

# Nuclear Gauge Regulatory Compliance

*Lessons Learned; Action Taken*

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# 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	<b>VIOLATIONS</b>
September 22, 1999: Inspection, Frederick, MD	<b>VIOLATIONS</b>
April 22, 2003: Inspection, Frederick, MD	<b>VIOLATIONS</b>
July 8, 2003: <b>Gauge Run Over</b> , Hanover, MD	<b>VIOLATIONS</b>
March 24, 2004: Inspection, Hanover, MD	<b>VIOLATIONS</b>
April 22, 2004: Inspection, Frederick, MD	<b>VIOLATIONS</b>

# 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- Survey meter calibration out of date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. 28<sup>th</sup> incident and Dec. 4<sup>th</sup> inspection results.

Meeting revealed that gauge operator of Nov. 28<sup>th</sup> 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 **REPEAT**

# 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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ASSISTANT ATTORNEYS GENERAL

January 4, 2009<sup>10</sup>

**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

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**= \$ 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.

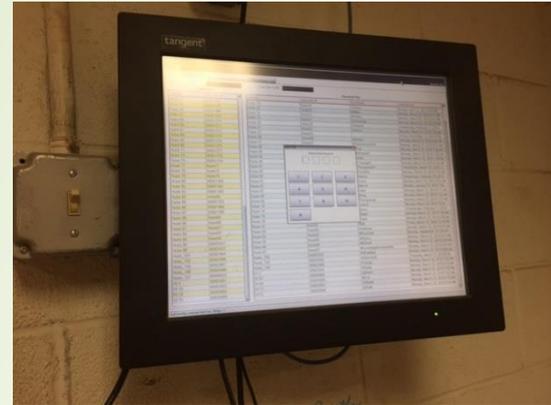
Spring/Summer, 2009: Radiation Safety Audits were conducted in all ECS Mid-Atlantic offices.

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

Setting the Standard for Service Version 1.6.5

Check In/Check Out | Discrepancy | Details | Utilization Log

Device Bar Code:  User Bar Code:

Available		Checked Out			
Device	DeviceID #	Device	DeviceID #	Employee	Checked out
21Gauge #01	00000905	Nuke 03	Nuke03	RHill	Monday, March 23, 2015 7:20 AM
21Gauge #02	00000906	Nuke 05	Nuke05	AFikermariam	Monday, March 23, 2015 7:33 AM
21Gauge #03	00000907	Nuke 07	Nuke07	TPhan	Wednesday, April 11, 2012 6:05 ...
21Gauge #04	00000908	Nuke 16	Nuke16	GOkyay	Monday, April 25, 2011 6:45 AM
21Gauge #05	00000909	Nuke 23	Nuke23	MHafezi	Monday, March 23, 2015 9:41 AM
21Gauge #06	00000910	Nuke 27	Nuke27	DAhotondji	Monday, March 23, 2015 5:25 AM
21Gauge #07	00000911	Nuke 29	Nuke29	OAdams	Wednesday, February 11, 2015 ...
21Gauge #08	00000912	Nuke 32	Nuke32		Friday, December 12, 2014 6:58 ...
21Gauge #09	00001234	Nuke 36	Nuke36	AEmeru	Monday, March 23, 2015 6:53 AM
21Gauge #10	00000914	Nuke 37	Nuke37	BGeberemicheal	Monday, March 23, 2015 4:27 AM
21Gauge #13	00000915	Nuke 38	Nuke38	VPaul	Monday, March 23, 2015 7:09 AM
21Gauge #14	00000916	Nuke 39	Nuke39	MMohamed	Monday, March 23, 2015 7:30 AM
21Gauge #15	00000917	Nuke 44	Nuke44	ASeda	Monday, March 23, 2015 7:39 AM
21Gauge #16	00000918	Nuke 45	Nuke45	RChapagain	Monday, March 23, 2015 6:54 AM
21Gauge #17	00000919	Nuke 51	Nuke51	PPhongsavan1	Wednesday, March 18, 2015 12:...
21Gauge #18	00005852	Nuke 55	Nuke55	RShrestha	Monday, March 23, 2015 7:01 AM
Nuke 02	00001346	Nuke 60	Nuke60	OAdams	Wednesday, February 25, 2015 ...
Nuke 04	00001347	Nuke 62	Nuke62	DWurie	Monday, March 23, 2015 8:52 AM
Nuke 06	00001348	Nuke 63	Nuke63	DAIBrich	Monday, January 19, 2015 7:36 ...
Nuke 08	Nuke08	Nuke 67	Nuke67	JButtar	Monday, March 23, 2015 8:17 AM
Nuke 09	Nuke09	Nuke 68	Nuke68	EBiney	Monday, March 23, 2015 7:53 AM
Nuke 10	00001349	Nuke 69	Nuke69	PPhongsavan	Monday, March 23, 2015 7:37 AM
Nuke 11	Nuke11	Nuke 70	Nuke70	AKidane	Monday, March 23, 2015 10:30 ...
Nuke 12	00001350	Nuke 74	Nuke74	AJama	Wednesday, February 11, 2015 ...
Nuke 13	00001351	Nuke 75	Nuke75	KMakki	Monday, March 23, 2015 7:09 AM
Nuke 14	Nuke14	Nuke 76	Nuke76	BKarki	Monday, March 23, 2015 6:50 AM
Nuke 15	00001352	Nuke 81	Nuke81	RMA	Friday, March 13, 2009 12:19 PM
Nuke 17	00001353	Nuke 88	Nuke88	KAnthony	Monday, March 23, 2015 6:47 AM
Nuke 18	00001354	Nuke 92	Nuke92	MPuschell	Monday, September 22, 2014 6:...
Nuke 19	Nuke19	Nuke 95	Nuke95	AEIgass	Monday, March 23, 2015 9:01 AM
Nuke 20	Nuke20	Nuke 96	Nuke96	MEIkordi	Monday, March 23, 2015 9:09 AM
Nuke 21	Nuke21	Nuke 97	Nuke97	MKarambakhshianesfan	Monday, March 23, 2015 6:43 AM
Nuke 22	Nuke22	Nuke_100	00002033	AAlhaddad	Monday, March 23, 2015 8:58 AM
Nuke 24	Nuke24	Nuke_102	00002985	AAllahVerdi	Thursday, March 12, 2015 6:35 ...
Nuke 25	00001355	Nuke_105	00002988	GOkyay	Monday, March 23, 2015 7:07 AM

Activity log tracks gauge usage.

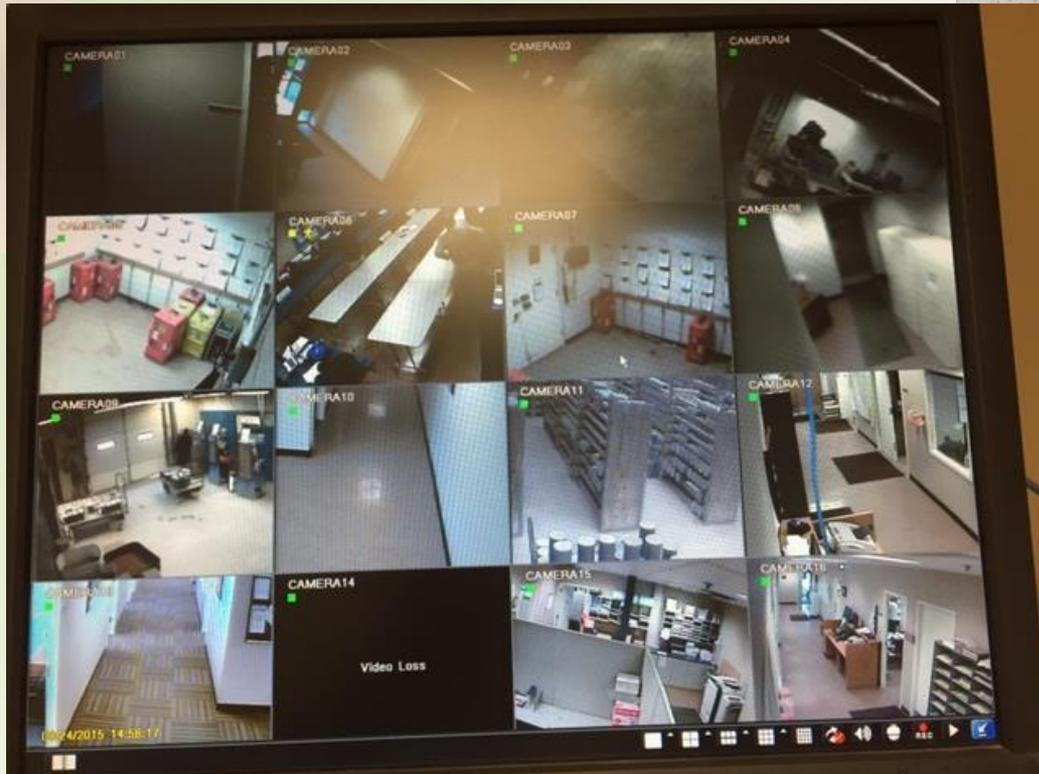
# Actions Taken

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:		Month:		Year:		Print					
Nuke 37		March		2015							
-		+		-		+		-		+	
Date	Name	DStd	Dxi	MStd	Mxi	Project #	Time Out	Time In			
1	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?