



August 5, 2010

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555-0001

U.S. Nuclear Regulatory Commission  
Region IV  
Regional Administrator  
612 Eat Lamar Blvd, Suite 400  
Arlington, TX 76011-4125

**Re: Reply to a Notice of Violation**

Docket No. 030-11376, License No. 35-04017-04  
NRC Inspection Report 030-11376/2010-001  
With Letter Dated July 7, 2010

Dear Sirs:

This letter is in reply to a notice of violation from the NRC dated July 7, 2010. In response to the notice of violation, Century is pleased to submit the following attached documents.

1. Dose rate evaluation letter dated August 4, 2010.
2. Dose rate calculation dated August 4, 2010.

The following items requiring further discussion have been addressed as below:

**1. Reason for the Violation:**

According to the violation, Century had not evaluated our wireline logging trucks for estimated doses to which members of the public may be exposed, as per 10 CFR 20.1301 and 1302, as required. All logging units are surveyed when sources are added or subtracted, but the annual dose calculations had not been made, as required. At some locations in Wyoming and West Virginia, vehicles are garaged at the personal residences of Century employees and the sources are stored permanently in the logging units, therefore the logging units become the storage facility.

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**2. Corrective Steps and the Results Achieved:**

Century has made surveys of the dose rates, as seen in the attached documents. Therefore, based on these dose measurements, Century will post additional signage on the logging units to keep members of the public at a greater distance from the logging unit, when it is stored at the engineer's personal residence.

**3. Corrective Steps that will be Taken to Avoid Further Violations:**

In addition to the "**Caution Radioactive Materials**" signage on the logging unit, we will add the following "**Stay Back 10 Feet**". For the logging units that are kept at personal residences, and under our engineer's control, this will alert others of the potential danger.

**4. Date when Full Compliance will be Achieved:**

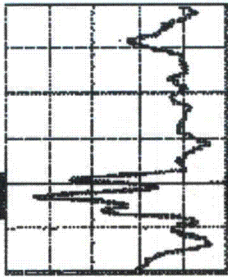
The additional signage will be ordered, and sent to field offices within 30 days of this letter. Additionally, the attached "**Dose Assessment**" document will be sent to field offices and all logging personnel showing the dose rates for members of the public.

If you need any further information, or have any questions, please feel free to contact me at the number below, extension 103, or by email, [peterson@century-geo.com](mailto:peterson@century-geo.com).

Sincerely,



Brian R. Peterson  
Radiation Safety Officer



**CENTURY GEOPHYSICAL CORPORATION**  
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Tulsa, OK 74112  
Phone: (918) 838-9811, FAX: (918) 838-1532  
www.century-geo.com, E-Mail: peterson@century-geo.com

August 4, 2010

Re: Dose Assessment for Members of Public, per 10 CFR 20.1301-1302

To Whom It May Concern:

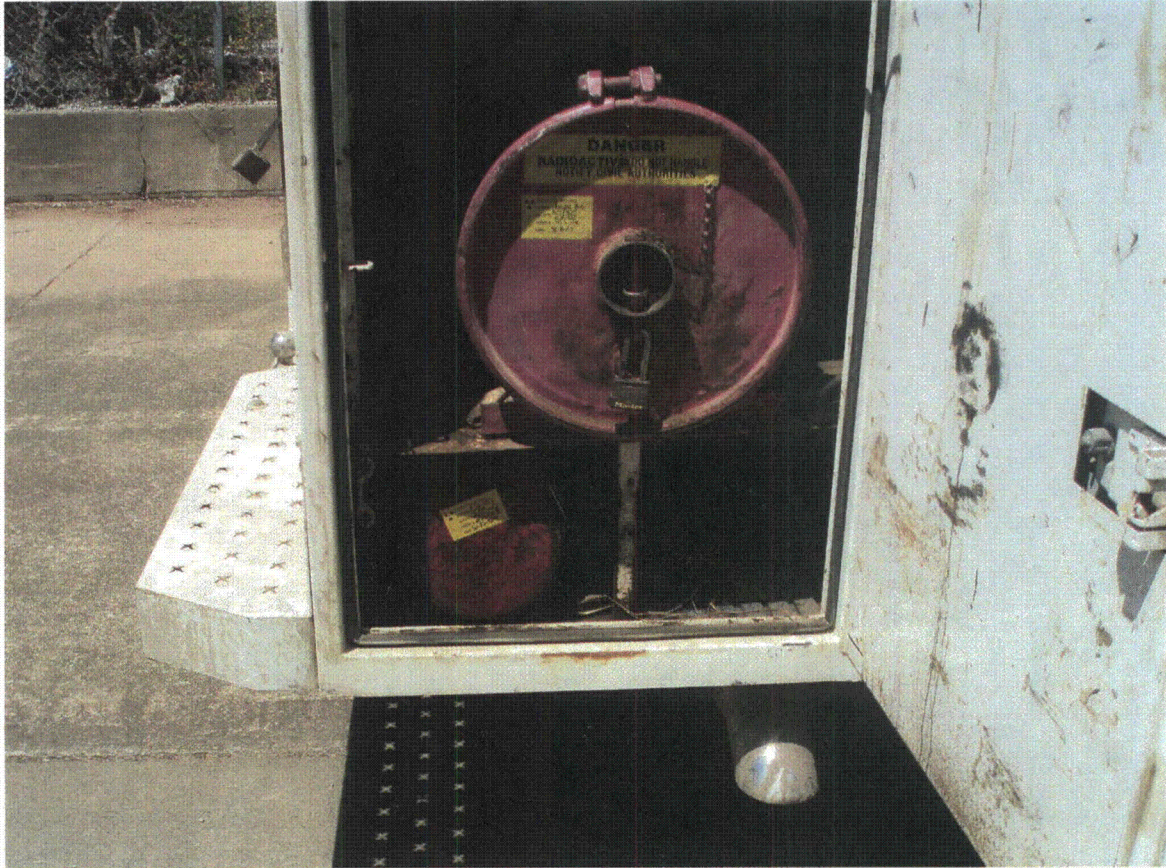
As of the above date, we have measured the dose rate from a "typical Century Geophysical Logging Unit" carrying a Cs137 source of 250 mci, and a 5.0 Ci Am241Be source. The accompanying document shows the radiation levels measured at 1 foot from the outside of the logging unit, and calculated dose rates at 5 and 10 feet from the logging unit.

Radiation levels were measured at the side and rear of the logging unit, at the point closest to the sources as pictured below:

**Rear View**

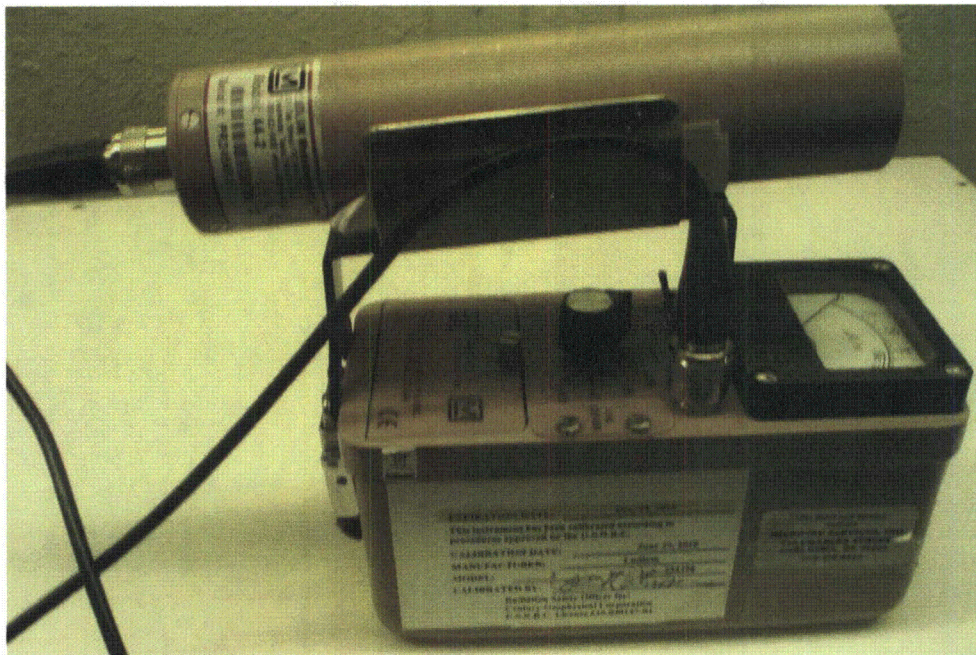


## Side View



Upon initial measurements, the 5 Ci Am<sup>241</sup>Be source was removed from the truck, and the dose rate was then measured again, showing about a 50% decrease in radiation levels.

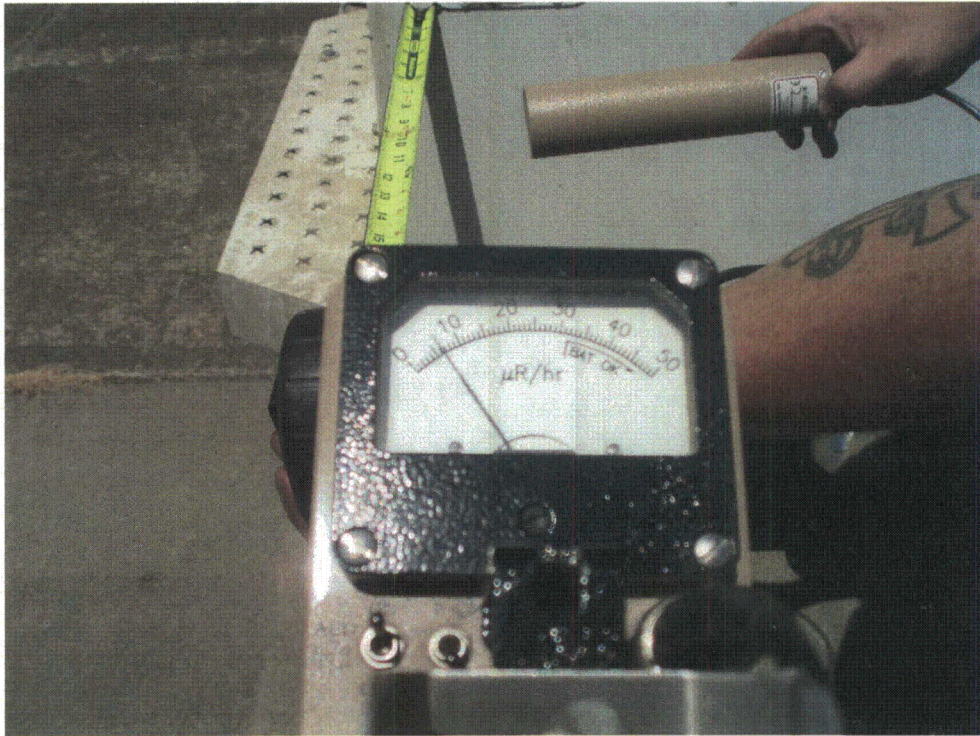
Measured doses were the following, made with a Ludlum Model #3, Scintillation Detector 44-2, Micro-Rem Survey Meter, calibrated on June 29, 2010, as seen below:



**Dose with Cs137 and Am241Be Sources:**

Dose Rate at 1 foot: Side of Truck: 1000 ur/hr.

Dose Rate at 1 foot: Rear of Truck: 900 ur/hr.



**Dose with Cs137 source only:**

Dose Rate at 1 foot: Side of Truck: 150 ur/hr.

Dose Rate at 1 foot: Rear of Truck: 450 ur/hr. (Shielding of Cs container is least effective to side of the shield)

**Dose Assessment for Member of the Public:**

Based on the above readings and calculated doses, it found that a member of the public, if in constant presence of the logging unit, for 365 days, would need to maintain a distance of 10 feet from the storage area of the truck, to stay below the 100 milli-rem per calendar year requirement (maximum dose would be 88 mrem/year). As the logging unit is utilized in the field, based on average use of 150 days per year, the dose rate would decrease to 70 mrem/year.

If you have any questions or need additional information, please feel free to contact myself.

Sincerely,

*Brian R. Peterson*

Brian R. Peterson  
US Operations Manager / Radiation Safety Officer  
Century Geophysical Corporation

## Dose Assessment of Century Geophysical Wireline Truck

Sources on board: 250 mci Cs137  
5.0 Ci, Am241Be

Survey Meter Type and Calibration Date: Ludlum Model 3, MicroRem Scintillation with 44-2 Detector  
Calibration Date: June 29, 2010

Background Radiation Measurement: 5-7 ur/hr

### Dose Measurement at 1 foot:

Rear of truck: 900 ur/hr  
Side of truck: 1000 ur/hr

### Calculated Dose at 5 feet:

Rear of truck: 36 ur/hr  
Side of truck: 40 ur/hr

### Calculated Dose at 10 feet:

Rear of truck: 9 ur/hr  
Side of truck: 10 ur/hr

### Cs137 Source only

#### Dose Measurement at 1 foot:

Rear of truck: 450 ur/hr  
Side of truck: 150 ur/hr

#### Calculated Dose at 5 feet:

Rear of truck: 18 ur/hr  
Side of truck: 6 ur/hr

#### Calculated Dose at 10 feet:

Rear of truck: 4.5 ur/hr  
Side of truck: 1.5 ur/hr

### Dose to Member of the Public in Storage Area:

Maximum Dose assuming a distance of 10 feet from nearest occupied area:

$$10 \text{ ur/hr} \times 24 \text{ hrs} \times 365 \text{ days} = 87,600 \text{ urem} = 88 \text{ mr/year}$$

Dose with 150 work days/year: No Source Presence per 12 hours/day = 290 equivalent days

$$10 \text{ ur/hr} \times 24 \text{ hrs} \times 290 \text{ days} = 69,600 \text{ urem} = 70 \text{ mr/year}$$