October 5, 2007

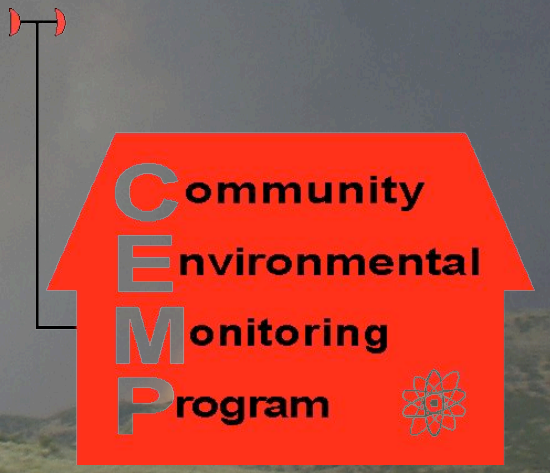
Analysis of Gamma Readings at the Milford CEMP Station During the Milford Flats Fire

Presentation to the

State of Utah Radiation Control Board

by the

Desert Research Institute
Nevada System of Higher Education



Community Environmental Monitoring Program

- Program funded by US Department of Energy National Nuclear Security Administration (NNSA)
- Program administered by the Desert Research Institute (DRI) of the Nevada System of Higher Education since 2000

Community Environmental Monitoring Program

-Established in 1981

-Mission to foster better relations between the Department of Energy and the communities surrounding the Nevada Test Site (NTS)

-Increase transparency of and accessibility to monitoring data

-Involve stakeholders directly in the monitoring process.

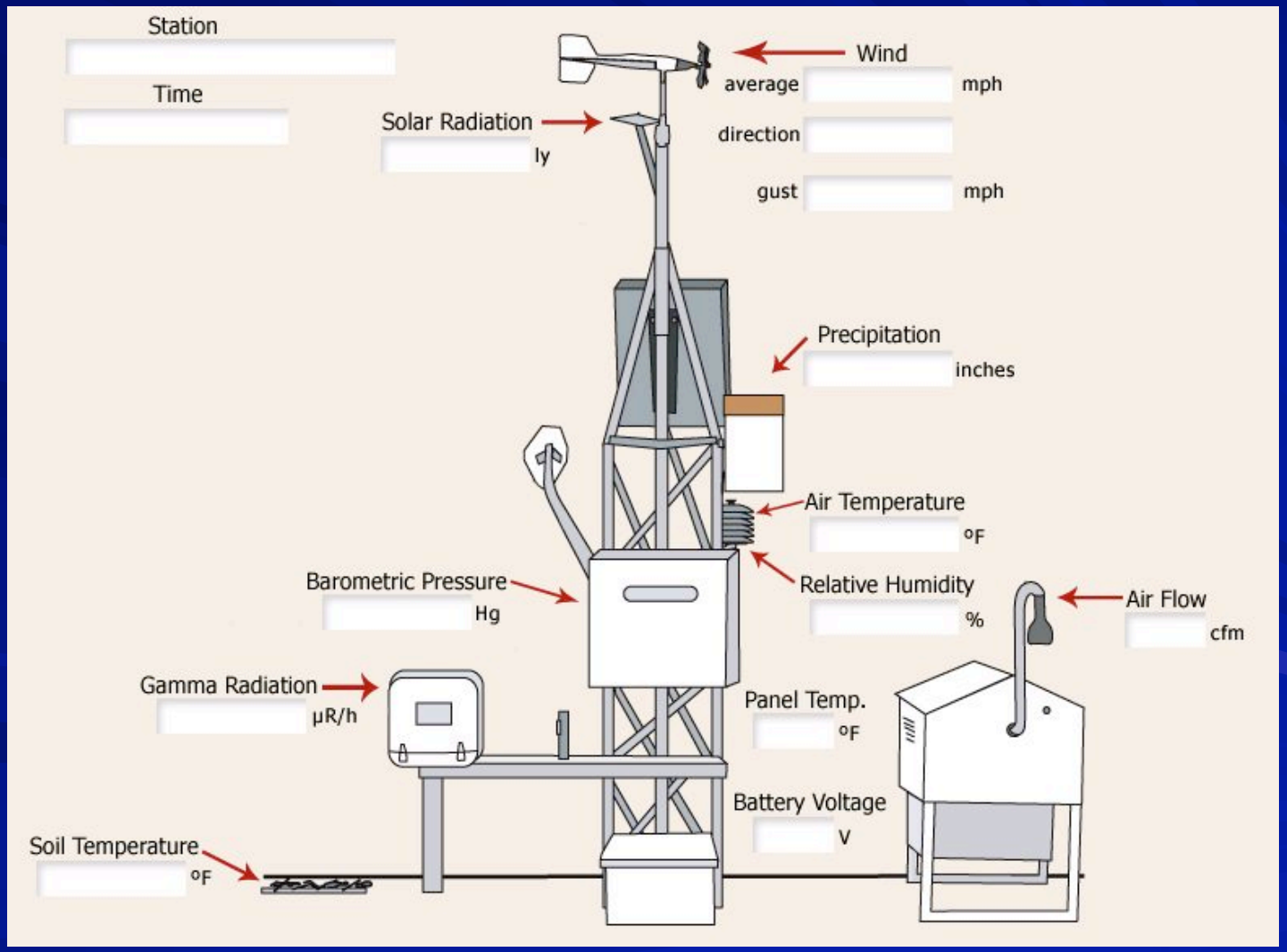
Community Environmental Monitoring Program

- 29 monitoring stations
- 24 in Nevada---18 in communities, six at ranches; 4 in Utah communities; 1 in California
- 160,000 km^2 coverage
- Stations collect data on background radiation and weather conditions
- Employs local stakeholders who serve as station managers

http://www.cemp.dri.edu/

CEMP station in Milford, Utah

Schematic of CEMP Station Instrumentation



Stakeholder Participation

-Program employs two individuals in each community

-“Community Environmental Monitors” (CEMs) are responsible for the weekly collection and routing of filter samples to DRI

-CEMs ensure that the stations are operating properly and serve as points of contact for stakeholders in their communities.

Who are the Community Environmental Monitors?

- Over half are high school science teachers
- Others representative of very diverse backgrounds
- Respected members of community
- Are points of contact for other stakeholders in their communities
- Become “lay-experts” in their communities on issues related to ionizing radiation

Annual Training

-CEMs attend annual 3-4 day training courses

-Operation of the equipment at the CEMP stations.

-Workshops on natural and man-made radiation that can occur in our environment.

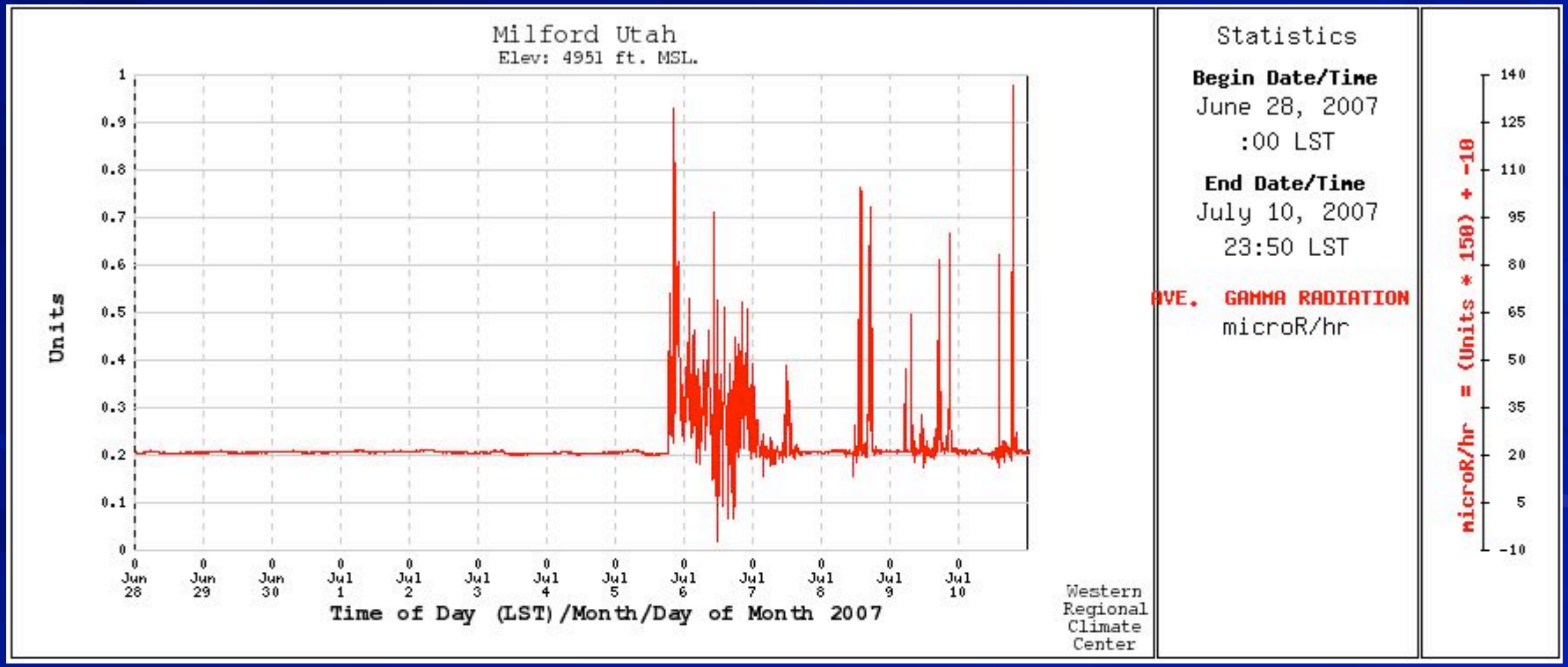
-Briefings from project personnel on current and planned Nevada Test Site and Yucca Mountain activities

-Invited lecturers on a range of topics from radiation and health effects to past testing activities and discussions on nuclear power

Anomalous Gamma Readings

- Anomalous gamma exposure rates measured by the pressurized ion chamber (PIC) noted on Monday, July 9--- intermittent average readings ranged from 4 to 7 times normal background
- Initially believed that radon progeny as a result of the Milford Flats Fire could be responsible for elevated gamma readings
  - This phenomenon was observed during the June 2000 Cerro Grande Fire at Los Alamos, New Mexico
- DOE issued a press release that elevated gamma readings observed at the station were presumed to be related to increases in the rate of radon release caused by the Milford Flats Fire.
- Significant regional media attention, with various unsubstantiated claims of re-suspension of radionuclides associated with past nuclear testing at the Nevada Test Site

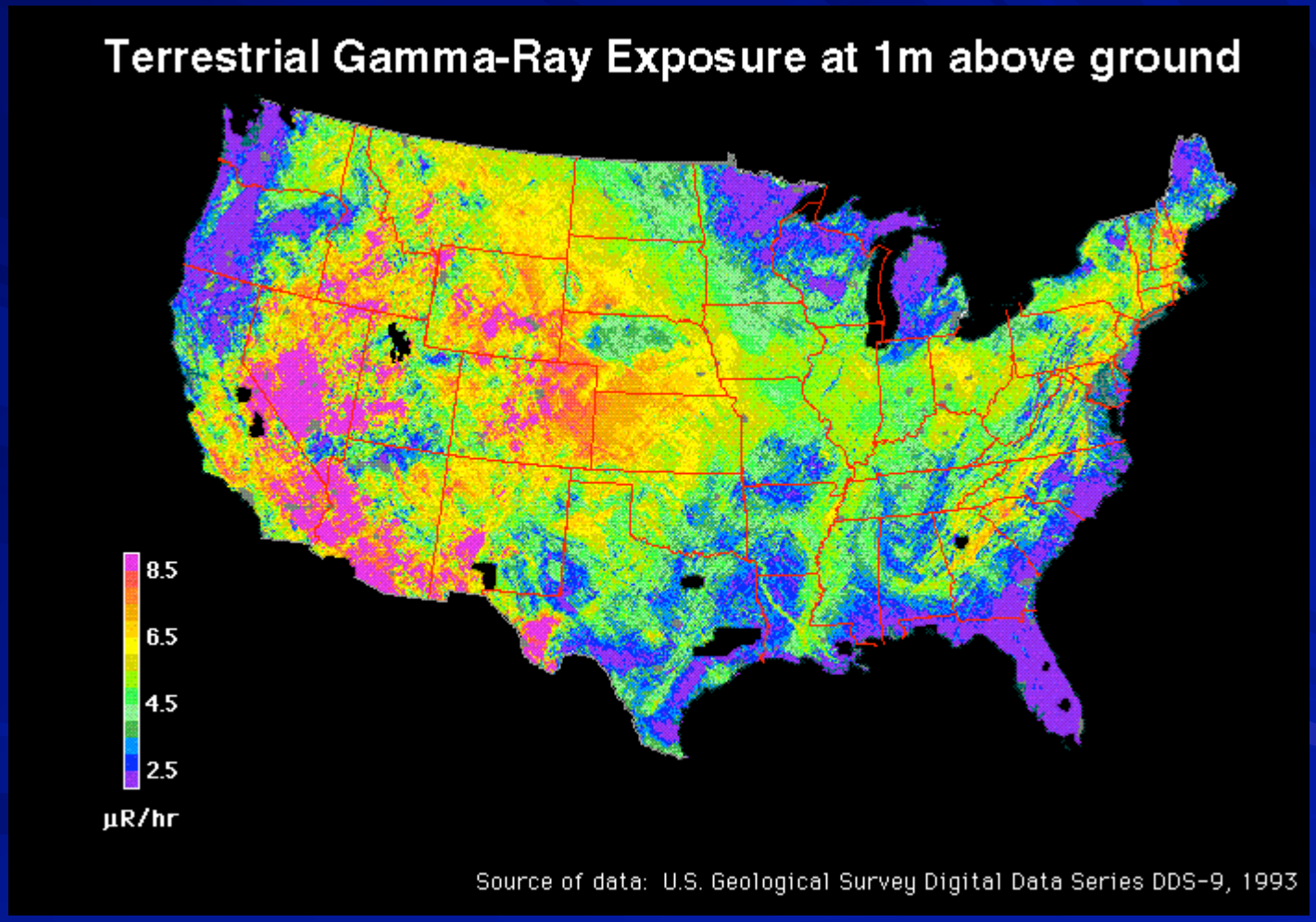
Ambient Gamma Exposure Rate Readings at Milford



Origin of Radionuclides

- Primordial – from when the earth was formed e.g. U-238, Th-232, K-40
- Cosmogenic – from interaction with cosmic particles, e.g. Be-7, C-14
- Anthropogenic – from man's activities, e.g. Cs-137. I-131

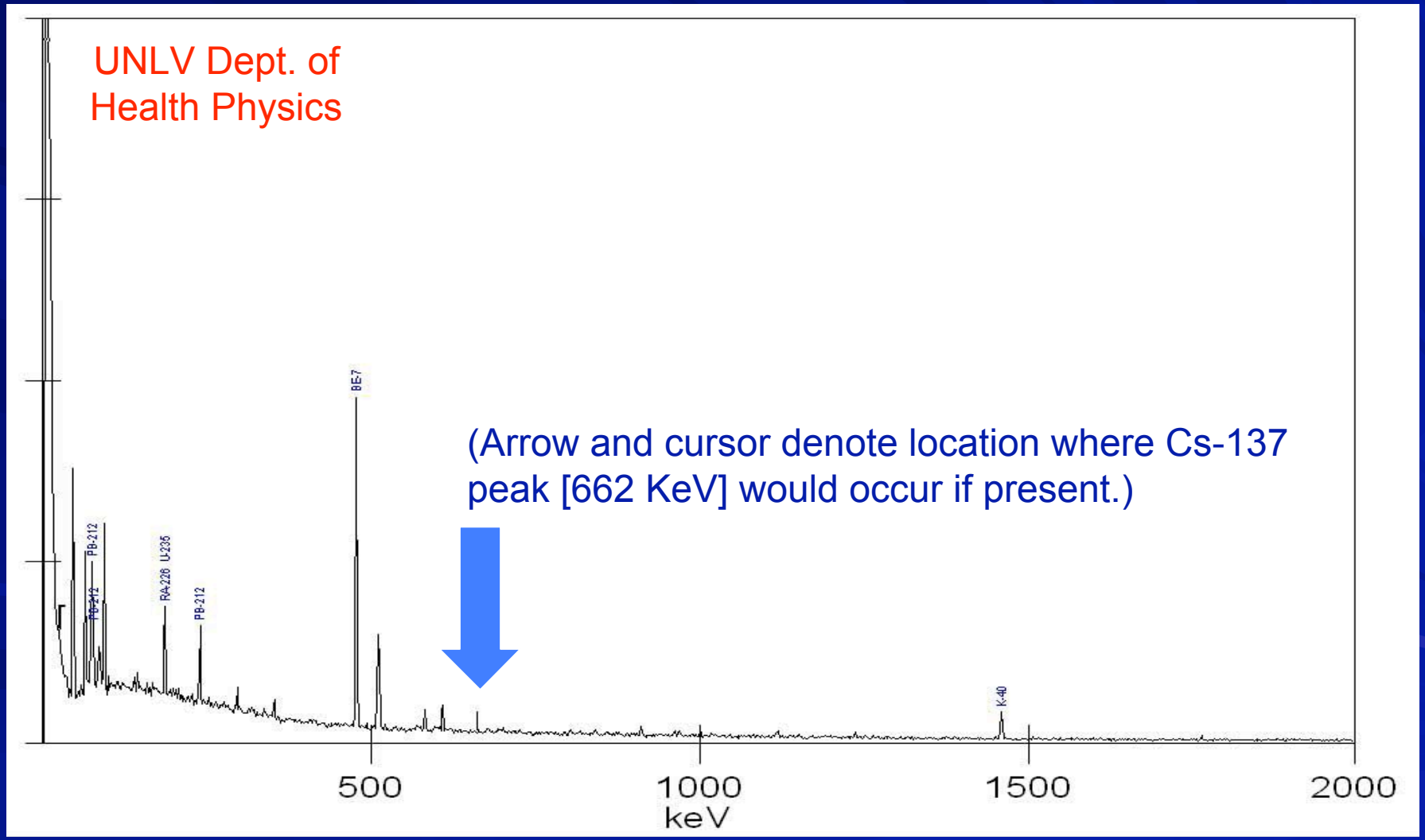
Terrestrial Gamma Exposure Rate



Avenues of Analysis

- Analysis of Air Particulate Filters
- Comparison of Gamma Exposure with Barometric Pressure & Precipitation Records
- Examination of Maximum vs. Minimum Gamma Exposure Rates
- Review of Lighting Strike Data
- Diagnostic Testing of the PIC

Gamma Spectrographic Analysis Milford Air Filter—week ending 7/9/07



Milford Station Gross Alpha and Beta Analyses July 2-9, 2007

Gross Alpha (pCi/m^3)				
	Maximum	**Mean**	**Minimum**	**Notes**
CY2006	0.0029	0.0012	0.0003	2006 Results
CY2007 (1st qtr)	0.0030	0.0015	0.0003	1st Qtr 2007 Results
CEMP-09593		0.0010		Main Milford Sample
CEMP-09593		0.0009		Duplicate Milford Sample
CEMP-09594		0.0014		Duplicate Lab Sample
Gross Beta (pCi/m^3)				
	Maximum	**Mean**	**Minimum**	**Notes**
CY2006	0.050	0.024	0.010	2006 Results
CY2007 (1st qtr)	0.056	0.030	0.014	1st Qtr 2007 Results
CEMP-09593		0.021		Main Milford Sample
CEMP-09593		0.022		Duplicate Milford Sample
CEMP-09594		0.025		Duplicate Lab Sample

All alpha and beta analyses well within normal range of measurements from CY2006 and 1st quarter 2007, and actually fall below the mean values for those periods.

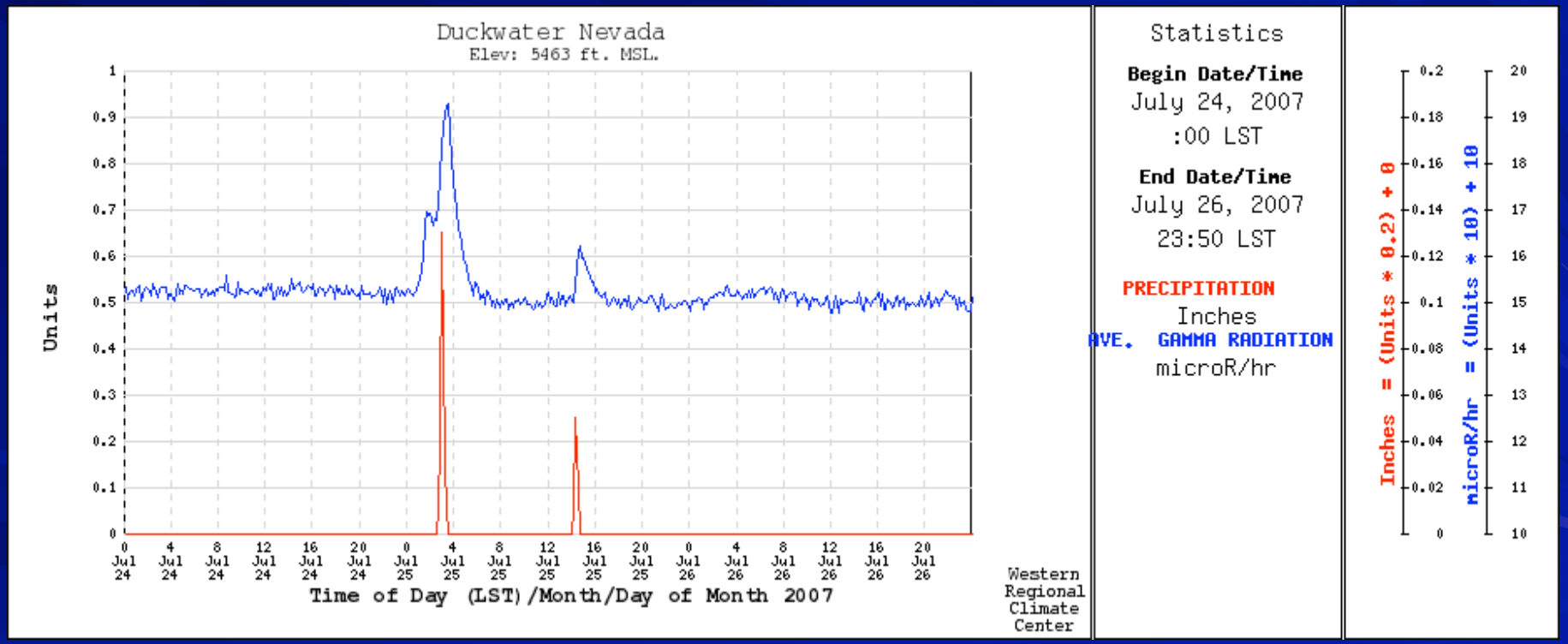
Test America, St. Louis, MO

Additional Milford Filter Analyses

- Gamma spectroscopy of filter from week prior to Milford Flats fire nearly identical, although particulate loading nearly double for the week of the fire.
- Gamma spec. of samples from duplicate air sampler in operation at Milford are comparable.
- Gamma spec. of samples from Delta CEMP station comparable, with no corresponding increase in PIC activity.
  - More smoke from the fire was actually reported in Delta, Utah than in Milford
- Filter analysis shows no activity, natural or manmade, sufficient to have caused gamma readings recorded by PIC.

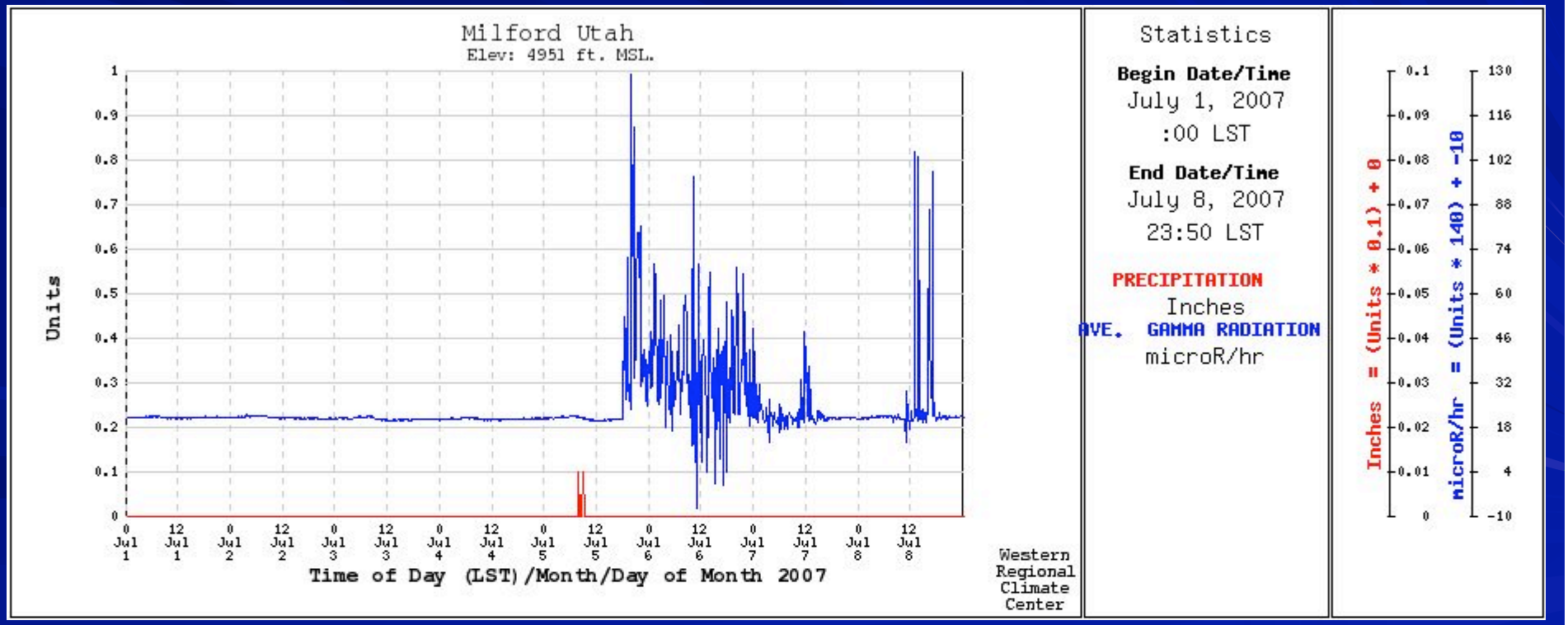
QUESTION: If radionuclides not present at activity levels high enough to have caused the spikes recorded by the PIC, what caused the readings?

Exposure Rate vs. Precipitation Duckwater, Nevada---July, 2007

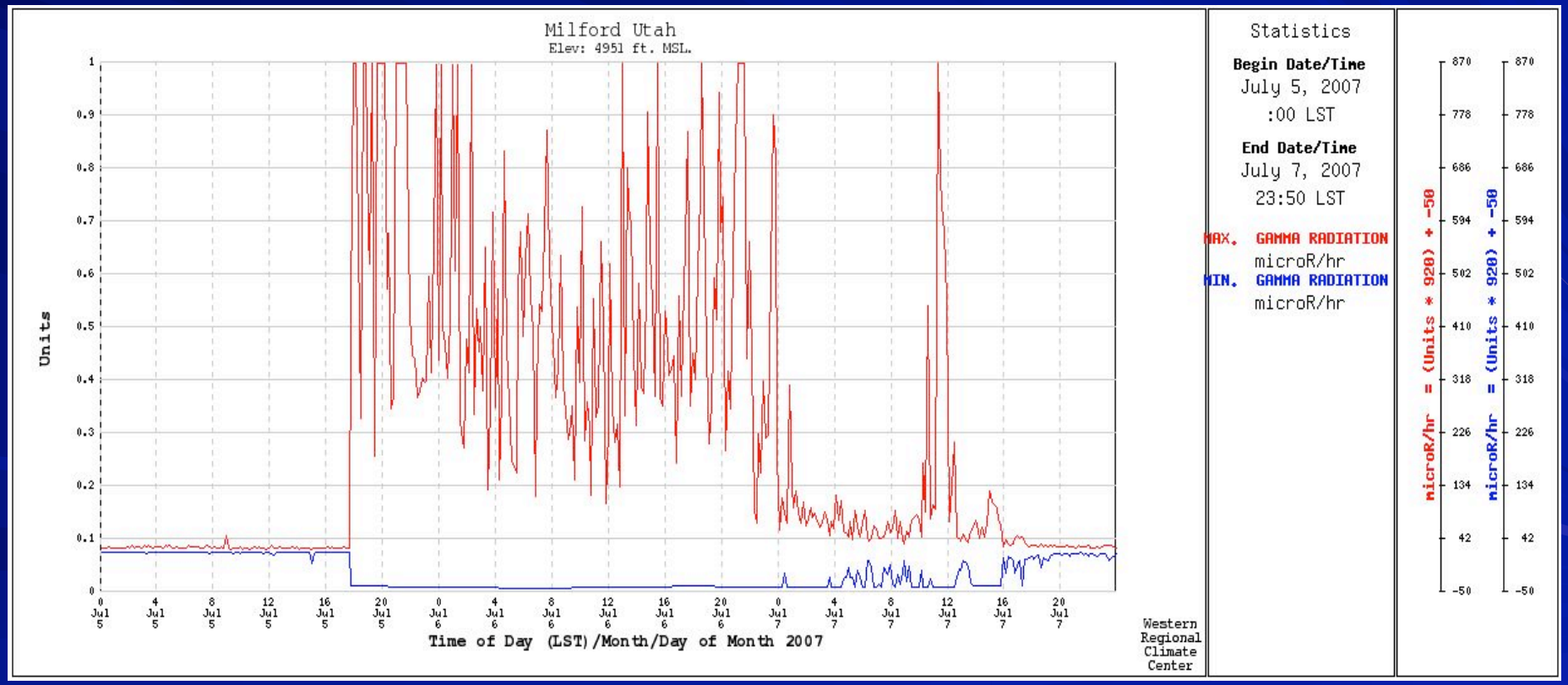


Exposure Rate vs. Precipitation Milford, Utah---July 2007

Conclusion: No Correlation



Maximum/Minimum Exposure Rate Readings---July 2007



Analysis of PIC Data

Evidence that PIC Readings Did Not Reflect An Actual Increase in Gamma Radiation

- Initiation of anomalous PIC readings began one day prior to start of Milford Flats Fire
- No correlation with meteorological events
- Abnormal reading initiation/termination extremely abrupt---not expected behavior for passage of a plume
- High positive and low negative readings initiated concurrently, also not expected behavior for passage of a plume.

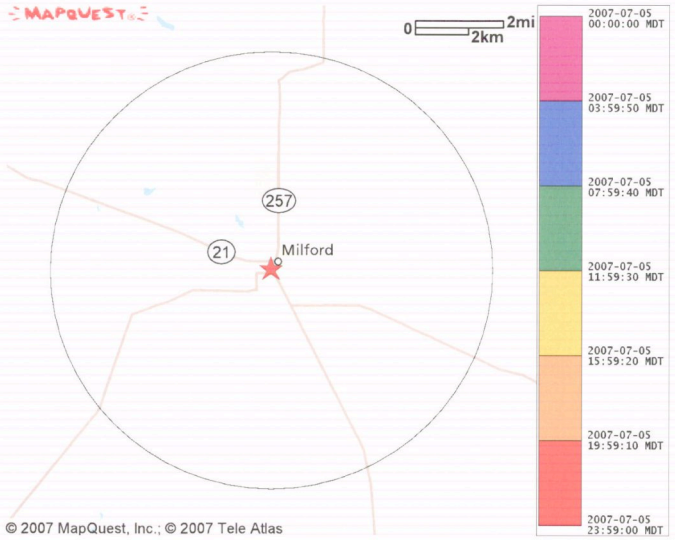
Review of Lightning Strike Data

STRIKEnet®

STRIKEnet Report 187938

Report Title: Milford CEMP station
Total Lightning Strokes Detected: 0
Lightning Strokes Detected within 5 mi/8 km radius: 0
Lightning Strokes Detected beyond 5 mi/8 km whose confidence ellipse overlaps the radius: 0
Search Radius: 5 mi/8 km
Time Span: Jul 5, 2007 12:00:00 AM US/Mountain to Jul 5, 2007 11:59:00 PM US/Mountain

Location Points For Lightning Strokes



Lightning data provided by Vaisala's NLDN® and/or Environment Canada's CLDN.

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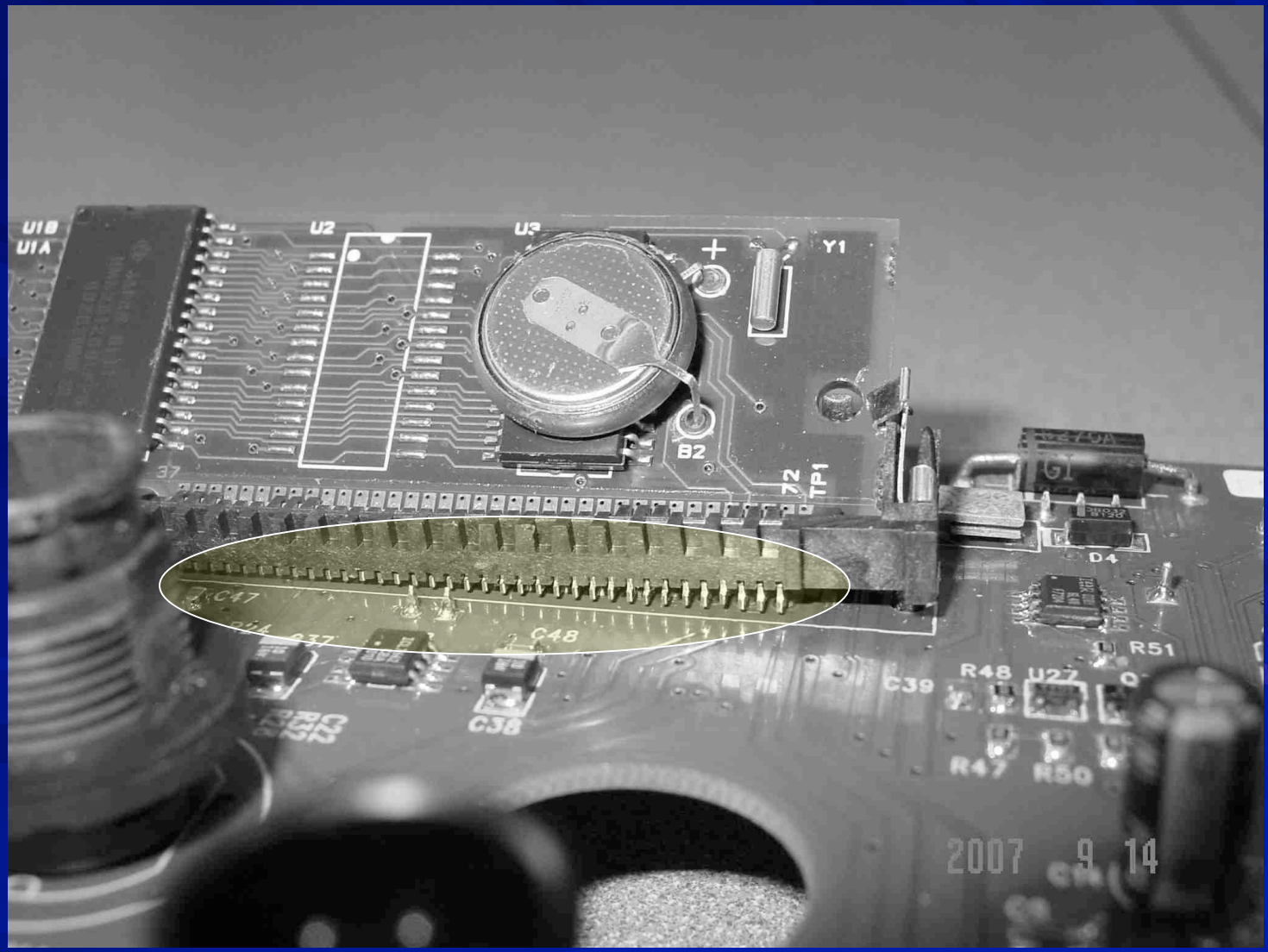
Diagnostic Testing of PIC

- Diagnostic testing of Milford PIC carried out by Pacific Northwest National Labs
- 70-pin SIMM socket on the PIC's data acquisition board severely warped
- Possible causes include extreme heat and/or incorrect seating of the board by the manufacturer

Warping of 70-pin SIMM socket on the Milford PIC's data acquisition board



Conclusions

- High degree of confidence that abnormal readings measured by the pressurized ion chamber at Milford were a result of equipment malfunction and not the result of either an increase in naturally-occurring radionuclides or resuspension of legacy fallout from the Nevada Test Site
  - Analyses of particulate air filters from the period of the Milford Flats Fire from both Milford and Delta, Utah, as well as from the pre-fire period, show results consistent with measurement of normal background activity, and no evidence of manmade radionuclides related to legacy fallout
  - Timing of PIC readings indicates no causal link with the onset of the anomalous readings and the onset of the Milford Flats Fire
  - Initiation and termination of high positive/low negative readings inconsistent with expected PIC behavior
  - Diagnostic testing of the Milford PIC shows severe warping of the SIMM socket on the data acquisition board
- All analytical results from the Milford CEMP station air samples are available on the CEMP web site: http://www.cemp.dri.edu

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