

## Poston-Brown, Martha

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**From:** Robert Clark <robclark@mad-eng.com>  
**Sent:** Wednesday, June 15, 2016 5:05 PM  
**To:** Poston-Brown, Martha  
**Subject:** [External\_Sender] Occupational Dosimetry Analysis  
**Attachments:** Employee Dose Rate of C-300.pdf

Marti

Please find attached our occupational dosimetry analysis.

Thanks!

Rob

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**From:** Poston-Brown, Martha [mailto:Martha.Poston-Brown@nrc.gov]  
**Sent:** Wednesday, June 15, 2016 11:44 AM  
**To:** robclark@mad-eng.com  
**Subject:** RE: RE: RE: RE: Follow up

Rob –

Thank you. Looks like you have everything but the justification for not providing dosimetry to your gauge users. Do you have that? If so, can you please provide. Thanks

Marti

**From:** Robert Clark [mailto:robclark@mad-eng.com]  
**Sent:** Wednesday, June 15, 2016 11:47 AM  
**To:** Poston-Brown, Martha <Martha.Poston-Brown@nrc.gov>  
**Subject:** [External\_Sender] RE: RE: RE: Follow up

Martha

Please find attached the loose ends to complete your inspection. Please let me know if you need anything else.

Thank You for all of your help on this!

Rob

**Robert F. Clark, PE, CMI**  
**Madison Engineering, LLC**  
895 Technology Boulevard, Suite 203  
Bozeman, MT 59718  
406.586.0262 office  
406.556.1205 mobile  
406.586.5740 fax  
[robertclark@mad-eng.com](mailto:robertclark@mad-eng.com)

**From:** Poston-Brown, Martha [<mailto:Martha.Poston-Brown@nrc.gov>]  
**Sent:** Monday, June 13, 2016 6:41 AM  
**To:** [robclark@mad-eng.com](mailto:robclark@mad-eng.com)  
**Subject:** RE: RE: RE: Follow up

Robert –

If the physical address did not change, then no, you don't need to update your license. Just be sure to do a public dose assessment for the new storage location.

Marti

**From:** Robert Clark [<mailto:robclark@mad-eng.com>]  
**Sent:** Tuesday, May 31, 2016 5:57 PM  
**To:** Poston-Brown, Martha <[Martha.Poston-Brown@nrc.gov](mailto:Martha.Poston-Brown@nrc.gov)>  
**Subject:** [External\_Sender] RE: RE: Follow up

Thank you, Martha.

We are actually changing gears. We are installing a storage shed in the parking lot to store the nuke gauge and all of our field equipment. Will we need to update our license based on this new storage area?

Thanks!

Rob

**From:** Poston-Brown, Martha [<mailto:Martha.Poston-Brown@nrc.gov>]  
**Sent:** Thursday, May 26, 2016 2:33 PM  
**To:** [robclark@mad-eng.com](mailto:robclark@mad-eng.com)  
**Subject:** FW: RE: Follow up

Robert –

Thought you might benefit from an example.

Dose rate of gauge in off position (based on SSDR) 1.3 mrem/hr at 3 feet  
Non gauge user work area closest to where the gauge is stored is 12 feet from storage area  
Gauge is stored in the work area only 25% of the time.  
Hours worked on average by the nearest individual per year – 2000 hrs. (40 hrs/ wks for 50 weeks)

So correct for dose at greater distance using  $(D1)(DR1) = (D2)(DR2)$  and solve for DR2 (DR2 is 0.325 mrem/hr at the non-gauge users work area. Multiple working hours per year by the storage percentage  $(2000 \times .25) = 500$  hrs

So over the course of a year a member of the public would be exposed to 0.325 mrem/hr for 500 hrs or 162.5 mrem annually.

Since you want to show that the dose rate is less than 100 mrem/year, you under this scenario would have to adjust your assumptions, but as long as you document what your assumptions are and they are reasonable. Maybe your person works part time or maybe you add shielding to the storage area to reduce the dose rate..hopefully this helps you get the idea of what the NUREG requires you to do.

M

**From:** Poston-Brown, Martha  
**Sent:** Thursday, May 26, 2016 1:55 PM  
**To:** 'robclark@mad-eng.com' <[robclark@mad-eng.com](mailto:robclark@mad-eng.com)>  
**Subject:** RE: RE: Follow up

Robert –

The dosimetry test is a calculation, you should be able to do it yourself using the guidance in Appendix I of NUREG-1556 Volume 1 as we discussed during the inspection. Being able to borrow a survey meter from MSU would make it easier but there are dose rates measured by the manufacturer in the sealed source and device registration (SSDR) for the Seaman C-300 series gauges. Just in case you did not get a copy of the SSDR from Seaman, I have attached it. The language in Appendix I walks you through how to take those dose rate numbers and calculate the dose for the gauge. All you need to know is that Model of the C-300 you have. Once you have the calculations done, please let me know so I can close my inspection. Thanks so much.

Marti

**From:** Robert Clark [<mailto:robclark@mad-eng.com>]  
**Sent:** Friday, May 13, 2016 4:08 PM  
**To:** Poston-Brown, Martha <[Martha.Poston-Brown@nrc.gov](mailto:Martha.Poston-Brown@nrc.gov)>  
**Subject:** [External\_Sender] RE: Follow up

Marti

We have made great progress. We have performed the leak test and all three additional users have taken the Radiation Safety Officers exams. We are still struggling trying to find someone to do the dosimetry test. I contacted both the MSU Extension hazardous materials division and the City Fire Department. I am at a bit of a loss on this but am going to try again with the hazardous materials division.

Thanks for the follow up!

Rob

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**Madison Engineering, LLC**  
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Bozeman, MT 59718  
406.586.0262 office  
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406.586.5740 fax  
[robertclark@mad-eng.com](mailto:robertclark@mad-eng.com)

  
**MADISON**  
**ENGINEERING**

**From:** Poston-Brown, Martha [<mailto:Martha.Poston-Brown@nrc.gov>]  
**Sent:** Friday, May 13, 2016 2:44 PM  
**To:** [robclark@mad-eng.com](mailto:robclark@mad-eng.com)  
**Cc:** Alldredge, Casey  
**Subject:** FW: Follow up

Robert –

How are you progressing on your corrective action? If I received a follow-up email as indicated in below, I must have accidentally deleted it. If you did respond, would you be so kind as to resend your update. If you did not respond, can you please send me an update. I have also included Casey on the email, please send the reply to both of us. Thanks so much.

Marti

**From:** Poston-Brown, Martha  
**Sent:** Tuesday, March 01, 2016 1:21 PM  
**To:** 'robclark@mad-eng.com' <[robclark@mad-eng.com](mailto:robclark@mad-eng.com)>  
**Subject:** RE: Follow up

Robert –

Thank you for the information and status update. I am sorry that MSU would not be more helpful regarding the loan of a survey meter. Another option you might pursue is to contact Seamans to see if they have public dose estimates and staff dose estimates based on possession of one gauge. You might have to adjust the doses based on the difference in distance from their example to the closest member of the public, but it would give you a place to start on the calculations if getting access to a survey meter cannot happen for awhile. There are several hospitals in Bozeman that might be willing to loan you a survey meter for a day or for use in an emergency. Any hospital that has nuclear medicine or radiation oncology should also have survey instruments. Hope this helps.

Marti

**From:** Robert Clark [<mailto:robclark@mad-eng.com>]  
**Sent:** Tuesday, March 01, 2016 12:09 PM  
**To:** Poston-Brown, Martha <[Martha.Poston-Brown@nrc.gov](mailto:Martha.Poston-Brown@nrc.gov)>  
**Cc:** 'Chris Budeski' <[chris@mad-eng.com](mailto:chris@mad-eng.com)>  
**Subject:** [External\_Sender] Follow up

Martha

Thanks for your time last week helping us to be in conformance with the NRC license regulations. We are addressing the deficiencies you made us aware of and have made the following progress:

- I have mounted a Bill of Lading with the appropriate contact info boldly stated on the dash of the gauge transport vehicle;

- When the gauge is stored in the office we will chain it to the table until we get a permanent anchor system installed;
- I contacted the MSU Physics department but they don't seem to want to help, so;
- We contacted the Fire Department to request a occupational dosimetry analysis and am awaiting to hear back to schedule;
- The other engineers using the gauge have signed up for the Radiation and Operational training and will complete the course before using the gauge again;
- A leak test kit is being sent to us and I will perform the wipe test and send back to Seaman for the analysis.

I will provide another follow up email once all of the items have been addressed.

Thanks!

**Robert F. Clark, PE, CMI**  
**Madison Engineering, LLC**  
 895 Technology Boulevard, Suite 203  
 Bozeman, MT 59718  
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 406.586.5740 fax  
[robertclark@mad-eng.com](mailto:robertclark@mad-eng.com)





# Nuclear Gauge Occupational Dosimetry Analysis

License No. 25-35260-01

15-Jun-16

Model: C-300-004 Seaman Nuclear Corporation  
7315 South First Street  
Oak Creek, WI 53154  
414.762.5100

## Dose Rate of gauge in ON position (based on SSDR)

	3 foot distance	1 foot distance	Contact
Front	1.0 mrem/hr	6.0 mrem/hr	35.8 mrem/hr
Back	1.1 mrem/hr	7.3 mrem/hr	41.0 mrem/hr
Right	1.2 mrem/hr	7.5 mrem/hr	56.0 mrem/hr
Left	0.2 mrem/hr	0.9 mrem/hr	3.3 mrem/hr
Top	0.4 mrem/hr	1.5 mrem/hr	7.1 mrem/hr
Bottom	5.4 mrem/hr	49.0 mrem/hr	1000.0 mrem/hr
Use Front	1.0 mrem/hr	6.0 mrem/hr	35.8 mrem/hr

Gauge is locked in a vehicle when employee is on a job site

Gauge is only removed when needed for testing.

Gauge is in employee's hands being used an average of 3 hours per day during construction season

Construction days: 165

Days of Actual Gauge use 60

$((35.8 \text{ mrem/hr})(3 \text{ hrs}) \times 60 \text{ days} + (1.0 \text{ mrem/hr})(5 \text{ hrs})) \times 165 \text{ days} = 7,269 \text{ mrem during a construction year}$

7,269 mrem/4 certified users = 1,818 mrem annual exposure per user    Acceptable level

# Seaman Nuclear Corporation

7315 South First Street Oak Creek, WI 53154 USA

Tel 414-762-5100 Fax 414-762-5106

info@seamannuclear.com

## Leak Test Certificate

April 12, 2016

A leak test has been performed on meter, serial number **21370**, a model C-300 DT, 12", containing the radionuclide Ra 226

Owned By: Madison Engineering LLC  
895 Technology Blvd., Suite 203  
Bozeman, MT 59718

Date Sample Collected: 4/5/16  
Collected By: R. Clark  
Date Sample Analyzed: 4/12/16  
Analyzed By: K. Krysiak

Most regulatory agencies consider a source to be leaking if a leak test reveals the presence of more than 0.005 microcurie of removable contamination.


Analysis found contamination of less than 0.005 microcurie.

Analysis authorized by Wisconsin license 079-1257-01.

**LEAK TEST DUE: 10/5/16**



Scott C. Seaman  
Radiation Safety Officer  
Seaman Nuclear Corporation

S/N: 21370  
Leak Tested: 4/5/16  
Due: 10/5/16  
 Seaman Nuclear Corporation  
Oak Creek, WI (414) 762-5100

## CERTIFICATION OF RADIOLOGICAL, RSO, AND OPERATIONAL TRAINING

This will certify that on **April 22, 2016**

**Juliene Sinclair**

successfully completed the factory training course for the use of Seaman Nuclear Corporation's Density Moisture content gauges. Seminar content and the written examination covered the duties of Radiation Safety Officer (RSO), radiological safety, regulatory requirements, theory and operation of nuclear gauges, accident procedures, initial HAZMAT training according to 49 CFR 172.700-704, transportation regulations, and the procedures involved in the transport of portable nuclear density moisture gauges.

This certificate further attests that the above named has received instruction in the procedures necessary for accurate compaction testing in soils and asphaltic concrete.

This Certificate Has Been Issued By  
**THE SEAMAN NUCLEAR CORPORATION**  
7315 South First Street  
Oak Creek, WI 53154



A handwritten signature in cursive script that reads 'Scott C. Seaman'.

Scott C. Seaman  
President, R.S.O. & Instructor



## CERTIFICATION OF RADIOLOGICAL, RSO, AND OPERATIONAL TRAINING

This will certify that on **April 5, 2016**

**Jason Humberger**

successfully completed the factory training course for the use of Seaman Nuclear Corporation's Density Moisture content gauges. Seminar content and the written examination covered the duties of Radiation Safety Officer (RSO), radiological safety, regulatory requirements, theory and operation of nuclear gauges, accident procedures, initial HAZMAT training according to 49 CFR 172.700-704, transportation regulations, and the procedures involved in the transport of portable nuclear density moisture gauges.

This certificate further attests that the above named has received instruction in the procedures necessary for accurate compaction testing in soils and asphaltic concrete.

This Certificate Has Been Issued By  
**THE SEAMAN NUCLEAR CORPORATION**  
7315 South First Street  
Oak Creek, WI 53154



A handwritten signature in cursive script that reads "Scott C. Seaman".

**SCOTT C. SEAMAN**  
President, R.S.O. & Instructor

## CERTIFICATION OF RADIOLOGICAL, RSO, AND OPERATIONAL TRAINING

This will certify that on **April 12, 2016**


**Brianna Baker**

successfully completed the factory training course for the use of Seaman Nuclear Corporation's Density Moisture content gauges. Seminar content and the written examination covered the duties of Radiation Safety Officer (RSO), radiological safety, regulatory requirements, theory and operation of nuclear gauges, accident procedures, initial HAZMAT training according to 49 CFR 172.700-704, transportation regulations, and the procedures involved in the transport of portable nuclear density moisture gauges.

This certificate further attests that the above named has received instruction in the procedures necessary for accurate compaction testing in soils and asphaltic concrete.

This Certificate Has Been Issued By  
**THE SEAMAN NUCLEAR CORPORATION**  
7315 South First Street  
Oak Creek, WI 53154



  
Scott C. Seaman  
President, R.S.O. & Instructor

## **Poston-Brown, Martha**

---

**From:** Robert Clark <robclark@mad-eng.com>  
**Sent:** Tuesday, March 01, 2016 12:09 PM  
**To:** Poston-Brown, Martha  
**Cc:** 'Chris Budeski'  
**Subject:** [External\_Sender] Follow up

Martha

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