



#### Trip Report:

David Kappelman, Health Physicist, US EPA Environmental Response Team

#### USEPA ERT site visit at R4 Smoky Mountain Smelter site

ERT was contacted by OSC- Dave Andrews to provide on-site support to determine extent of radiological exposure issues. Request was made after Environmental Restoration LLC personnel radiation monitoring dosimeter results indicated a potential problem. Based on a review of this documentation, I recommended that work be stopped until another exposure rate survey with different instrumentation was conducted.

#### Background:

Discussions with the Environmental Restoration Site Manager prior to departure was helpful in determining that ring dosimeters were being utilized instead of “whole body” Thermoluminescent Dosimeters (TLDs). Radiation Exposure Rate Survey results conducted by EPA START were mapped to annotate the exposure rate readings on site. These results compounded the assumption that exposure rates higher than 5 mR/hr were on-site.

#### On-site:

A review of survey instrument calibration records of instrumentation utilized to perform the exposure rate survey was conducted upon arrival. This instrument (Ludlum Model 14-C) was calibrated for two probes a 44-2 NaI probe and a 44-9 GM(pancake) probe. This particular model has an analog combination scale with both CPM and mR/hr scales. The instrument was calibrated to utilize the CPM scale readings for the 44-2 NaI probe and the mR/hr scale readings for the 44-9 probe. The apparent higher exposure rate readings were the result of using the wrong scale on the instrument; however, NaI probes are normally calibrated for exposure rate measurements ( $\mu$ R/hr or mR/hr) and the 44-9 probe is normally calibrated for contamination monitoring (cpm).

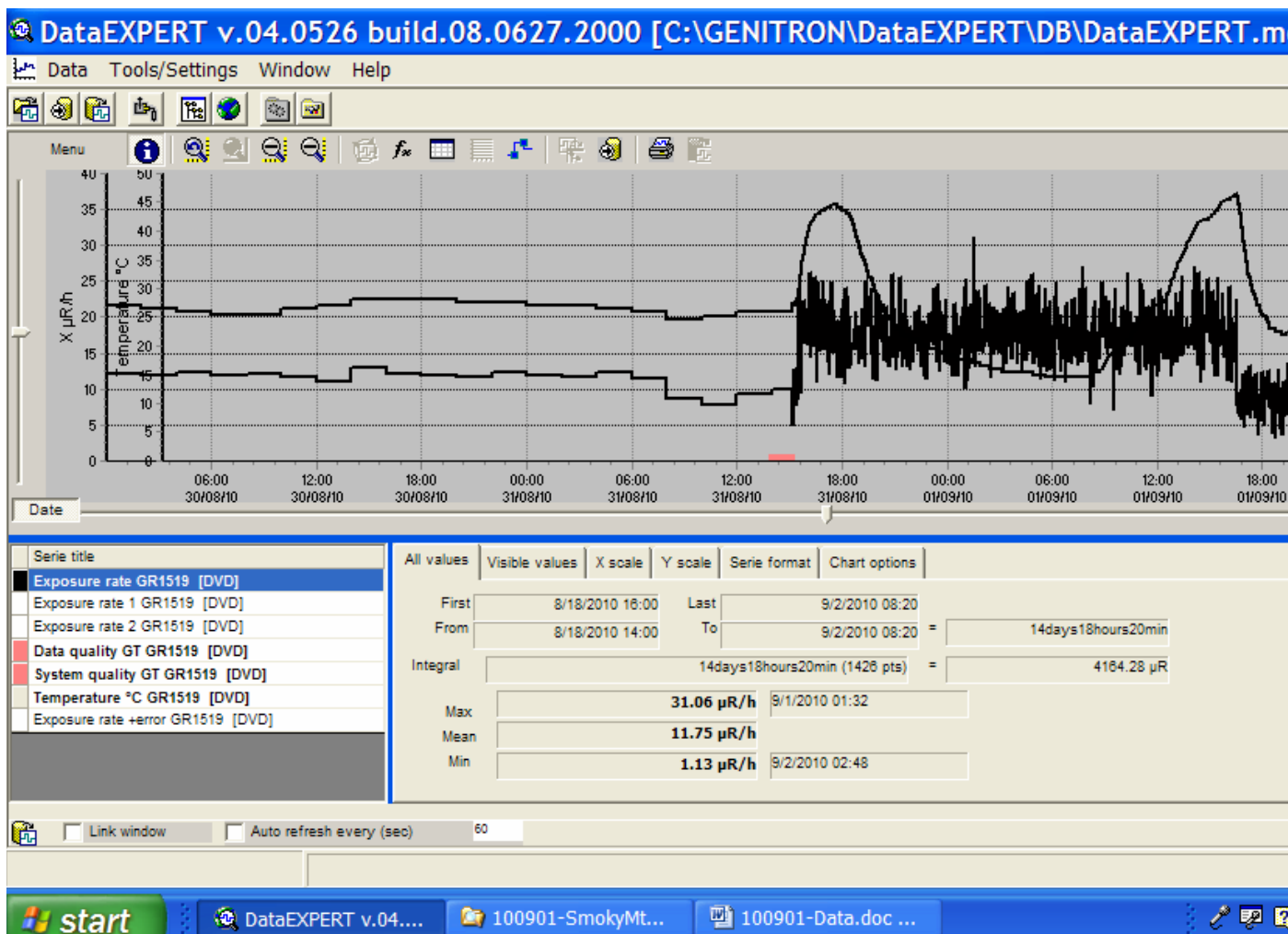
A rapid assessment of the entire site was then conducted to determine exposure rates present on-site. The highest exposure rate found on site during our visit was 60  $\mu$ R/hr in the area that had been previously identified as 5 mR/hr. Another area known to contain fire brick was also elevated. No loose surface contamination was found during our limited contamination monitoring after entry into the higher exposure rate area. NaI gamma spectra were collected, but only radon daughter products Pb-214 and Bi-214 were identified. Genitron GammaTracers (see attached results) were placed along the site

boundary close to residences and in close proximity to where the TLDs were stored. Measurements indicate that the exposure rate at the property boundary is at normal background levels.

Recommendations for moving forward:

1. Environmental Restoration (ER) LLC is acquiring “whole body TLD badges”, but they had not been received on-site prior to our departure.
2. Continue to have TLD exposures evaluated on a monthly basis.
3. ER LLC personnel to continue to wear the ring badges for comparison.
4. Acquire electronic personnel dosimeters in order to provide a mechanism for daily monitoring of personnel exposure.
5. A knowledgeable HP should perform routine operational surveys during the work-day to determine if radiological conditions are changing based on work being performed. Exposure rates greater than 25  $\mu\text{R/hr}$  should be reported to the site manager and OSC.
6. Enforce site control requirements for all personnel on-site to wear “whole body” TLDs.
7. Review daily electronic dosimeter results to determine if additional radiological controls should be implemented.
8. Sampling and radio-analyses need to be performed for determining radionuclide mix and concentrations within the area having highest exposure rates.
9. Review radio-analytical results to determine if additional removal/remedial actions are required.

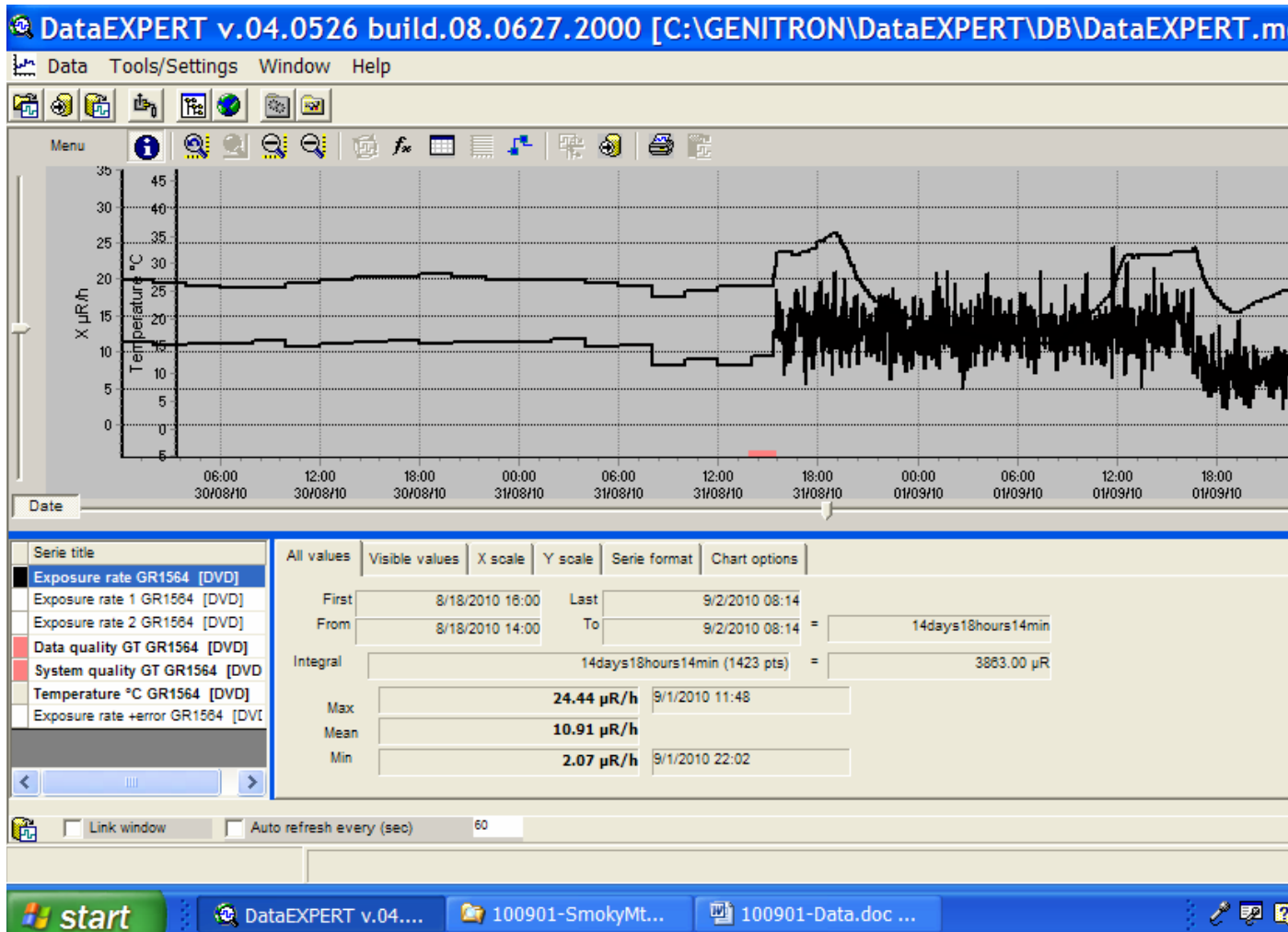
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GF1519 Green Fence Post

35.91919

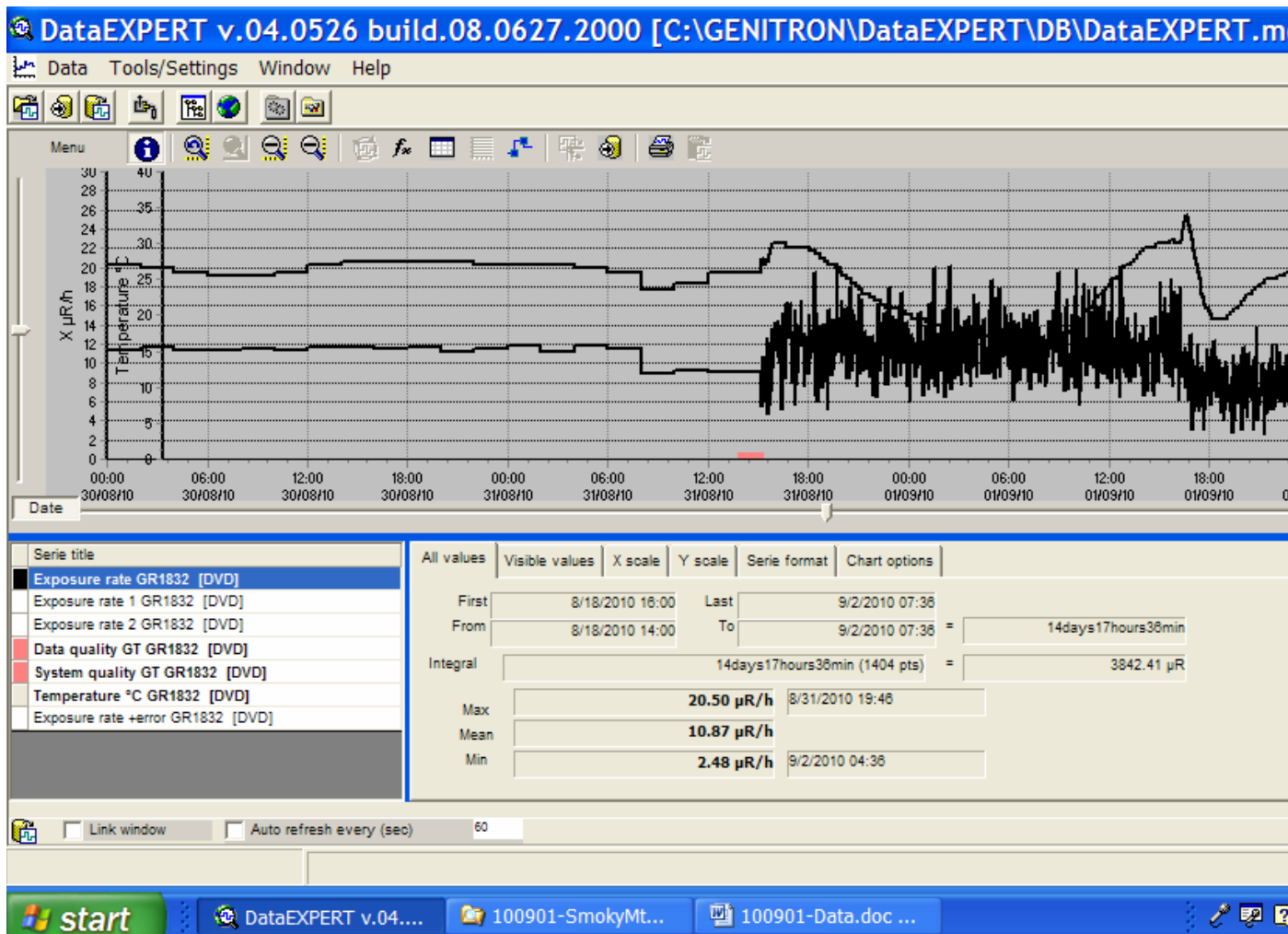
83.92542



GF1564 Near red sign on fenceline

35.91901

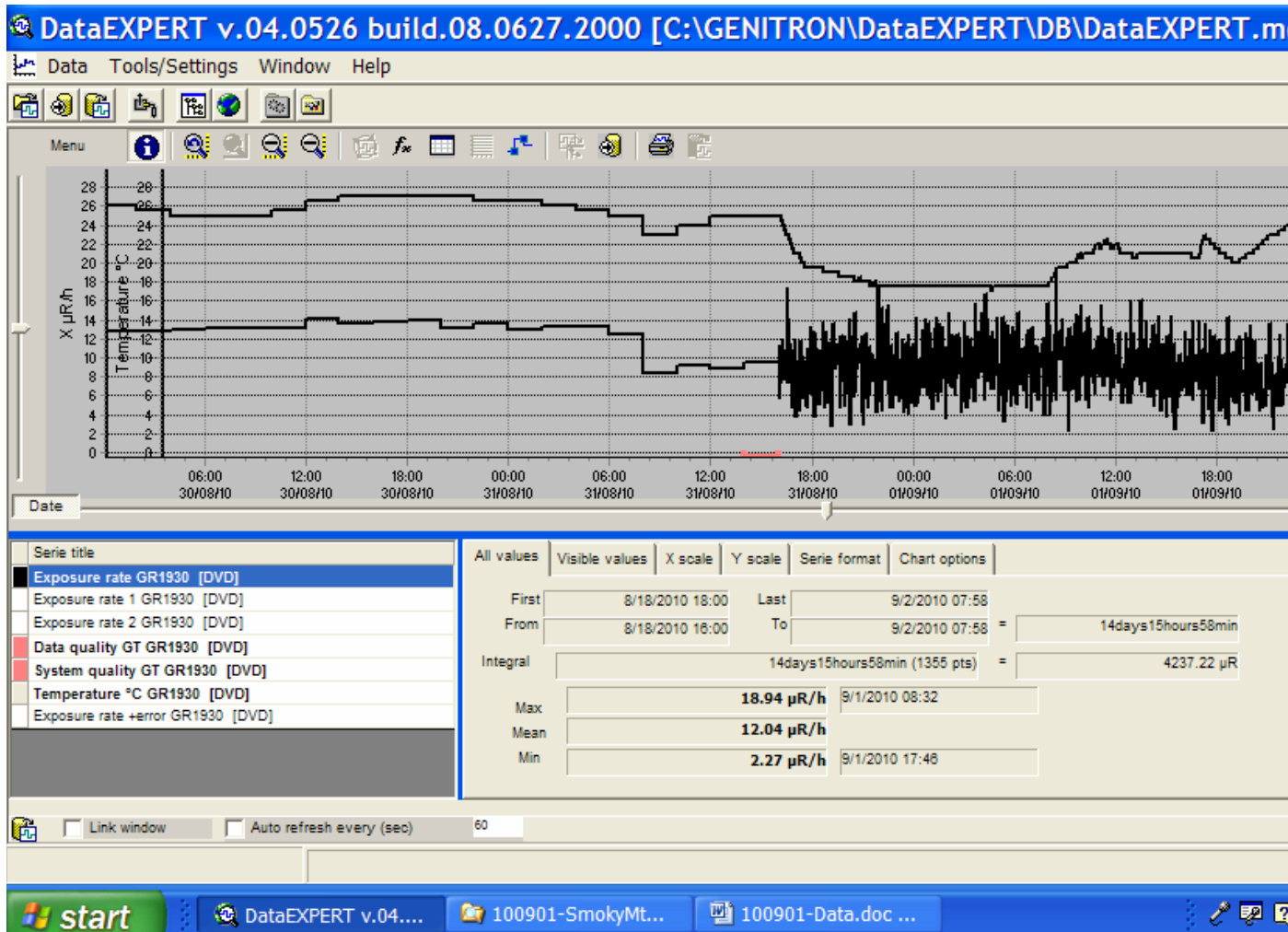
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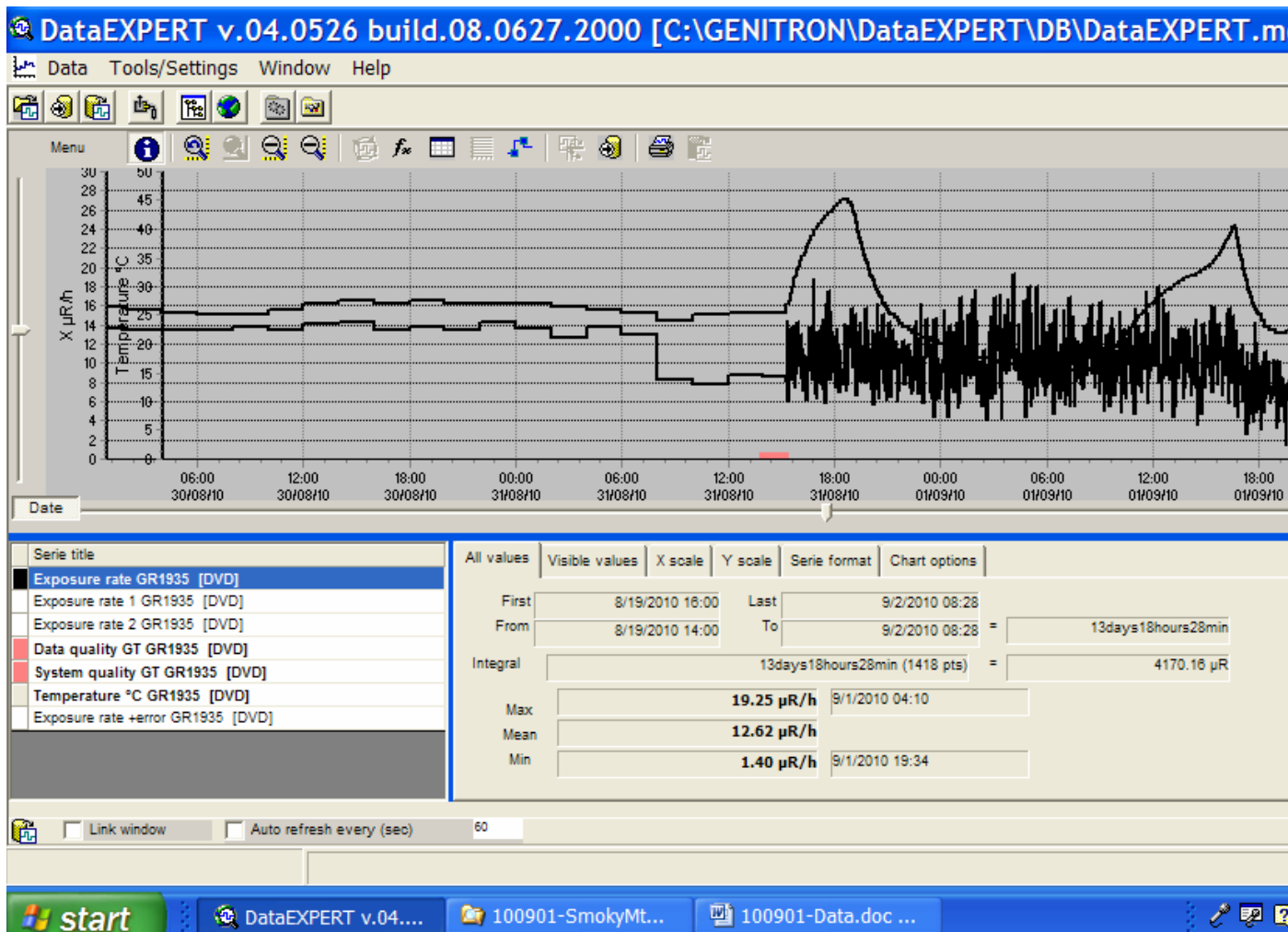
GF1832 Red gate

35.91741

83.92706



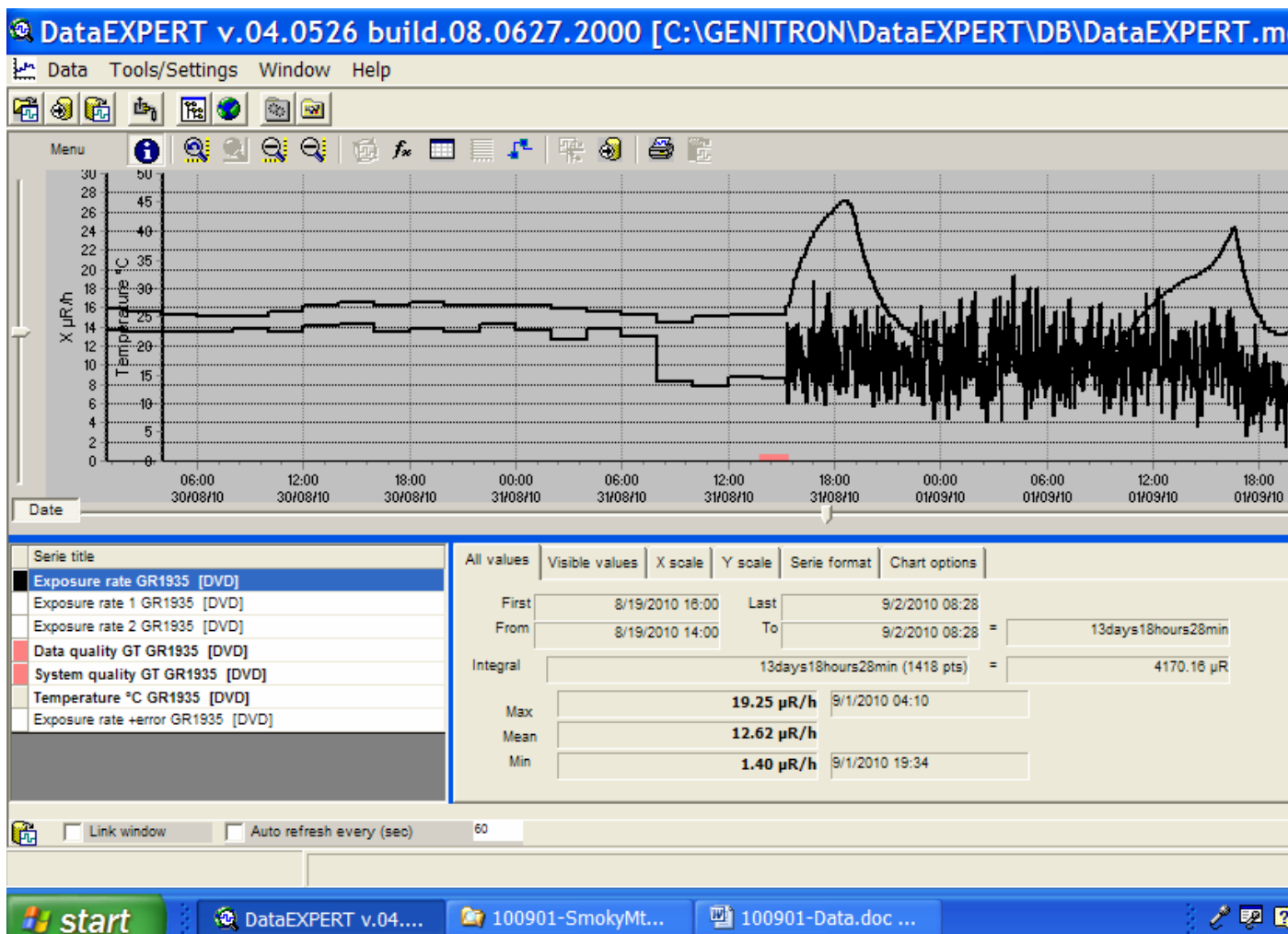
GF1930 Office trailer near the badge board



GF1935 Property corner

35.91940

83.92522



GF1937 Railroad fenceline  
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35.91917