

**LEWIS  
AND  
ROCA**  
LLP  
LAWYERS

Phoenix  
40 North  
Phoenix  
Facsimile  
Telephone



0000114669

Telephone (520) 622-2090

Thomas H. Campbell  
Direct Dial: (602) 262-5723  
Direct Fax: (602) 734-3841  
Internet: TCampbell@lrlaw.com  
Admitted in Arizona

Las Vegas Office  
3993 Howard Hughes Parkway  
Suite 600  
Las Vegas, Nevada 89109  
Facsimile (702) 949-8398  
Telephone (702) 949-8200

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**RECEIVED**

2002 JUL 15 P 4: 26

AZ CORPORATION COMMISSION  
Our File Number 38055-0008  
DOCUMENT CONTROL

July 15, 2002

**VIA HAND DELIVERY**

Docket Control – Utilities Division  
Arizona Corporation Commission  
1200 W. Washington Street  
Phoenix, Arizona 85007

Arizona Corporation Commission  
**DOCKETED**

JUL 15 2002

DOCKETED BY	<i>CMC</i>
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Re: Duke Energy Arlington Valley Facility II - ACC Decision No. 64717  
Docket No. L-00000P-01-0117  
- AND -  
Duke Energy Arlington Valley Facility I – ACC Decision No: 62995  
Docket No: L-00000P-01-0098

Duke Energy Arlington Valley, L.L.C. is filing the attached Subsidence Monitoring Program in compliance with condition #26 of ACC Decision No. 64717. Duke Energy Arlington Valley is also filing with the Subsidence Monitoring Program the Stipulation and Agreement regarding the program entered into by the power plant operators in the Palo Verde area.

A copy of the Stipulation and Subsidence Monitoring Program is also being filed in Docket No. L-00000P-99-0098, ACC Decision No. 62995, in which a Certificate of Environmental Compatibility was granted for the construction of Duke Energy Arlington Valley Facility I.

Very truly yours,

LEWIS AND ROCA LLP

Thomas H. Campbell

THC/bjg  
Enclosures

# A LAND SUBSIDENCE MONITORING NETWORK FOR THE PALO VERDE AND CENTENNIAL WASH GROUNDWATER BASINS, ARIZONA

Land subsidence is defined as the permanent lowering or the sinking of the land surface that results from fluid withdrawal or subsurface mining activities. Differential (uneven) land subsidence has caused tensional breaks in the surface of the alluvial sediments known as earth fissures. Locally, the earth fissures are called "earth cracks". The earth fissures tend to occur on the periphery of subsiding alluvial basins and act as drains.

An earth fissure was reported in September 2001 about 1.5 miles east of the Palo Verde Nuclear Generating Station (PVNGS) in the Palo Verde Groundwater basin (Harris, 2001). The Arlington Valley Energy facility, the Mesquite facility and the Red Hawk facility are located in the adjacent Centennial Wash Groundwater Basin.

## Local Site Conditions

The local geologic and hydrogeologic conditions in the aforementioned groundwater basins control the potential for land subsidence and for earth fissure formation. The groundwater basins are bounded by well consolidated rocks that are elevated relative to the valley floor. The rocks of the mountains are considered nearly incompressible and retard the flow of groundwater into or out of adjacent basins. The alluvial sediments that underlie the gently sloping valley floors are relatively unconsolidated and are moderately compressible. These sediments store and yield moderate to large volumes of groundwater to properly designed wells. Large-scale pumping of groundwater to irrigate crops had caused water levels in wells to decline more than 100 feet by 1975 in both the Palo Verde and the Centennial Wash Groundwater Basins. Pumping for irrigation was greatly reduced in both basins after work began on the construction of the PVNGS. By 1985, water levels in wells had recovered over 30 feet in much of the area.

Interviews with local residents and land surveyors have not provided any indications of differential land subsidence in the Centennial Wash Groundwater Basin. A review of National Geodetic Survey (NGS) records indicates that repeat high-order level survey data are not available to determine if there had been land subsidence in the area.

Although there have been no known indications of land subsidence in the Centennial Wash area, the power plant owners have agreed to develop a voluntary land subsidence monitoring network. A two-part monitoring program is proposed to help monitor land subsidence in the Palo Verde and the Centennial Wash Groundwater Basins (See attached map). Monitoring in the Palo Verde Groundwater basin, where the PVNGS is located, has been and will continue to be the responsibility of the PVNGS. The other part of the program is in the Centennial Wash Groundwater Basin, where the Arlington Valley, the Mesquite, and the Redhawk power plant facilities are located and will be the responsibility of those power plants.

### Proposed Land Subsidence Monitoring Network

Traditionally land subsidence was measured by repeating high-order leveling surveys that crossed entire groundwater basins. These surveys were tied to stable bench marks set on bedrock or to tidal gauges to allow accurate determination of changes in the elevation of the land surface. Today, precise satellite surveys are being used to measure land subsidence using the Global Positioning System (GPS) Schumann (1996).

A program of repeated high-order GPS surveys of a network of roughly-equally-spaced bench marks is proposed to help monitor any land subsidence that might occur in the area of the new power plants in the lower Centennial Wash Groundwater Basin (See attached map). In addition to the 24 bench marks (Cw1-24) set on the valley floor three (3) new bench marks (Cw25-27), set in stable bedrock areas, will be needed to permit the determination of land subsidence rates and amounts. The expense of developing and operating a subsidence monitoring network for the Centennial Wash Groundwater Basin will be shared by the power plants located in the Centennial Wash Groundwater Basin.

A program to monitor building settlement at the Palo Verde Nuclear Generating Station (PVNGS) has been in operation in the Palo Verde Basin for more than 20 years (See attached map). The benchmarks at the Station are tied to bench marks set on hard rock on the north (Pvm2) and south (Pvm1) sides of the facility. In addition monitoring is planned near the new earth fissure (Pvm8-9) and along the water pipeline northeast of the facility (Pvm 10-12). Although the Palo Verde Basin and the Centennial Wash Basins monitoring programs will be conducted separately, their operation will be coordinated. Both networks will be tied

into the regional network of stable bench marks being developed by Arizona Department of Water Resources (ADWR).

Data from the proposed networks will provide early warning of land subsidence in the Palo Verde and in the Centennial Wash Groundwater Basins. The network will be installed and an initial baseline survey run by the end of this year (2002). The first resurvey of the Centennial Wash part of network will be made 2 years after the initial baseline survey. The second resurvey will be made 3 years after the first resurvey and five years after the initial baseline survey. If little or no land subsidence is measured by the time of the second resurvey; the frequency of the resurveys will be once each 5 years -- concurrent with measurements at the PVNGS. Because of its 20 year history of measurements, the PVNGS network is now starting to be monitored on a 5 year interval. If rapid declines in water levels in wells occur in the future, more frequent surveys may be warranted.

Each of the power plants owns existing non-pumping wells that can be used to monitor groundwater water levels in the area of subsidence monitoring. Groundwater levels in the regional groundwater system will be measured, in a selected number of those wells, on a quarterly basis for the next 3 years. Water-level data and pumping records for each power plant should be exchanged between participants annually. Results of the water-level monitoring should be evaluated at the end of each year for the first three years of water-level data collection.

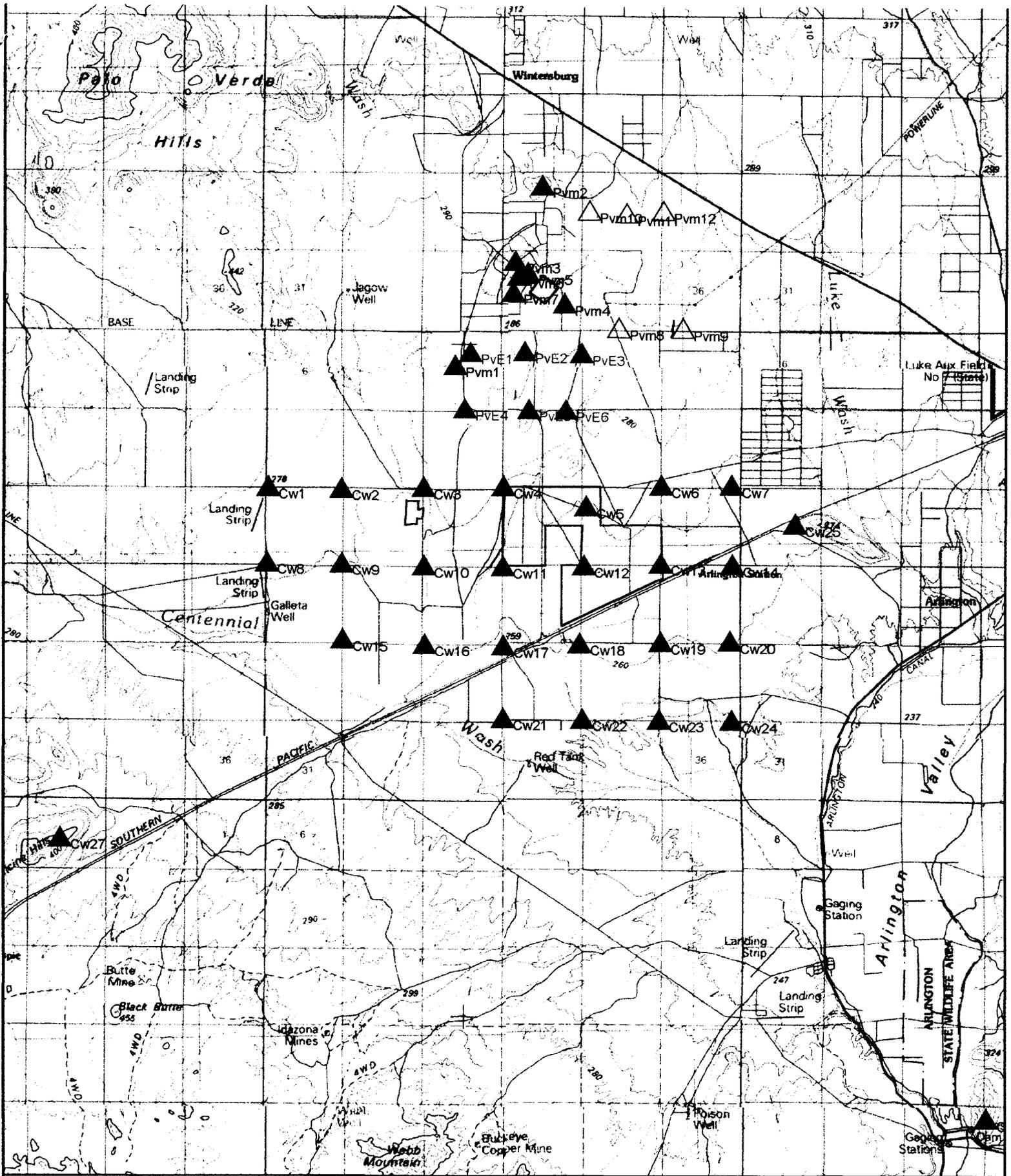
The design of the land subsidence monitoring network should be documented at the end of the first year of operation. Land subsidence, if any, should be evaluated soon after the second resurvey.

Any reports, including results of any ADWR study, will be filed with the Arizona Corporation Commission, the Arizona Department of Water Resources and the U.S. Geological Survey.

#### SELECTED REFERENCES

Harris, Richard C., 2001, A new earth fissure near Wintersburg, Maricopa County, AZ: Arizona Geological Survey Open-file Report 01-10, 23p.

Schumann, Herbert H., 1996, Land Subsidence and Earth fissures in the west Salt River Valley, Arizona: Proceedings of the Annual Symposium of the Arizona Hydrological Society, Prescott, AZ, September 12-14, 1996.



Name: PHOENIX SOUTH  
 Date: 5/31/2002  
 Scale: 1 inch equals 1.578 miles

Location: 033° 19' 46.1" N 112° 52' 00.7" W  
 Caption: A LAND SUBSIDENCE MONITORING NETWORK FOR THE PALO VERDE AREA, ARIZONA

## **Stipulation and Agreement Regarding Subsidence Monitoring Program for Palo Verde Area**

### Parties

1. The parties to this Stipulation and Agreement ("Agreement") are Arizona Public Service Company ("APS") as operator of the Palo Verde Nuclear Generating Station ("PVNGS"); Pinnacle West Energy Corporation ("PWEC"); Duke Energy Arlington Valley LLC ("Duke-AV"); and Mesquite Power LLC ("Sempra-Mesquite") (collectively the "Generator Parties").

### Background

2. The Generator Parties own or operate generating facilities in the Palo Verde area in Maricopa County.

3. On February 12, 2002, the United States Department of the Interior, U.S. Geological Survey ("USGS") sent a letter to the Arizona Corporation Commission ("Commission") indicating concern over a fissure near the PVNGS, and recommended that a subsidence monitoring program be implemented in this area.

4. On April 4, 2002, the Commission voted to amend the Certificate of Environmental Compatibility issued to Duke-AV for the Arlington Valley Energy Facility II to include a subsidence monitoring condition.

5. Incident to approving the amendment, the Commission requested that the other Generator Parties who are also located in the Palo Verde area work with Duke-AV to develop a subsidence monitoring program.

6. The Generator Parties have since conferred and desire to enter into this Agreement to adopt such a subsidence monitoring program.

### Subsidence Monitoring Program

7. The Generator Parties agree to implement the subsidence monitoring program that is set forth in Appendix A to this Agreement, and which is incorporated by reference (the "Program").

8. The Program has been reviewed by the Arizona Department of Water Resources ("DWR") and USGS, and the Generator Parties agree to report results of the Program to DWR, with copies to USGS and the Commission.

9. The Generator Parties shall enter into a separate cost sharing agreement to allocate the costs of the Program between the Generator Parties.

10. The Generator Parties agree that this Agreement is a legally binding commitment on each party and their respective successors and assigns, and may be enforced as such.

11. This Stipulation and Agreement is effective as of July 12, 2002 and shall continue in effect for the duration of the Program.

Signed:

Arizona Public Service Company,  
as operator of the Palo Verde Nuclear Generating Station

By: Craig K. Jean  
Its: Director

Pinnacle West Energy Corporation

By: Scott Lahrin  
Its: PLANT MANAGER

Duke Energy Arlington Valley LLC

By: Stuall  
Its: VICR PRESIDENT

Mesquite Power LLC

By: MA  
Its: Manager, Project Development