

Nuclear Gauge Regulatory Compliance

Lessons Learned; Action Taken

Leo J. Titus, Jr., P.E.

Agenda

Review the chronology that led to action taken by the Maryland Department of the Environment.

Review of actions taken by ECS to improve management oversight and compliance of nuclear devices.

Summarize lessons learned.

Background

ECS Mid-Atlantic has 17 locations in Virginia, Maryland, Pennsylvania, New Jersey and Washington D.C.

Approximately 250 nuclear gauges in the Mid-Atlantic region.

Maryland is an Agreement State assuming NRC regulatory authority over nuclear devices.

Over a 12 year period, ECS had several violations in Maryland that ultimately resulted in claims against ECS by the Maryland Attorney General.

Chronology

September 26, 1996: Inspection, Frederick, MD	VIOLATIONS
September 22, 1999: Inspection, Frederick, MD	VIOLATIONS
April 22, 2003: Inspection, Frederick, MD	VIOLATIONS
July 8, 2003: Gauge Run Over , Hanover, MD	VIOLATIONS
March 24, 2004: Inspection, Hanover, MD	VIOLATIONS
April 22, 2004: Inspection, Frederick, MD	VIOLATIONS

Chronology

September 3, 2008: Aberdeen, MD - **Notice of Violation**

- Refresher training not done
- Annual review of program not done
- DOT Haz Mat training not done
- Survey meter calibration out of date
- MDE contact # incorrect on the bill of lading
- Failure to post “Notice to Employees”
- Code of MD regulations posted but incomplete

Chronology

November 28, 2008: Hanover, MD



VIOLATION

“ECS failed to control and maintain constant surveillance of the nuclear gauge.”

REPEAT

Chronology

December 4, 2008: Hanover, MD - **Notice of Violation**

- Annual review of program not done

REPEAT

Chronology

March 12, 2009: ECS senior management attend a meeting at MDE to discuss Nov. 28th incident and Dec. 4th inspection results.

Meeting revealed that gauge operator of Nov. 28th incident was wearing another person's monitoring badge.



VIOLATION
REPEAT

Chronology

March 12, 2009: Hanover, MD **(SAME DAY AS MDE MEETING!!)**



“ECS failed to control and maintain constant surveillance of the nuclear gauge.”

VIOLATION: REPEAT... of a REPEAT

Chronology

To make matters worse (if that's even possible)...

“ECS contacted the Department to report the damaged nuclear gauge on March 13, 2009, 17 hours after the incident occurred, depriving the Department of the ability to respond to the incident scene.”

VIOLATION

Chronology

March 23, 2009: Frederick, MD - **Notice of Violation**

- | | |
|--|---------------|
| • Refresher training not done | REPEAT |
| • Annual review of program not done | REPEAT |
| • DOT Haz Mat training not done | REPEAT |
| • Survey meter calibration out of date | REPEAT |
| • Leak tests not done | REPEAT |
| • Improper locking of devices | REPEAT |
| • Illegible labels on devices | |

Chronology

September 14, 2009: Frederick, MD - **Notice of Violation**

- Failure to monitor exposures to radiation **REPEAT**
- Failure to maintain records of doses received by individuals **REPEAT**

Chronology

January 6, 2010...

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January 4, 2009¹⁰

CERTIFIED MAIL

The Corporation Trust Incorporated
Resident Agent, ECS Mid-Atlantic, LLC
351 West Camden Street
Baltimore, MD 21201

Mr. [REDACTED], Radiation Safety Officer
ECS Mid-Atlantic, LLC
1340P Charwood Road
Hanover, Maryland 21076

RE: Notice of Opportunity to Resolve Claims Against ECS Mid-Atlantic, LLC, Maryland
License Nos. MD-03-092-01 and MD-21-037-01, Prior to Filing of Civil Suit

Chronology

- 12 specific regulations violated.
- Multiple instances of violations cited during the 2008/2009 inspections.
- Each day a leak test was not performed or survey meter not calibrated is a separate violation.
- Multiple repeat violations.

Chronology



“Section 8-509 of the Environmental Article of the Maryland Code authorizes the Department to seek a civil penalty in circuit court of up to \$10,000 for each violation of a radiation control regulation...

... Each day that a violation continues is a separate violation.”

Chronology

12 Violations

X Multiple instances

X \$10,000 Per day/per instance

X Multiple days

= \$ X,000,000.00

Actions Taken

October, 2008: Began design of a software management tool, the Device Management Console (DMC).

March, 2009: Developed and implemented ECS Enhanced RSO Training. Comprehensive and standardized.

April, 2009: Enhanced RSO Training mandatory for all RSO's and office managers. Presented by senior management.

Actions Taken

Spring, 2009: Mandatory refresher training performed for all field technicians.

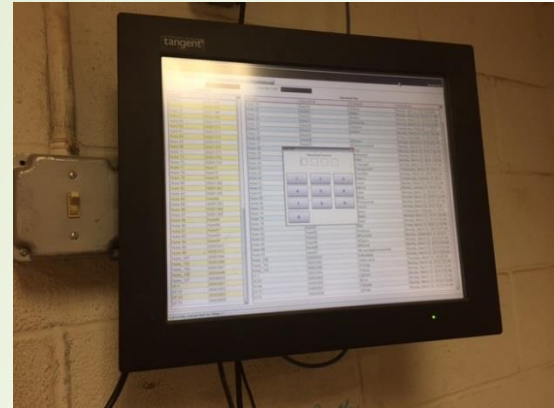
Spring/Summer, 2009: Radiation Safety Audits were conducted in all ECS Mid-Atlantic offices.

May, 2009: An RSO was terminated for lack of performance of RSO duties.

Spring, 2010: Radiation safety plan document audit to confirm all Maryland offices comply with MDE requirements.

Actions Taken

Innovative Equipment Tracking System



Actions Taken

Getting the Standard for Service

Version 1.6

Check In/Check Out

Discrepancy

Details

Utilization Log

Device Bar Code:

User Bar Code:

Available

Checked Out

Device	DeviceID #
21Gauge #01	00000905
21Gauge #02	00000906
21Gauge #03	00000907
21Gauge #04	00000908
21Gauge #05	00000909
21Gauge #06	00000910
21Gauge #07	00000911
21Gauge #08	00000912
21Gauge #09	00001234
21Gauge #10	00000914
21Gauge #13	00000915
21Gauge #14	00000916
21Gauge #15	00000917
21Gauge #16	00000918
21Gauge #17	00000919
21Gauge #18	00005852
Nuke 02	00001346
Nuke 04	00001347
Nuke 06	00001348
Nuke 08	Nuke08
Nuke 09	Nuke09
Nuke 10	00001349
Nuke 11	Nuke11
Nuke 12	00001350
Nuke 13	00001351
Nuke 14	Nuke14
Nuke 15	00001352
Nuke 17	00001353
Nuke 18	00001354
Nuke 19	Nuke19
Nuke 20	Nuke20
Nuke 21	Nuke21
Nuke 22	Nuke22
Nuke 24	Nuke24
Nuke 25	00001355

Device	DeviceID #	Employee	Checked out
Nuke 03	Nuke03	RHill	Monday, March 23, 2015 7:20 AM
Nuke 05	Nuke05	AFikermariam	Monday, March 23, 2015 7:33 AM
Nuke 07	Nuke07	TPhan	Wednesday, April 11, 2012 6:05...
Nuke 16	Nuke16	GOKyay	Monday, April 25, 2011 6:45 AM
Nuke 23	Nuke23	MHafezi	Monday, March 23, 2015 9:41 AM
Nuke 27	Nuke27	DAhotondji	Monday, March 23, 2015 5:25 AM
Nuke 29	Nuke29	OAdams	Wednesday, February 11, 2015 ...
Nuke 32	Nuke32		Friday, December 12, 2014 6:58...
Nuke 36	Nuke36	AEmeru	Monday, March 23, 2015 6:53 AM
Nuke 37	Nuke37	BGeberemicheal	Monday, March 23, 2015 4:27 AM
Nuke 38	Nuke38	VPaul	Monday, March 23, 2015 7:09 AM
Nuke 39	Nuke39	MMohamed	Monday, March 23, 2015 7:30 AM
Nuke 44	Nuke44	ASeda	Monday, March 23, 2015 7:39 AM
Nuke 45	Nuke45	RChapagain	Monday, March 23, 2015 6:54 AM
Nuke 51	Nuke51	PPhongsavan1	Wednesday, March 18, 2015 12...
Nuke 55	Nuke55	RShrestha	Monday, March 23, 2015 7:01 AM
Nuke 60	Nuke60	OAdams	Wednesday, February 25, 2015 ...
Nuke 62	Nuke62	DWurie	Monday, March 23, 2015 6:52 AM
Nuke 63	Nuke63	DAIBrich	Monday, January 19, 2015 7:36 ...
Nuke 67	Nuke67	JButtar	Monday, March 23, 2015 8:17 AM
Nuke 68	Nuke68	EBiney	Monday, March 23, 2015 7:53 AM
Nuke 69	Nuke69	PPhongsavan	Monday, March 23, 2015 7:37 AM
Nuke 70	Nuke70	AKidane	Monday, March 23, 2015 10:30 ...
Nuke 74	Nuke74	AJama	Wednesday, February 11, 2015 ...
Nuke 75	Nuke75	KMakki	Monday, March 23, 2015 7:09 AM
Nuke 76	Nuke76	BKarki	Monday, March 23, 2015 6:50 AM
Nuke 81	Nuke81	RMA	Friday, March 13, 2009 12:19 PM
Nuke 88	Nuke88	KAnthony	Monday, March 23, 2015 6:47 AM
Nuke 92	Nuke92	MPuschell	Monday, September 22, 2014 6:...
Nuke 95	Nuke95	AEIgass	Monday, March 23, 2015 9:01 AM
Nuke 96	Nuke96	MEIkordi	Monday, March 23, 2015 9:09 AM
Nuke 97	Nuke97	MKarambakhshianesfan	Monday, March 23, 2015 6:43 AM
Nuke_100	00002033	AAIhaddad	Monday, March 23, 2015 8:58 AM
Nuke_102	00002985	AAIlahVerdi	Thursday, March 12, 2015 6:35 ...
Nuke 105	00002988	GOKyay	Monday, March 23, 2015 7:07 AM

Activity log
tracks gauge
usage.

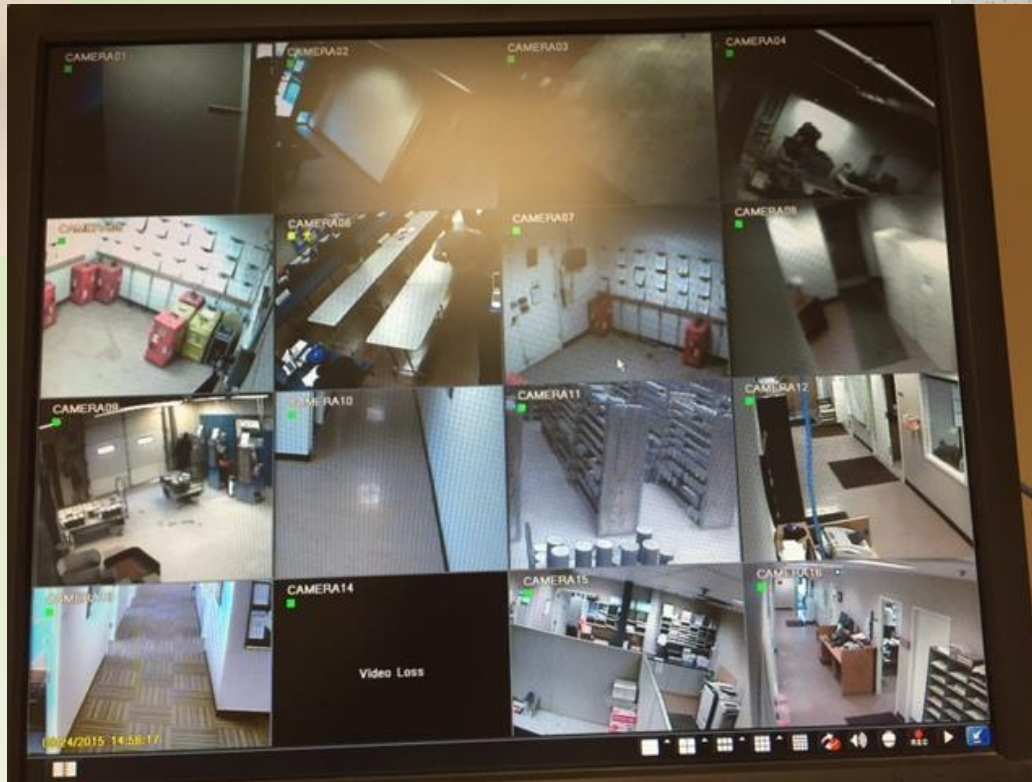
Actions Taken

Utilization log for every gauge tracks users, standard counts and check in/check out times.

Check In/Check Out Discrepancy Details Utilization Log								
Gauge No: Nuke 37 Month: March Year: 2015 Print								
		-	+	-	+	-	+	
Date	Name	DStd	Dxi	MStd	Mxi	Project #	Time Out	Time In
1								
2	Geberemicheal, Berhanu 1284190 1284169 1285650	35890	0.93	8250	0.97	20858-B; Belmont Executive Center - CMT; Ashburn	6:52 AM	2:53 PM
3	Geberemicheal, Berhanu 2000033856 1284191 1284170	35564	0.92	8029	1.03	20858-B; Belmont Executive Center - CMT; Ashburn	6:05 AM	2:55 PM
4	Geberemicheal, Berhanu 1284192 1284171	36098	0.89	8082	1.04	20858-B; Belmont Executive Center - CMT; Ashburn	6:39 AM	1:12 PM
5								
6								
7								
8								
9	Geberemicheal, Berhanu 1284195 1284174	35559	0.98	8208	0.93	20858-B; Belmont Executive Center - CMT; Ashburn	6:37 AM	2:30 PM
10	Geberemicheal, Berhanu 1284175	35429	0.96	8025	1.04	20858-B; Belmont Executive Center - CMT; Ashburn	6:38 AM	2:04 PM
11	Paul, Varun 1286185 1287029					999-37; Trump Old Post Office - (Concrete-Steel Inspections); Washington	6:00 AM	6:37 PM
12	Pokhrel, Bhupal 1286174 1287175	36688	0.95	1732	1.07	13438-JP; Springfield Town Center - Frontier Dr	6:05 AM	4:15 PM

Actions Taken

Increased Security



Actions Taken

Weekly email report sent to RSO and senior management alerting them to upcoming leak tests and calibrations due.

LTitus

From: noc@ecslimited.com
Sent: Monday, March 09, 2015 6:00 AM
To: _Subsidiary Presidents; _Radiation Safety Officers
Subject: [INFO] DMC Notification

TargetType: project

Office No.	Office Name	Device Name	Leak Test Due	Calibration Test Due
01	Chantilly	Nuke 06	03/26/2015	05/13/2015
01	Chantilly	Nuke 15	03/26/2015	05/13/2015
01	Chantilly	Nuke 36	08/05/2015	04/02/2015
01	Chantilly	Nuke 63	07/19/2015	04/02/2015
01	Chantilly	Nuke 84	06/11/2015	04/02/2015
01	Chantilly	Nuke 91	03/26/2015	05/13/2015
01	Chantilly	W 64	04/15/2015	04/02/2015
02	Baltimore	#32	07/12/2015	03/28/2015
02	Baltimore	#33	07/12/2015	03/27/2015
03	Richmond	Gauge #01	03/23/2015	09/24/2015
07	Williamsburg	07-NG#12	07/07/2015	03/12/2015
08	Charlotte	ND - Humboldt Scientific 1724	04/04/2015	01/28/2016
08	Charlotte	ND - Humboldt Scientific 1831	04/04/2015	06/30/2015
08	Charlotte	ND - Humboldt Scientific 1876	04/04/2015	01/28/2016
08	Charlotte	ND - Humboldt Scientific 2102	04/04/2015	03/05/2015
08	Charlotte	ND - Humboldt Scientific 2187	04/04/2015	06/30/2015
08	Charlotte	ND - Humboldt Scientific 2743	04/04/2015	04/30/2015
08	Charlotte	ND - Humboldt Scientific 3017	04/04/2015	07/12/2015
08	Charlotte	ND - Troxler 1830	04/04/2015	12/29/2015
11	Corporate	TEST_NUKE	02/24/2015	02/12/2015
12	Beane	12 Nuclear Gauge #05	03/05/2015	03/01/2015

Actions Taken

- Consolidated dosimeter monitoring.
- Improved disciplinary policy.
- Improved administration.
- Significant investments in training and IT infrastructure to assist in compliance management.

Actions Taken

- Mandatory monthly RSO calls.
- Corporate Radiation Compliance Officer position created to oversee progress.
- Increased attention and frequency of internal audits.

Results

Since 2009, we have had multiple surprise inspections in Maryland and all other states we operate gauges in.

ECS has had ZERO nuclear regulatory compliance violations since 2009.

Numerous comments from regulators/inspectors praising ECS nuclear regulatory compliance programs as “outstanding” and “a model for the industry”.

Results

ECS ultimately signed a settlement agreement in 2011 which included a **\$122,000** civil penalty.

Penalty did not include:

- Legal fees and senior management time to settle the case.
- Senior management time to perform audits companywide.
- IT development costs
- Additional training time for all staff
- Cost of having to buy new gauges!!

Lessons Learned

- Inadequate oversight and management attention can be expensive!!
- Minor violations over time can add up. They should be considered a warning sign of a potentially bigger problem.
- What we may consider a “minor” violation may be considered “very serious” by state or federal nuclear regulators.
- Innovation can be an investment.
- Monitor what is important.
- Trust but verify.

Questions?