was conducted on the site and provided to ADEQ for the Voluntary Remediation Program characterization report. Ms. Neill noted that ADEQ had verbally accepted this report as sufficient to characterize the site.

Ninyo & Moore interviewed Officer Don Burke from the Sheriff's Shooting Range on September 2, 2005. Officer Burke stated that he has worked on the range for approximately 11 years. Officer Burke stated that the Sheriff's Posse built the range in 1984. Officer Burke stated that primarily rifles and handguns are used at the range; however, shotguns are occasionally used in Bay 4. He further indicated and that the firing pattern has always been the same as the current direction of fire (to the west). In addition, Officer Burke stated that burn pits were previously used on the site to burn fireworks and ammunition. Officer Burke also stated that the Sheriff's Office has not performed lead reclamation at the range. Officer Burke indicated that a previous environmental study was performed on the site in the mid-1990s. The source or results of this report were unable to be obtained by Ninyo & Moore.

On September 29, 2005, Ninyo & Moore interviewed Sergeant Bill Wiscomb, Captain James Mason and Captain Ray Harkey of the Maricopa County Sheriff's Office. The officers interviewed stated that they had not spent much time at the shooting range; however, the range was under the command structure of Captain Harkey for several years in the late 1990s. The officers corroborated Officer Burke's statements that the historical firing patterns were the current firing directions. In addition, the officers stated that the burn pits were used to burn fireworks and old ammunition; however, the officers did not observe burn activities. The officers also stated that a previous environmental study had been performed at the site in approximately 1987. Ninyo & Moore was unable to obtain the results of this report, which is likely the report discussed by Officer Burke.

On October 3, 2005, Ninyo & Moore interviewed Sergeant Mike Branham, who is the supervisor/coordinator of the shooting range. Sergeant Branham stated that he has worked at the shooting range for 10 years. Sergeant Branham stated the range was transferred from the posse to the Sheriff's Office in approximately 1989. Sergeant Branham corroborated Officer Burke's comments regarding historical firing patterns. Sergeant Branham noted that burn pits were previously operated on site but commented that they have not been active in the past 2 to 3 years. Sergeant Branham also commented that the burn pits were used to burn confiscated items such as ammunition and fireworks. Sergeant Branham also stated that dynamite may have been burned on the ground. In addition, Sergeant Branham noted that lead reclamation has not been performed by the Sheriff's Office; however, he indicated that the Posse performed lead reclamation more than 10 years ago.

Data Gaps: Ninyo & Moore was unable to locate any members of the Sheriff's Posse from the time the range was constructed and operated by the Posse.

#### **5.4. Aerial Photo Interpretation and Map Analysis**

The records search effort included reviewing historical photographs of the Maricopa County Sheriff's Range that might give an indication on the nature and timing of the activities that occurred there. The search involved the review of quarterly aerial photographs from Rupp Aerial Photography from 1977 to 2004. According to the FCDMC (Mr. Michael Greenslade) the flood control structures were in place by 1956, the Sheriff's Range was not developed until 1985; therefore, the historical aerial photography review was conducted using aerial photographs dated from 1977 to present. A brief discussion of the historical photographs used for the evaluation is presented below and summarized in Figure 3. The aerial photographs reviewed were at a scale of 1:25,200 (1 inch = 2,100 feet) and evaluations were conducted with the naked eye and a handheld magnifying glass.

*1977* – The shooting range does not exist at this time. There are no surface disturbances noted aside from existing flood control structures. No area of stained soil were noted.

*1988 First Quarter* – The shooting range has been developed as a large C-shaped bay. This large open shooting range encompasses Bays 1 through 4. The SWAT Area has not been developed at this time. No areas of soil staining were noted.

*1989 First Quarter* – There is no change from 1988 noted. The shooting range is still one, large open range.

*1990 First Quarter* – There is no change from 1989 noted.

*1994 Third Quarter* – Three lateral berms have been developed separating the individual bays from each other. The SWAT Area south of the original shooting range has also been developed.

*1995 Second Quarter* – Shooting range features are similar to present day features. Four shooting bays are located to the north and the SWAT Area to the south. The building structures in the SWAT Area have been constructed by this time.

*2004 Fourth Quarter* – Shooting range features are similar to present day features. Four shooting bays are located to the north and the SWAT Area to the south. The building structures in the SWAT Area have been constructed by this time.

## **6. CURRENT SITE USE SUMMARY**

The site contains several features of concern as noted in the site reconnaissance, the Phase I ESA, and during the interviews. The current shooting range configuration consists of five bays. Bay 1 is used as a rifle range, Bay 2, Bay 3, and Bay 4 are used for pistol and shotgun range training, and Bay 5 is used for SWAT training. In addition, there are open burning treatment units and an ammunition storage area. The layout of the areas of concern is presented in Figure 2. The detailed review of the use for each particular area of concern is included below.

### **6.1. Firing Bays**

#### **6.1.1. Bay 1**

Bay 1 is a rifle firing range located in the along the northern side of the Sheriff's Range complex. The bay is partially surrounded by impact berms constructed of earthen materials to the west and north, and a block wall separates Bay 1 from Bay 2 to the south. The impact berms form the western and northern boundary of the range. The target or impact area is in the western portion of the bay, in front of the impact berm.

Bay 1 contains firing positions at distances of 50, 100, 200, and 300 yards. Each firing position is reportedly a fixed location and no other firing points are procedurally used.

#### **6.1.2. Bay 2**

Bay 2 is used as a handgun range located in the western central portion of the Sheriff's Range complex, south of Bay 1 and adjacent on the east to the administration building. The bay is partially surrounded by impact berms constructed of earthen materials, and block walls to the north and south separate Bay 2 from Bays 1 and 3. The impact berms form the western boundary of the range. The target or impact area is in the western portion of the bay, in front of the impact berm. The floor of the bay is compacted stabilized soil, with concrete walkways.

The firing points are well defined by the shade structures and shooting rest benches provided.

#### **6.1.3. Bay 3**

Bay 3 is used as a handgun range located in the western central portion of the Sheriff's Range complex south of Bay 2, adjacent on the east to the storage building. The bay is partially surrounded to the west and south by impact berms constructed of earthen materials, and block walls to the north and south separate Bay 3 from Bays 2 and 4. The impact berms form the western boundary of the range. The target or impact area is in the western portion of the bay, in front of the impact berm. The floor of the bay is compacted stabilized soil, with concrete walkways.

The firing points are well defined by the shade structures and shooting rest benches provided.

Bay 3 includes a small storage building to the east of the firing positions. The building is generally used to store target materials.

#### **6.1.4. Bay 4**

Bay 4 is used as a shotgun range located in the western central portion of the Sheriff's Range complex south of Bay 3. The bay is partially surrounded on the north, south, and west by impact berms constructed of earthen materials. The impact berms form the western boundary of the range. The target or impact area is generally in the western portion of the bay, in front of the impact berm; however, targets may be placed randomly during practical shooting, with fire towards the impact berm. The floor of the bay is compacted soil.

The firing points are not well defined; however, by procedure firing lines are required to be towards the impact berm. The use of clay targets was noted in this bay during the Phase I ESA (EEC, 2004). These targets may indicate an upward shot pattern with the shotguns, typical of trap or skeet ranges.

Bay 4 includes a small storage building east of the firing positions. The building is generally used to store target materials.

#### **6.1.5. Bay 5 (SWAT Area)**

The SWAT Area is located in the south-western portion of the Sheriff's Range complex south of Bay 4. The SWAT Area is partially surrounded by impact berms constructed of earthen materials on the west, north, and south sides. The impact berms form the western and southern boundary of the range.

The SWAT Area reportedly is used for training the Sheriff's SWAT officers in various techniques such as explosively accessing (breaching) buildings. The interview process did not yield much information on the operations within the SWAT Area. The officers interviewed were not actively involved with the SWAT area operations. A small, collapsed, shed-like structure in the SWAT Area was observed during the site reconnaissance. The building reportedly had been used as a "gas house" where officers are exposed to different chemical irritants during training.

The main structures in the SWAT Area are constructed of heavy timbers and poles such as railroad ties. The structure is outfitted with several doors and window arrangements, presumably to be used as the training requires. During the site reconnaissance Ninyo & Moore staff observed several carcasses of explosives charges on the berms surrounding the SWAT Area. Additionally, Ninyo & Moore observed the expended projectiles of what was identified by Deputy Burke as "Stun Rounds." These range from large wood baton rounds, plastic bullets, beanbag rounds, or sock rounds and such items as flash/bang grenades.

Based on the physical evidence inside and around the SWAT Area, this area may be used for multiple types of munitions in the Sheriff's arsenal. Ninyo & Moore personnel have observed, from outside the range, several explosions that ejected soil into the air several meters above the berms.

Data Gap: No detailed description of operations or munitions used was available for the SWAT Area.

#### **6.1.6. Open Burning Treatment Units**

As noted in the Phase I ESA, there are two types of open burning treatment units located on the Sheriff's Range Complex, the Small Arms Burn Pits and the Fireworks / Irritant Burn Bin. This section will address each open burning treatment unit separately.

The Small Arms Burn Pits are located in the approximate center of the site, approximately 300 feet to the east of the developed areas. The Maricopa County Risk Management, Environmental Division Request for Quote, *Environmental Consulting Services - Environmental Site Remediation Surprise Shooting Range Surprise, Arizona*, dated May 6, 2005 and the Phase I ESA reported that four pits were located in the general area. During the interviews performed by Ninyo & Moore, it was noted by Officer Burke that the stormwater retention developed after an infiltration ditch was placed in the general vicinity of the burn pits during the 1990s-era assessment.

The Small Arms Burn Pits reportedly received small arms ammunition that had been confiscated during Sheriff's Department operations. The Phase I ESA documented that "[t]he ammunition, scrap wood and starter fuel, reportedly diesel fuel, are used in the open burning process. Diesel fuel contains PAHs and small quantities of benzene, toluene, ethylbenzene and xylenes." The fuel constituents may be released to the soil during the process causing the soil to be impacted. Metals may cause soil impacts from the burning of the ammunition, concentrating the metals in the ash and debris. The Phase I ESA further stated that "[p]ropellants, including nitrocellulose, nitroglycerin and possibly nitroguanidine may be released to the environment, if combustion is incomplete."

The Fireworks/Irritant Burn Dumpster (Bin) is located in the southwestern corner of the Sheriff's Range Complex, inside the SWAT Area. The Phase I ESA (EEC, 2004) documented that "[t]he unit reportedly receives fireworks and out-of-specification CN (chloroacetophenone), CS (o-chlorobenzylidenemalononitrile) and pepper spray (Capsaicin) chemical irritants. Ash and debris from operation of this unit is visible on soil."

A review of agency files at ADEQ revealed no files on record for the facility.

Data Gaps: 1) There are no records of the types of items and quantities burned in the open burning treatment units. 2) The detailed position of the historical burn pits was not available to locate the pits by records. 3) The number of previous pits was not recorded.

#### **6.1.7. Ammunition Storage Bunkers**

The Ammunition Storage Bunkers are located on the eastern boundary of the site, approximately 400 feet east of the administration building. The site contains three earth-covered ammunition bunkers and one portable magazine. The three earth-covered bunkers are operated by the Sheriff's Office and the portable magazine is operated by the Arizona Department of Public Service. The bunkers are reportedly used to store ammunition and explosives for training. The bunkers contained, based on interviews with Officer Burke, products in transportation packaging, not waste materials. The bunkers were not inspected by Ninyo & Moore or during the Phase I ESA.

**Data Gaps:** The on-site personnel did not have records of the items stored in the bunkers by others (Arizona Department of Public Safety and SWAT units). The data may have yielded valuable data in the contaminants of concern for the eventual site characterization.

## 7. REFERENCES

EEC, Final Phase I / II - Environmental Site Assessments of Sheriff's Shooting Range, Surprise Arizona, EEC Project No. 203169.01: dated June 28, 2004.

EEC, Final II Environmental Site Assessment Surprise Shooting Range Burn Units & Offsite Drainage Surprise Arizona, EEC Project No. 203169.02: dated January 31, 2005.

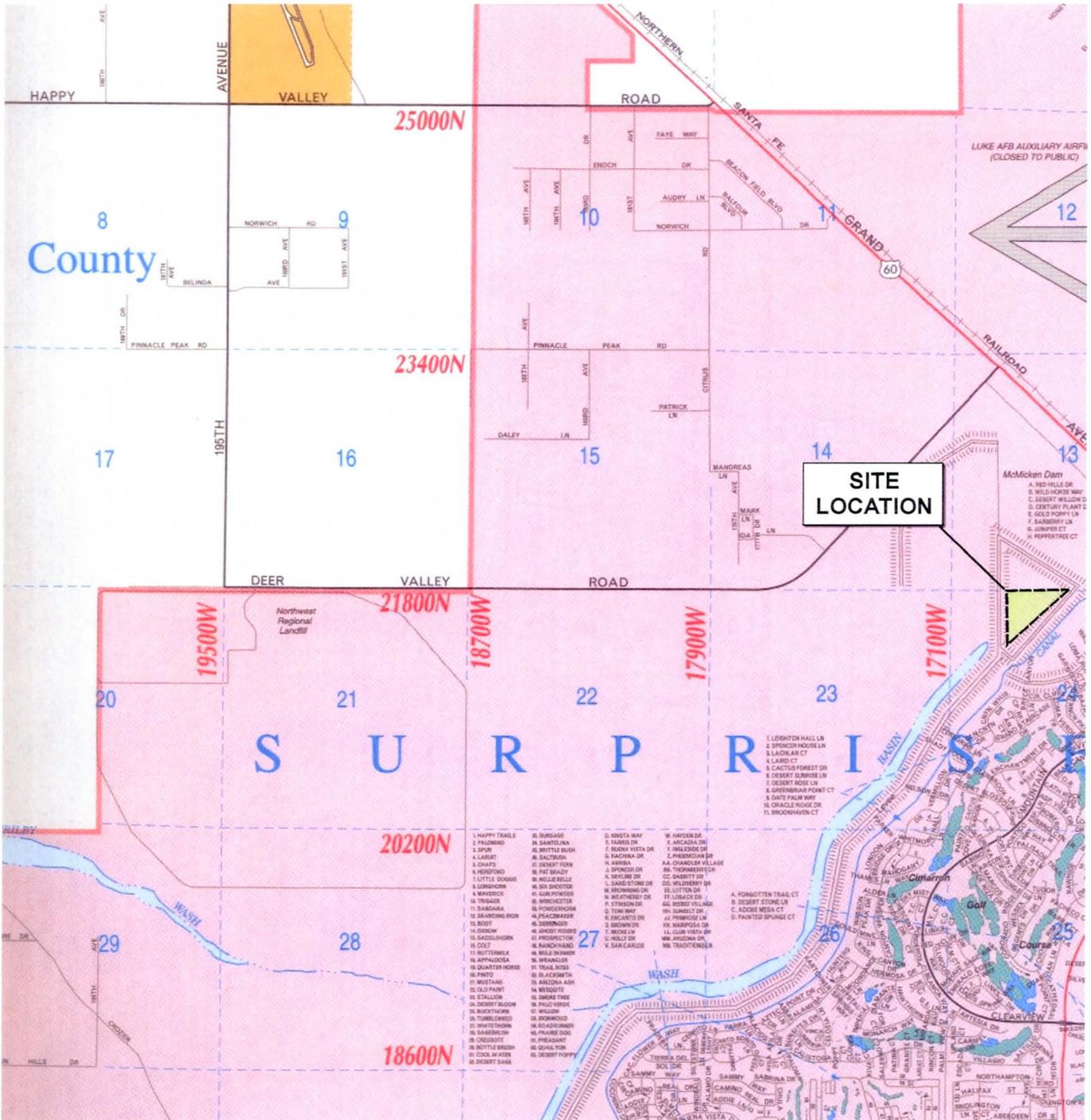
Maricopa County Risk Management, Environmental Division Request for Quote, Environmental Consulting Services - Environmental Site Remediation Surprise Shooting Range Surprise, Arizona: dated May 6, 2005.

Rupp Aerial Photography, 2005, Aerial Photo Review.

United States Department of Agriculture, Soil Survey of Maricopa County, Arizona, Central Part: dated 1977.

United States Geological Survey (USGS), 7.5-Minute Topographic Quadrangle Map Series, McMicken Dam AZ, 1957, photorevised 1981 Scale 1:24,000.

**FIGURES**



0 3300  
 Approximate Scale:  
 1 inch = 3300 feet

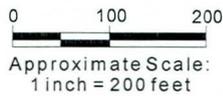
Source: Phoenix Mapping Service, Phoenix Metro 2005

<b>Ninyo &amp; Moore</b>		SITE LOCATION MAP	
MARICOPA COUNTY SHERIFF'S SHOOTING RANGE HISTORICAL RECORDS REVIEW		FIGURE <b>1</b>	
PROJECT No: 600996003	FILE No: 0996slm1105	DATE: 01/06	



**LEGEND**

FP = FIRING POSITION



Source: Maricopa County Assessor's GIS Dept, 2005,  
Boundaries and Locations are Approximate

**Ninyo & Moore**

SITE LAYOUT MAP

MARICOPA COUNTY SHERIFF'S SHOOTING RANGE  
HISTORICAL RECORDS REVIEW

FIGURE

PROJECT No:  
600996003

FILE No:  
0996spl11053

DATE:  
01/06

2



**LEGEND**

-  1988
-  1994
-  1995

0 150 300  
Approximate Scale:  
1 inch = 300 feet

Source: Maricopa County Assessor's GIS Dept, 2005,  
Boundaries and Locations are Approximate

***Ninyo & Moore***

SITE PLAN AND  
VICINITY MAP

MARICOPA COUNTY SHERIFF'S SHOOTING RANGE  
HISTORICAL RECORDS REVIEW

FIGURE

PROJECT No:  
600996003

FILE No:  
0996spl11052

DATE:  
01/06

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