

# ***Section 17 Projects: Old Church Rock Mine and Downwind Structures***

Presenter: Eugene Esplain

**Navajo Superfund Program - Site Assessment**

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**Waste Regulatory Compliance Dept.  
Navajo Nation  
Environmental Protection Agency**

# Day After Heavy Rain



# August 2, 2006





**Waste Material:**  
**Height: 8-12 feet**  
**Length: 370 feet**

**Exposure Measurements:**  
**65-110  $\mu\text{R/hr}$  (bank)**  
**30-65  $\mu\text{R/hr}$  (sediment)**

**Background=12-15 microRoentgens per hour ( $\mu\text{R/hr}$ )**



**Dry Ponds On-site  
(unreclaimed)**

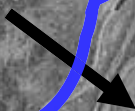
**320  $\mu$ R/hr**

**White Waste Material in Bank  
(Stratum: 3' thick & 30' length)**



# Old Church Rock Mine

Settling (dry) Ponds



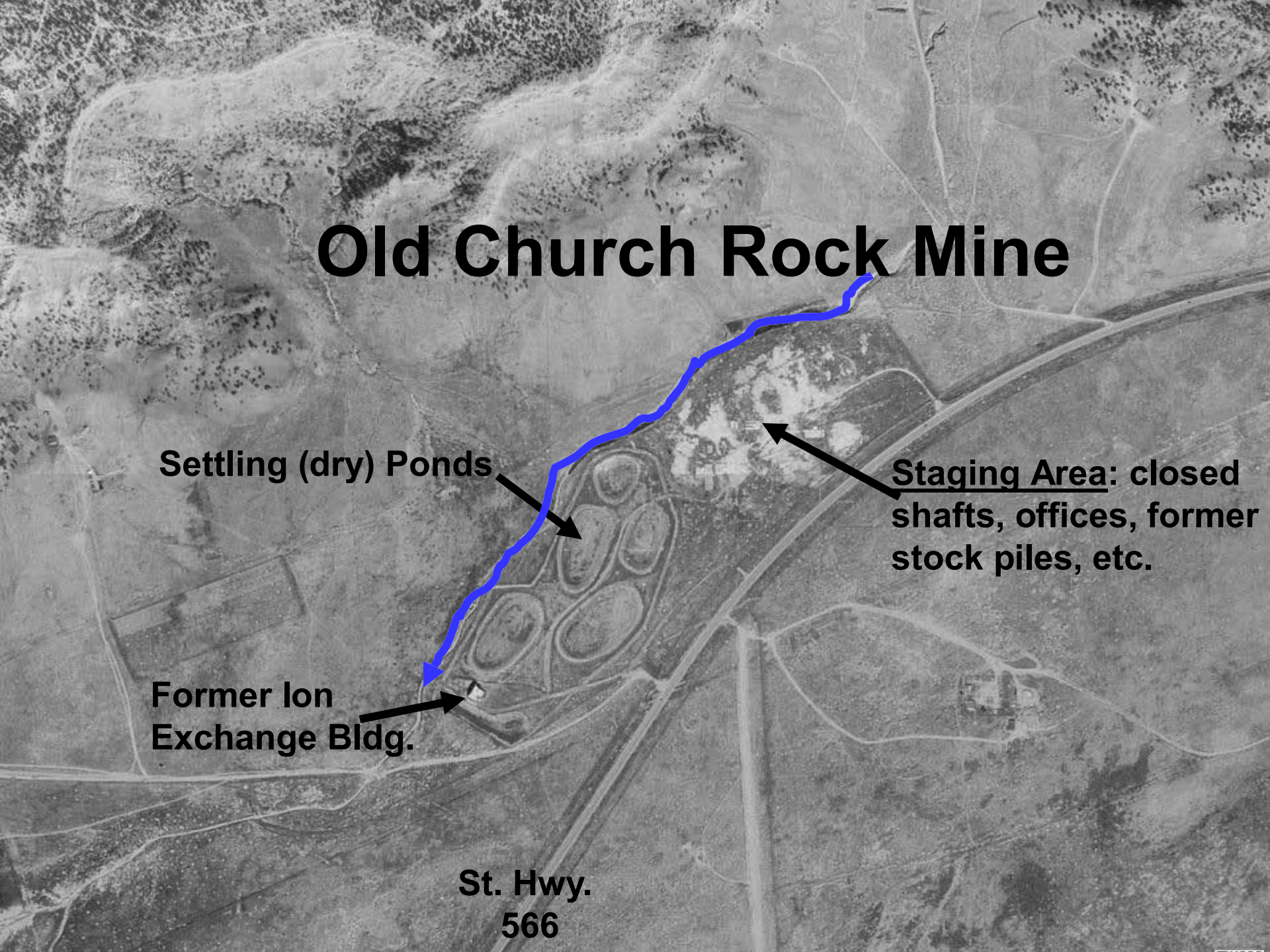
Staging Area: closed shafts, offices, former stock piles, etc.



Former Ion Exchange Bldg.



St. Hwy.  
566





# Scoping Survey done by Navajo Superfund Program March 2007

Bureau of Land Management

Navajo Trust Land

Residence

Navajo  
Trust

Sec. 9

Sec. 16

State  
Land

Sec. 8

Sec. 17

Residences

SITE

Former Ion  
Exchange  
Building

Hwy.  
566

Residences

Township 16 North, Range 16 West



# Establishing Survey Grid Points Inside OCRM Site



# Old Church Rock Mine Site History

- Mined 1960-'62 by Phillips Petroleum Co.; Reopened 1976-'77 and 1979-'81 by United Nuclear Corporation (UNC)
- Underground mining (800 ft.- 900 ft. shafts) with on-site processing
- Ore production was 77,965 tons
- Uranium Resources Inc. (URI) now owns the subsurface mineral rights



# Exposure Results (microRoentgens per hour)

Old Church Rock Mine Site

Counts per minute at Waist Level

Exposure Rate, uR/hr = (0.000656 X cpm) + 5.1

Exposure Rate uR/hr Level Code

Area (inside perimeter Fence)

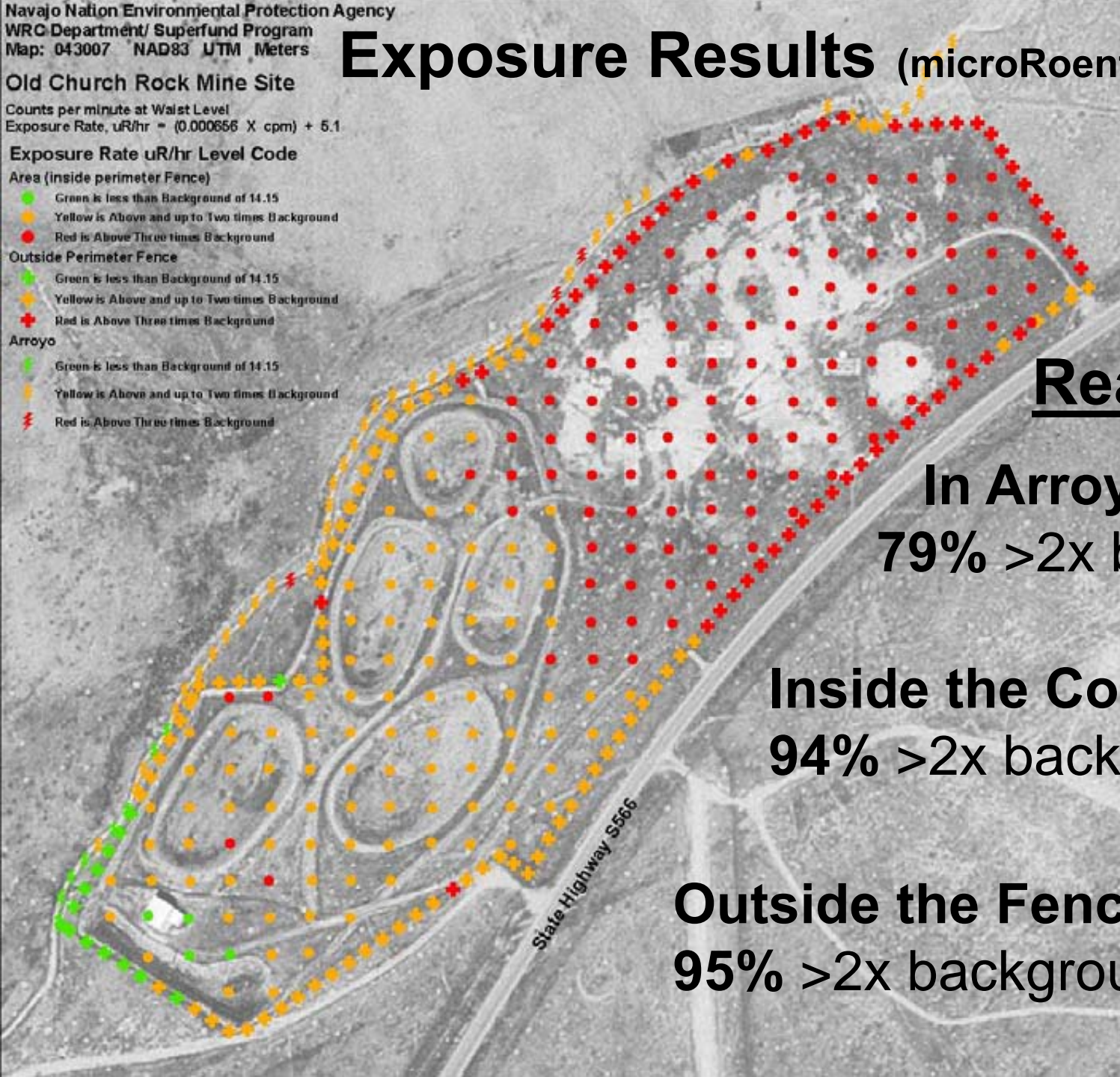
- Green is less than Background of 14.15
- Yellow is Above and up to Two times Background
- Red is Above Three times Background

Outside Perimeter Fence

- Green is less than Background of 14.15
- Yellow is Above and up to Two times Background
- Red is Above Three times Background

Arroyo

- Green is less than Background of 14.15
- Yellow is Above and up to Two times Background
- Red is Above Three times Background



## Readings:

**In Arroyo**

**79% >2x background**

**Inside the Compound**

**94% >2x background**

**Outside the Fence Line**

**95% >2x background**



Old Church Rock Mine Site

Conversion correlation (waist to contact) adjustment:  
Contact cpm = (Waist cpm X 1.25) - 3508  
Conversion for adjusted contact to pCi/g:  
picoCuries per gram (pCi/g) = (0.000531 X cpm) - 3

Equivalent Ra-226, pCi/g

Area (inside perimeter Fence)

- Yellow is Equal to and Below 9.3 pCi/g
- Red is Above 9.3 pCi/g

Outside Perimeter Fence

- Yellow is Equal to and Below 9.3 pCi/g
- Red is Above 9.3 pCi/g

Arroyo

- Yellow is Equal to and Below 9.3 pCi/g
- Red is Above 9.3 pCi/g

# Soil Activity Results (picoCurie per gram)

## Readings:

**In Arroyo**

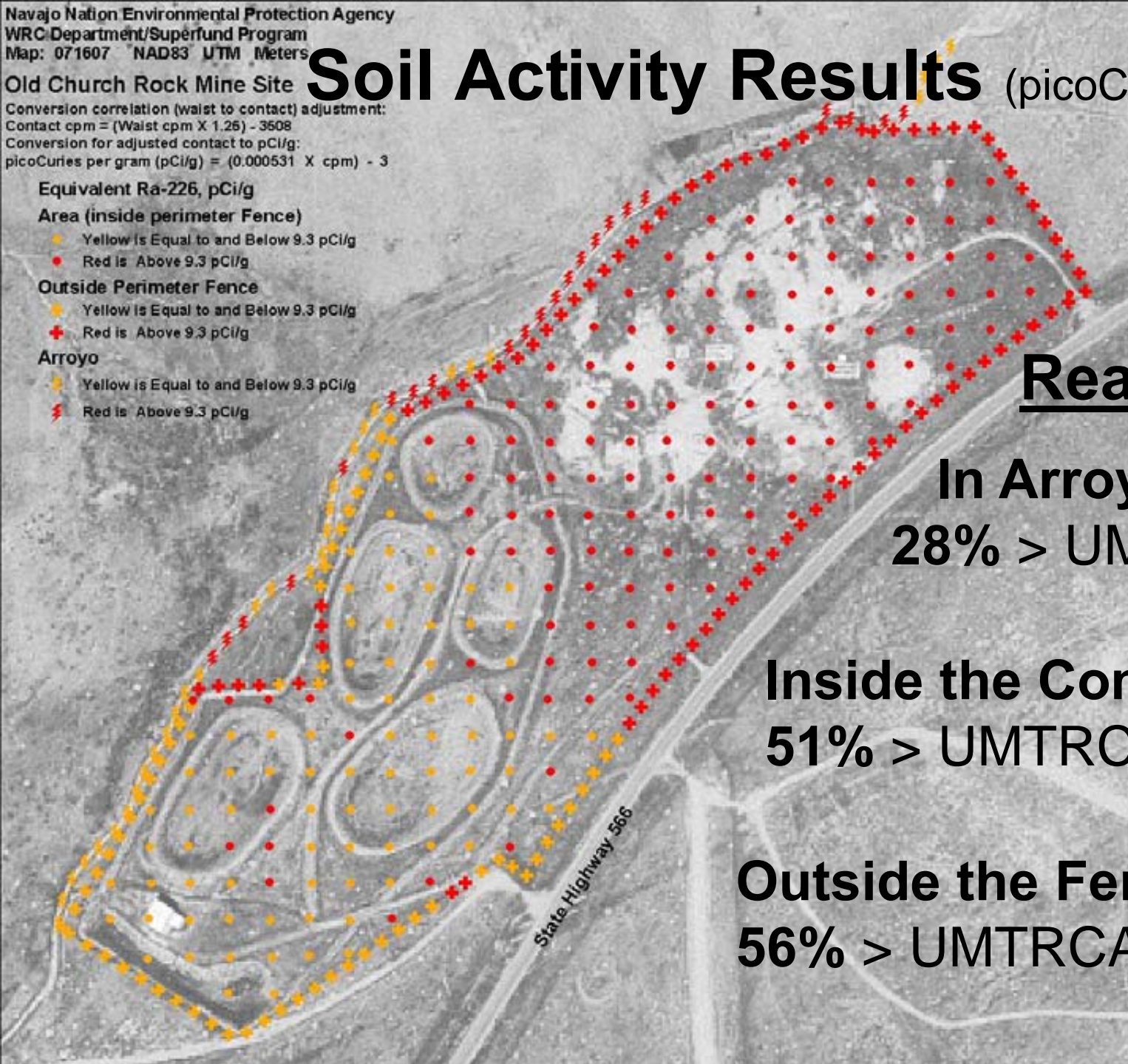
**28% > UMTRCA std.**

**Inside the Compound**

**51% > UMTRCA standard**

**Outside the Fence Line**

**56% > UMTRCA standard**





# Community Concerns

- Radioactive contaminants being transported off-site by way of surface water and air
- Heavy metals in on-site dry ponds
- Still have mined ore rocks scattered in areas
- Residences are nearby and near a regional drainage ( $\approx$  mile downstream of site)
- Adjacent land used for agricultural purposes



**Phase I Site Characterization Work Plan  
Old Church Rock Mine  
McKinley County, New Mexico**



***Prepared for:***

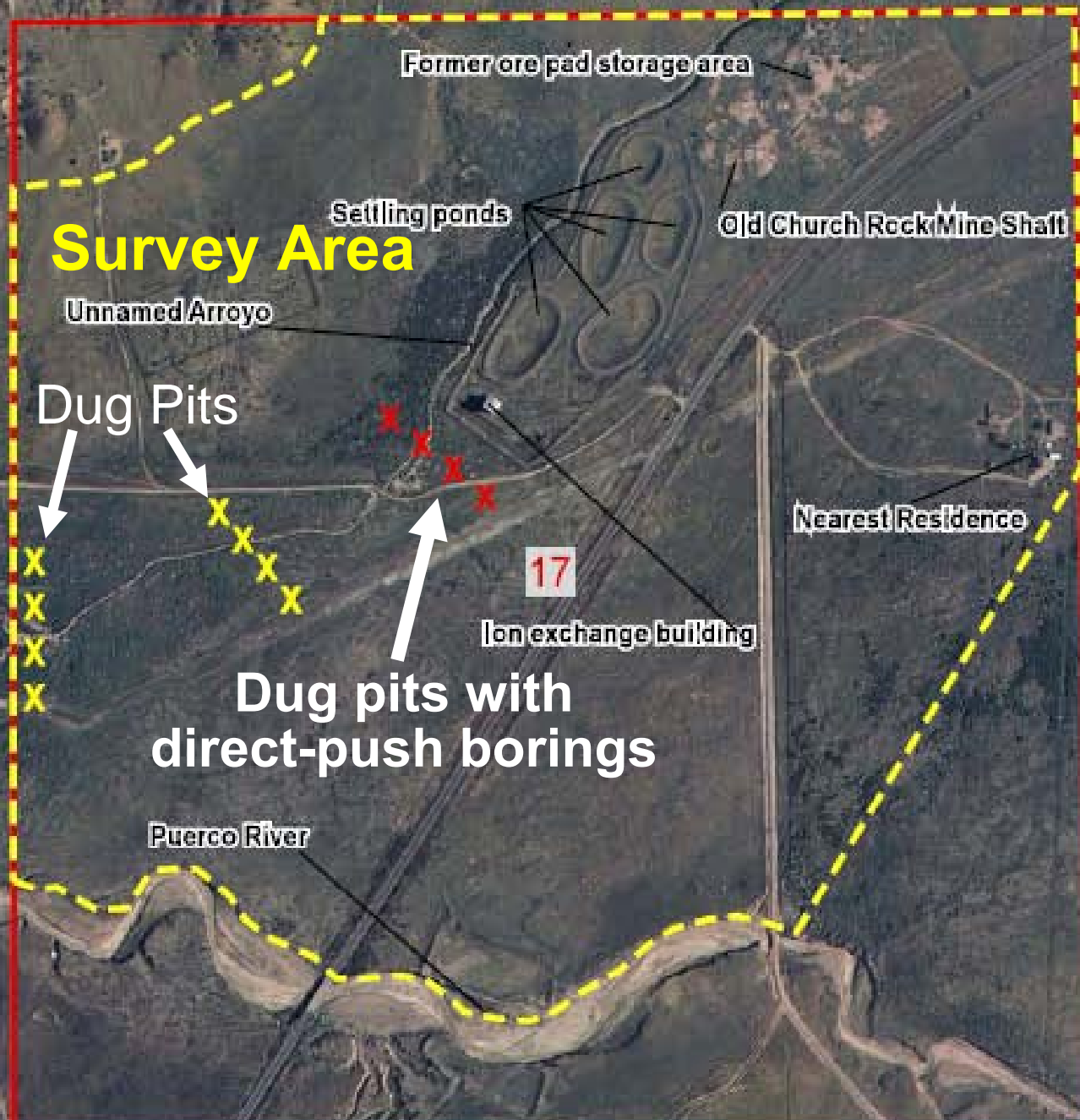
Uranium Resources Inc.  
5041 Indian School Rd. NE  
Albuquerque, NM 87110

***Prepared by:***



INTERA Incorporated  
6000 Uptown Boulevard, NE  
Suite 100  
Albuquerque, New Mexico 87110

**July 11, 2008**







**Soil bores carried out with a direct-push equipment (GeoProbe)**



# Twelve Pits Were Dug







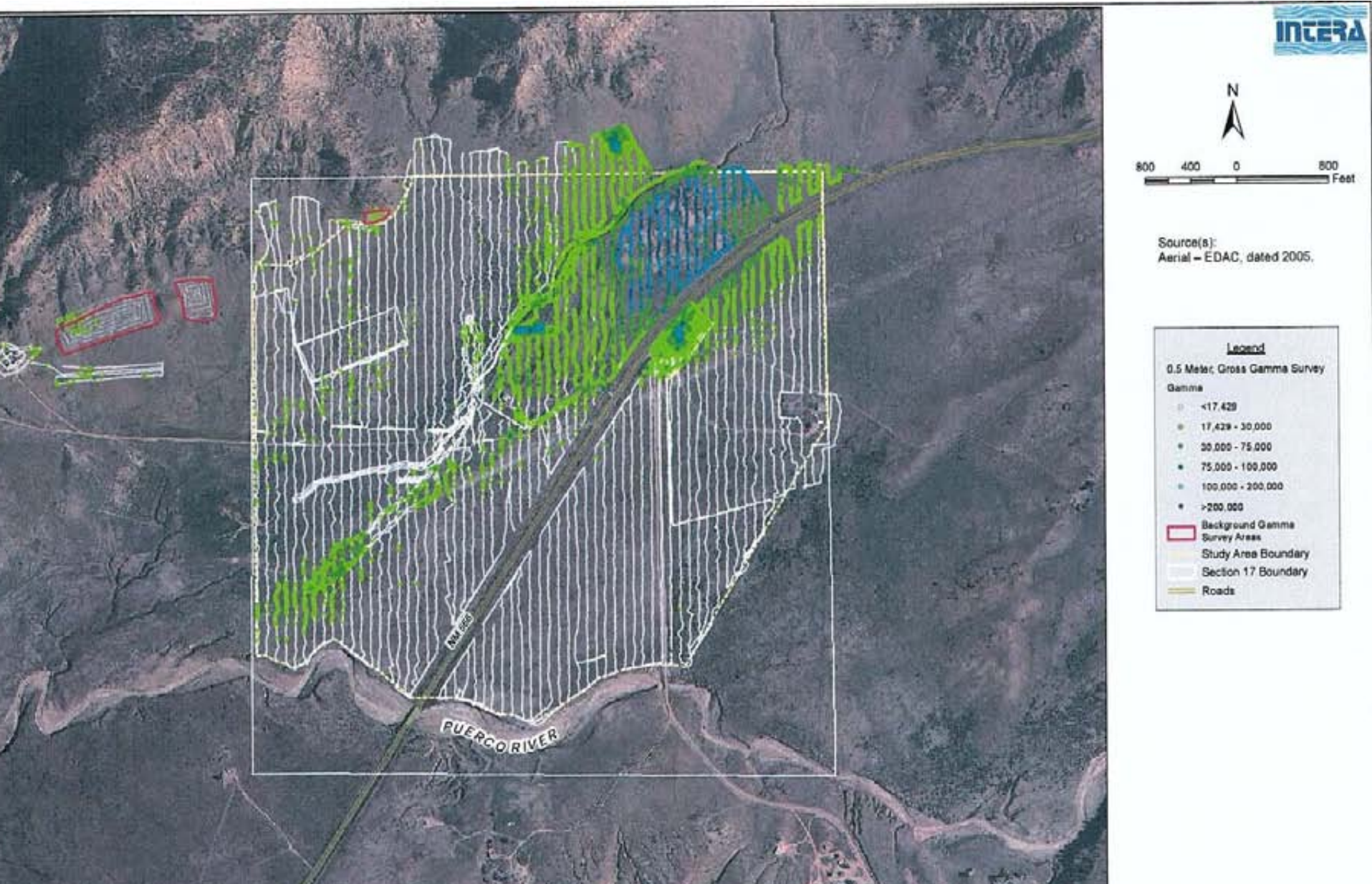
**Data Collected w/Ratemeter Connected to GPS Equipment**

A black and white aerial photograph of a desert landscape. A winding river or dry creek bed flows from the bottom left towards the center. A dashed black line, likely representing a boundary or road, runs diagonally from the bottom left towards the top right. In the upper right quadrant, there is a small cluster of buildings or structures. The terrain is rugged and arid, with various shades of gray representing different ground features.

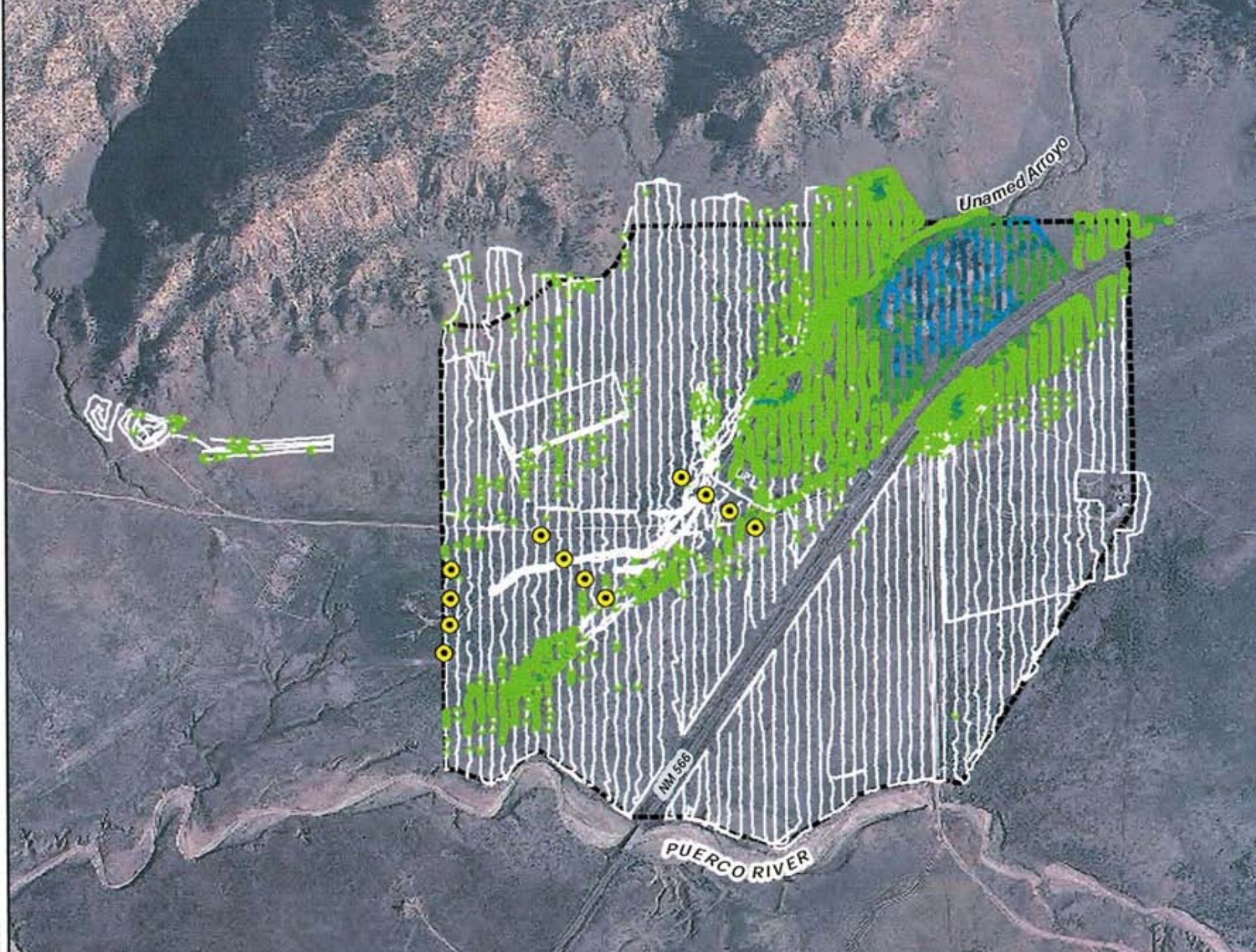
# 1962 Aerial Photo of OCRM Site and its vicinity



# Results From Gamma Radiation Survey During May 2009

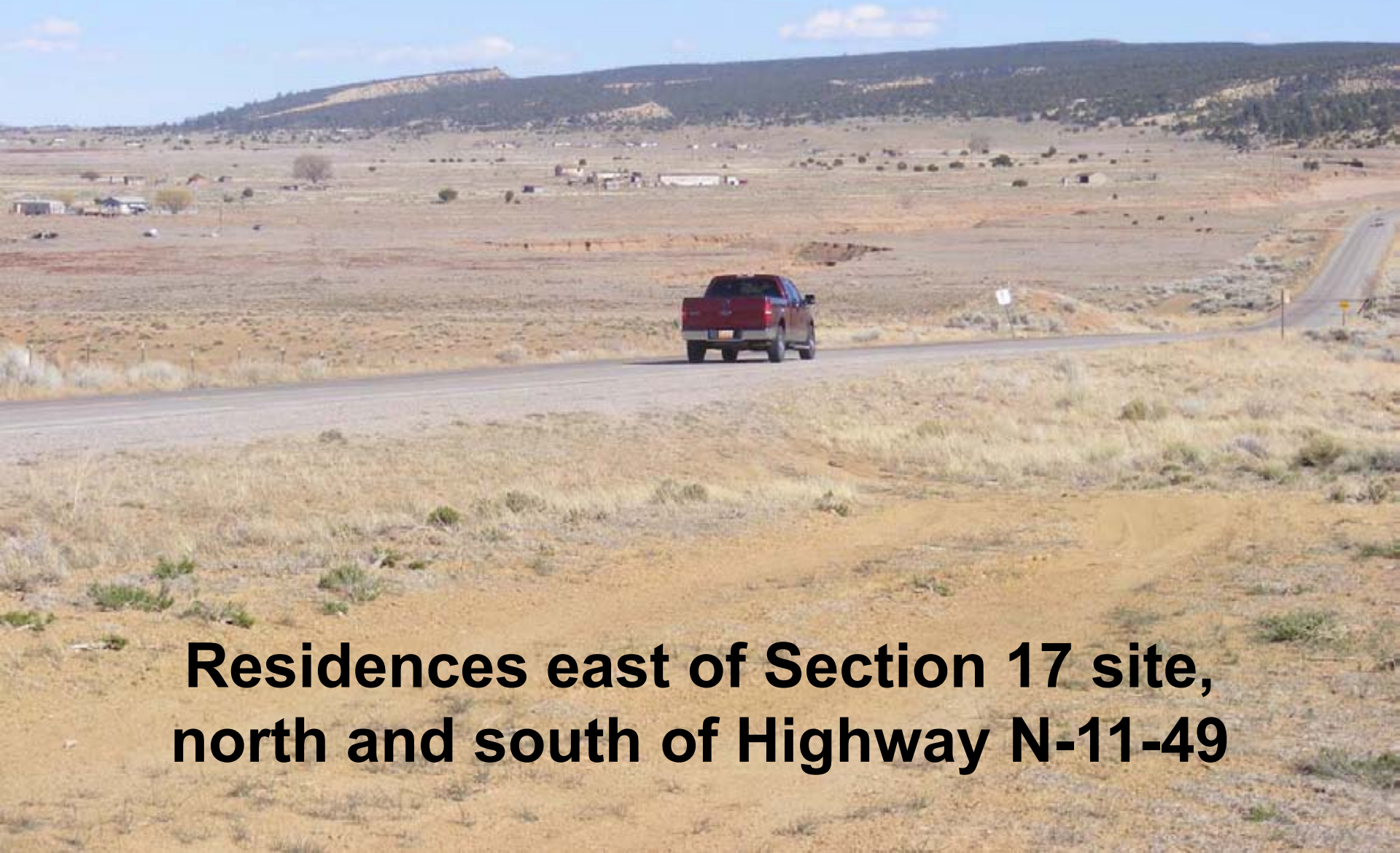








# **Associated Project: Radiological Survey Around Structures Downwind of Section 17**



**Residences east of Section 17 site,  
north and south of Highway N-11-49**



**July 6, 2006 – Visit to Section 17 by the  
New Mexico Environment Department**



**Just So Happened ... 60+ MPH Winds That Day**







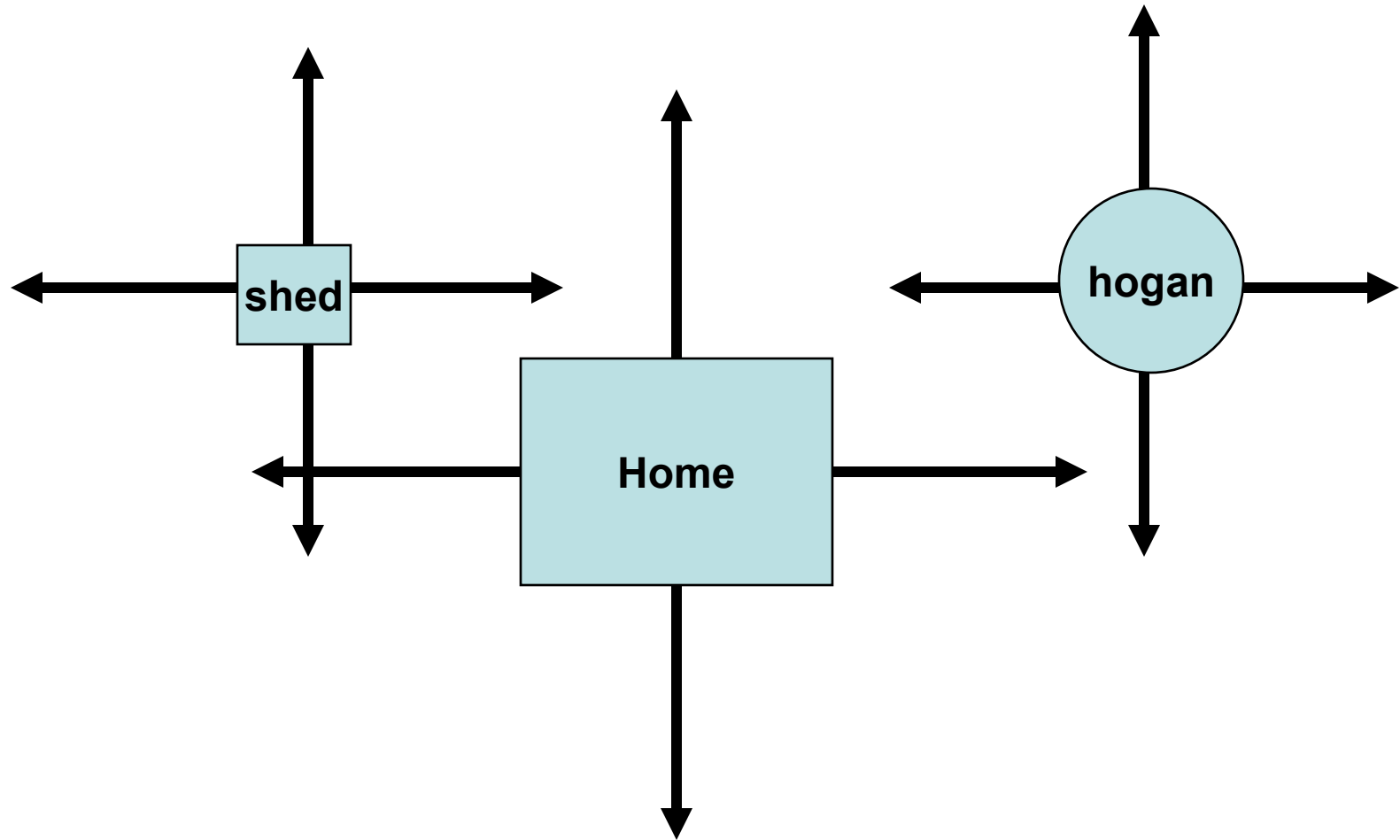
**This event brought out the concern of  
windblown sand from Section 17  
depositing at residences downwind**





**Radiological Survey to check on soils around structures, primarily main residences, hogans, storage buildings, and sheds.**

# Survey Method at Primary Structures



**Reading collected every 10 feet over a 50-ft. length.**