

# THIRD PARTY REFURBISHMENT OF A PORTABLE GAUGE

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DEPARTMENT OF PUBLIC HEALTH



3440

ON  
OFF

YES	NO/CE	STATUS	MODE	SPECIAL
ENT	CLT	7	8	9
STORE	OFFSET	PROJECT	PRINT	GRAPH
HL	HL	4	5	6
PROCTOR WARNING	TIME	COUNTS	DEPTH	CALL
-	-	1	2	3
SHIFT	STANDARD	MODE		START/ ENTER
		0	.	

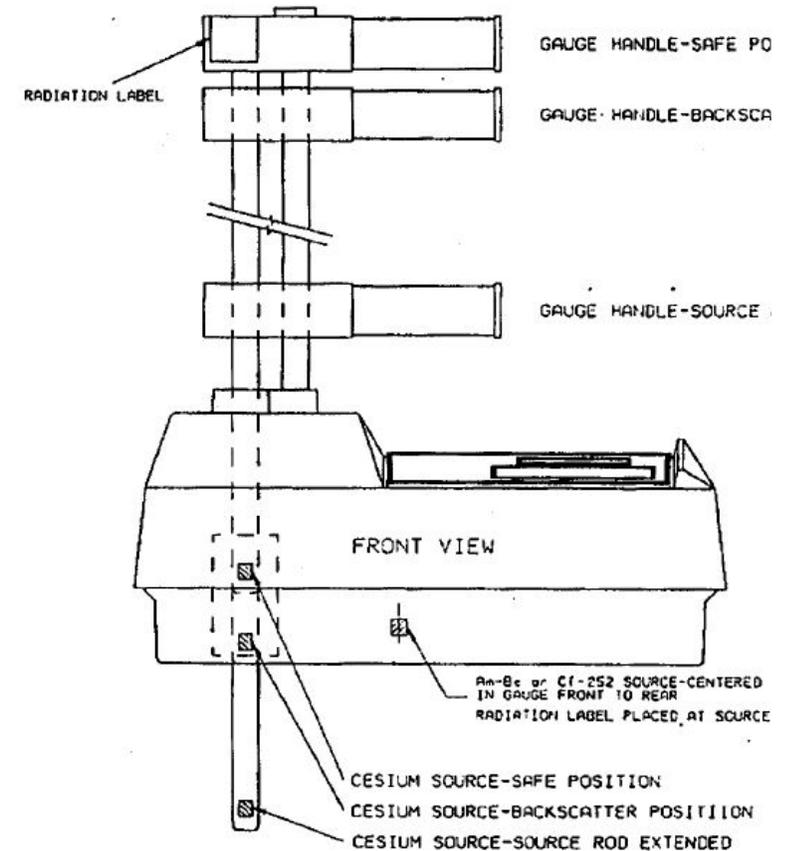
MOISTURE - DENSITY GAUGE

# EVENT

On February 16, 2021 Pacific Nuclear Technology Inc. notified the California radiation control program of a contamination incident while repairing a Troxler Model 3440 portable gauge. The licensee was attempting to replace the gauge source rod by cutting the source off the rod with the intent to replace the gauge with a Humboldt Scientific Inc. (HSI) rod and subsequently attach the same Troxler source onto the HSI rod. Fortunately, the licensee only breached the source container not the source itself. The contamination was confined to a small portion of the work counter top and subsequently remediated.

# TOPIC OF DISCUSSION

- Improper source removal
- Unauthorized combination of components
  - Replacing Troxler Rod with Humboldt Scientific, Inc. (HSI) Rod
  - Reattach Original Troxler source
- What we learned
  - Electronics Changeout
  - Three Modified Gauges
- Licensing and Enforcement actions



## IMPROPER SOURCE REMOVAL



- On February 13, 2021 a Troxler 3440 portable moisture/density gauge was being repaired by Pacific Nuclear Technologies (PNT). PNT was attempting to replace the Troxler source rod with a HSI source rod. During this process PNT sawed through the source container and discovered Cesium-137 contamination.
- In the process of sawing it off they breached the source container for the sealed source but not the sealed source itself. A wipe for contamination revealed contamination (~25nCi) inside the source container. PNT then notified the State.

## IMPROPER SOURCE ROD REMOVAL (CONT'D)

- An investigation was conducted between February 16, 2021 and July 13, 2021 including PNT's repair policies with respect to Troxler and HSI, origin of the contamination, number of gauges repaired, where they are currently located, and review of any SSDR certificate issues.
- PNT does not have Troxler's permission to perform this work.

**SEALED SOURCE MODEL DESIGNATION:**

Troxler Drawing No. A-102112 which covers:  
AEA Technology/QSA, Inc. Model No. CDCW556  
Capsule Type XN.30  
Special Form Certificate No. USA/0673/S

**ISOTOPE:**

Cs-137

**MAXIMUM ACTIVITY:**

9 millicuries (333 MBq)

AEA Technology/QSA, Inc. Model No. CDCW556  
Capsule Type X1218  
Special Form Certificate No. USA/0614/S

Cs-137

9 millicuries (333 MBq)

Isotope Product Laboratories Model # HEG-137  
Capsule type: 3024  
Special Form Certificate # USA/0356/S

Cs-137

9 millicuries (333 MBq)

Source: SS&DR NC-646-D-130-S (Troxler)

**SEALED SOURCE MODEL DESIGNATION:**

Humboldt Drawing No. 2200064-1 which covers:

AEA Technology/QSA, Inc. Model No. CDC.805  
Capsule Type X8

**ISOTOPE:**

Cs-137

**MAXIMUM ACTIVITY:**

11 millicuries (407 MBq)

Isotope Product Laboratories Model HEG-137  
Capsule Type A3015

Cs-137

11 millicuries (407 MBq)

Source: SS&DR NC-356-D-101-S (Humboldt)

# UNAUTHORIZED COMBINATIONS OF COMPONENTS

- A total of three Troxler gauges were refurbished with HSI source rods.;
- We learned PNT routinely replaces Troxler electronics with HSI electronics
  - Troxler electronics were not evaluated in the SS&DR and thus electronic replacement repairs are beyond the scope of this investigation.
- No mechanical verification and validation had been done to ensure functionality of the refurbished gauges
- No prototype testing was performed on the refurbished gauge configuration
- Since these refurbished gauges are not suitable for commerce and not legal for transport they have all been removed from use and treated as radioactive waste



# FINDINGS

- Interviewed all portable gauge service providers regarding source & source rod replacement. No other California licensee is licensed for this type of work.
- NOV issued for violation of PNT's radiation safety program commitment not to modify the device such that it violates the SS&DR.
- Added standard license condition to prohibit opening or removal of sources from respective source holders. (NRC condition specified as "Licensee Shall Not Open/Remove Sources").
- Troxler opposes PNT's service work on their devices, including the replacement by PNT of Troxler electronics with HSI electronics modules

# TAKEAWAYS

- New items may need to be added to the SS&DR manufacturer/service provider inspection checklist
- States/NRC should investigate if their service providers are performing similar unauthorized activities outside of their currently approved procedures.
- Inform licensees about the issue of unauthorized modifications to their devices. (California Information Notice)
  - What rarely done modifications have you performed since the last inspection
  - How long has this gauge been in service and what maintenance has been performed other than the usual leak tests and routine servicing and maintenance?