


East Kentucky Power Co-Op - John Sherman Cooper
Unit 2 Boiler



Boiler INSPECTION REPORT

November, 1, 2021

Gecko Job Number: 2021-02275

Name	Certification	Date of Inspection	Signature
Dylan Gabel	Supervisor Level II UT Inspector	Monday, October 18, 2021	Dylan Gabel
Sean Springob	NDT UT Level II Supervisor	Tuesday, November 02, 2021	

Gecko Job Number: 2021-02275

TEST METHOD AND PROCEDURE

Rapid Ultrasonic Gridding (RUG) is a nondestructive examination (NDE) method of performing ultrasonic thickness gauging in which multiple ultrasonic thickness probes are utilized, simultaneously, to rapidly gather thickness measurements. Like other ultrasonic testing (UT) methods, RUG captures raw A-Scan data, which can be presented in B-Scan or C-Scan modes — or used to create visual representation as 3-D models. However, RUG is capable of capturing multiple A-Scan data points at a much faster rate than traditional thickness measuring techniques for post-inspection data validation.

Techniques and Methodology

RUG tools utilize multiple thickness probes, anywhere from 4 up to approximately 100 probes at a time. As such, the speed of coverage is greatly increased over methods utilizing a single thickness probe. The spacing of the probes and the frequency of recording varies depending on the amount of thickness data needed.

RUG can be performed using manual scanners or robotic crawlers. With robotics and nearly 100 thickness probes at a time spaced from a range of ¼” to 3” apart, millions of data points with A-scans can be gathered in a matter of days.

RUG does not rely on manual grid marking for determining the location of the thickness data. The use of encoders allows localization, repeatability and prove-up of RUG findings.

Data Validation

Data Validation is conducted using Gecko Robotics proprietary tools such as Artificial Intelligence (AI) with machine learning capabilities, human supervision and review of the processed data.

The data processing algorithms tend to favor Mode 3 (when multiple echoes present in A-scan, gauging is done from peak-to-peak, 1st BWE and 2nd BWE).

When signs of corrosion are detected, the data processing algorithms are switched to Mode 2 (when limited echoes present in A-scan, gauging is done from peak-to-peak, 1st Interface Signal and 1st BWE).

Procedure

Instrumentation Calibration and asset inspection is conducted using current inspection procedure GR.110 – Rev. 4, available upon request.

Gecko Job Number: 2021-02275

SUMMARY

Inspection Findings:

Gecko Robotics was contracted by **East Kentucky Power Co-Op – John Sherman Cooper** to perform a **Rapid Ultrasound Gridding Survey** and report the findings from the **Unit 2 Division Wall, Lower Slopes, Water walls**. Gecko was able to perform an inspection to map out accessible areas of the **boiler** by gathering **25.3 million** readings. This was accomplished by taking at least **400 UT readings per linear foot** inspected. Gecko Robotics would like to point out the lowest three readings found during the inspection:

Division wall:

Thickness	Location
0.129 in	Division Wall, Elevation: 14.0ft - Tube #: 20
0.133 in	Division Wall, Elevation: 15.0ft - Tube #: 20
0.136 in	Division Wall, Elevation: 29.0ft - Tube #: 62

Lower Slopes:

Thickness	Location
0.122 in	Front Slope, Elevation: 11.0ft - Tube #: 204
0.122 in	Front Slope, Elevation: 11.0ft - Tube #: 206
0.125 in	Front Slope, Elevation: 12.0ft - Tube #: 201

Waterwall:

Thickness	Location
0.111 in	Right (West) Wall, Elevation: 27.0ft - Tube #: 58
0.114 in	Right (West) Wall, Elevation: 28.0ft - Tube #: 63
0.116 in	Left (East) Wall, Elevation: 36.0ft - Tube #: 60

Gecko Job Number: 2021-02275

SUMMARY

Final readings were compiled using Gecko Robotics' proprietary software program designed for industrial inspections. These results are available on the Gecko Portal to anyone given permission by the East Kentucky Power Co-Op staff with a secure username and password. The inspection results were finalized on Friday, October 22, 2021, and East Kentucky Power Co-Op was given access to all inspection results.

By utilizing this report, Customer acknowledges responsibility for and agrees that the accuracy and interpretation of inspection data within the portal and the accuracy and interpretation of the several outputs of the portal, will be dependent on the accuracy and use of Customer-controlled data variables, logic rules, system functions, and its own independent analysis.

Gecko Robotics' Appreciation:

Industrial plants, engineering companies, and environmental organizations are seeing the value in basing decisions on high quality, spatially dense, data. Managing infrastructure assets is expensive and doing it without solid data is throwing away valuable resources. Until now, collecting data to make better decisions was time intensive and oftentimes prohibitively expensive, but with Gecko's robots and NDT expertise, the equation has changed. We are helping to make infrastructure asset management a data-driven activity, driving down overall costs and improving outcomes.

Thank you for allowing Gecko Robotics to perform the above service for your company. For further information regarding this project, please contact our office [\(412\) 407- 2444](tel:4124072444) or Geckorobotics.com.

Gecko Job Number: 2021-02275

GENERAL INFORMATION

Plant:	Operating Company:
John Sherman Cooper	East Kentucky Power Co-Op
Address:	Date:
Cooper Power Plant Rd, Somerset, KY 42501	Wednesday, October 27, 2021
Unit ID:	Contact Name:
Unit 2	Dan Begley
Plant Contact Phone:	Reporting Inspector:
606-561-4138 ext7401	Dylan Gabel

ASSET INFORMATION

Year Built:	Manufacturer:
Please refer to drawing	Please refer to drawing
Fuel Type:	Asset Dimensions:
Coal	165 tubes x 95 tubes
Original Wall Thickness:	Material Alloy:
Waterwall: 0.203" Division wall: 0.19" Slopes: 0.203"	Carbon Steel
Coating Thickness:	Coating Type:
None	N/A
Tube Diameter:	Wall Layout:
2.5"	Front (North), Right (West), Left (East), Rear (South)
Tube Center-to-Center:	Angles Inspected:
3"	-35°, 0, 35°

JOB SPECIFIC INFORMATION

Walls Accessed By:	Hole Watch Provided:
Scaffold	No
Safety Harnesses Needed:	Adequate Access to Inspection Target:
No	Yes
Air Monitor Needed:	Respirator Required:
No	No
Exclusive Access:	Lighting Adequate:
Yes	Yes

Gecko Job Number: 2021-02275

Number of Inspectors:	Number of Robots:
6	3
Safety Certifications Needed:	Permits Required:
No	Yes (LOTO)

SAFETY INFORMATION

This project was executed in accordance with the Gecko Robotics Safety Program. Safety is always the top priority on our projects. All persons on the crew are trained in accordance with our safety and health program.

The following were completed to prevent accidents and unsafe conditions:

- Gecko daily JSA and work area walkthrough before and after every shift

Safety is always the top priority on any project. As with all projects, Gecko welcomes any safety suggestions to help keep its employees safe and healthy.

INSPECTION FINDINGS / NOTES

Inspection Type:	Cleanliness:
Ultrasound Thickness	Fair
Coating on Asset:	Most Prevalent Issues:
N/A	Wall loss
Secondary Issues:	Location of Greatest Wall Loss:
None	Widespread
Minimum Thickness:	Number of Recorded Readings:
Waterwalls: 0.11" Division wall: 0.19" Slopes: 0.122"	25.3 million
Data Resolution:	Angles Inspected:
12" x 12"	-35°, 0, 35°

Gecko Robotics Inspection:

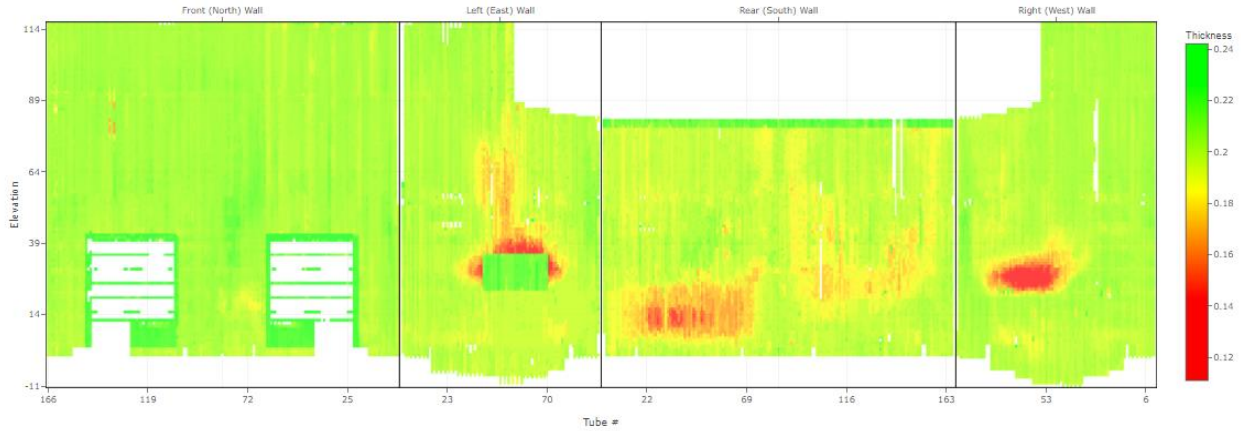
During the Ultrasonic Thickness inspection performed on Unit 2 Boiler the supervising Robot specialist / UT technician visually noted that there were no identified items of concern.

Gecko Job Number: 2021-02275

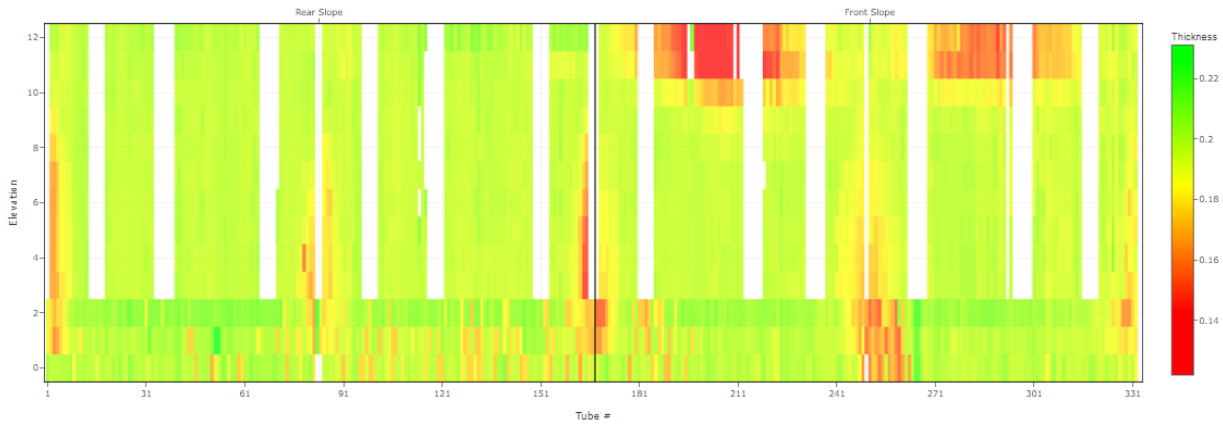
INSPECTION DELIVERABLES

Gecko C-scans:

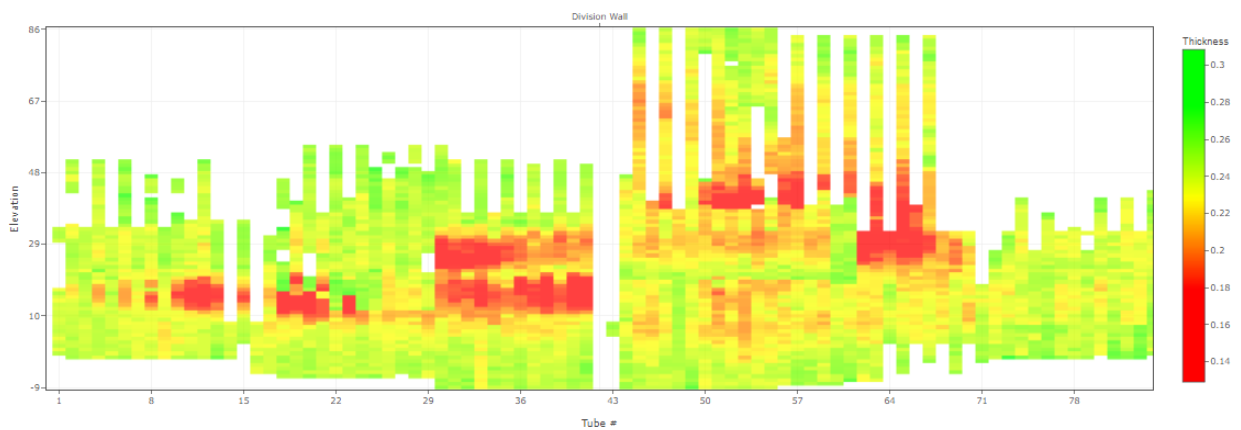
Waterwall:



Slopes:



Division wall:



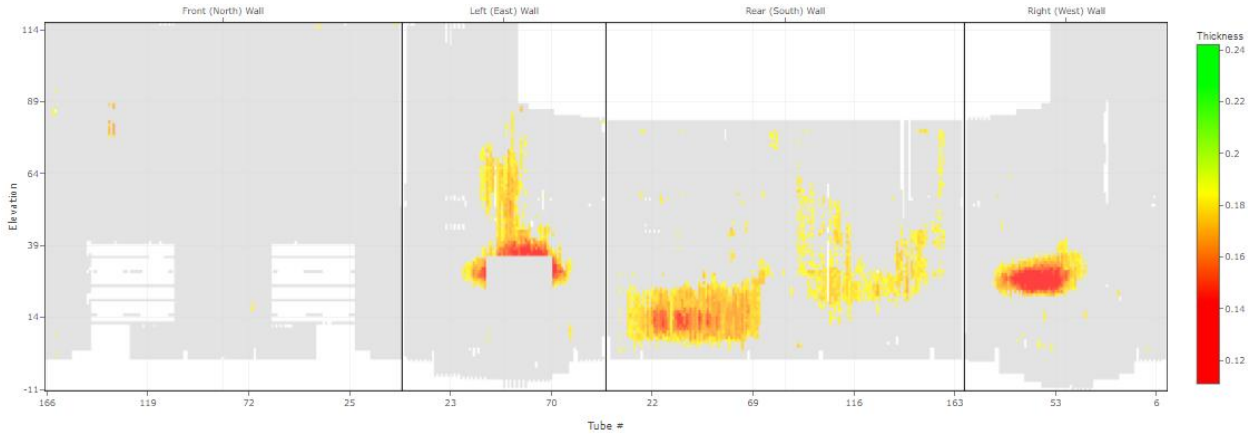
Gecko Job Number: 2021-02275

To access entire inspection, log on to the Gecko Portal™ at portal.geckorobotics.com with username and password.
If a username/password or any other issues arise with the Portal, please, email sales@geckorobotics.com

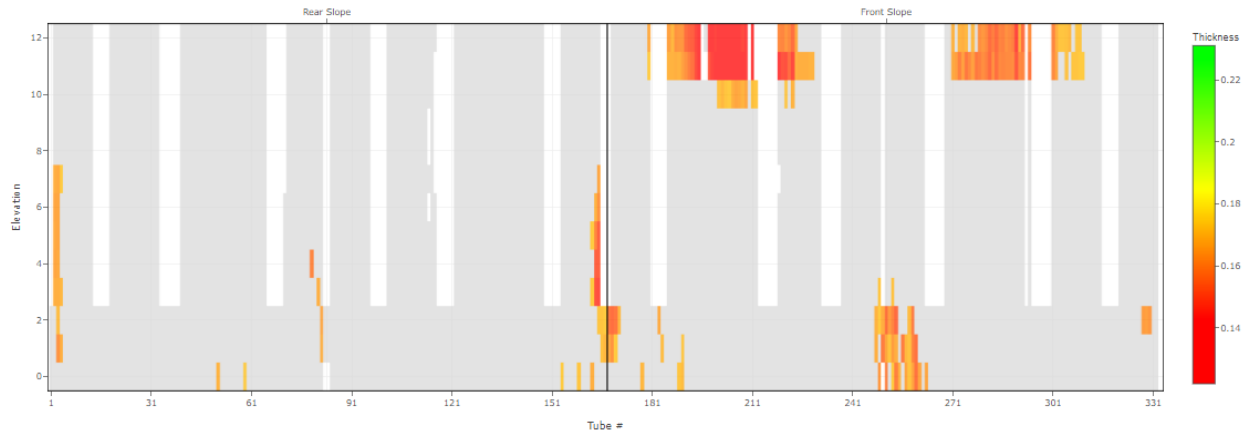
INSPECTION DELIVERABLES

Areas of Lowest Readings:

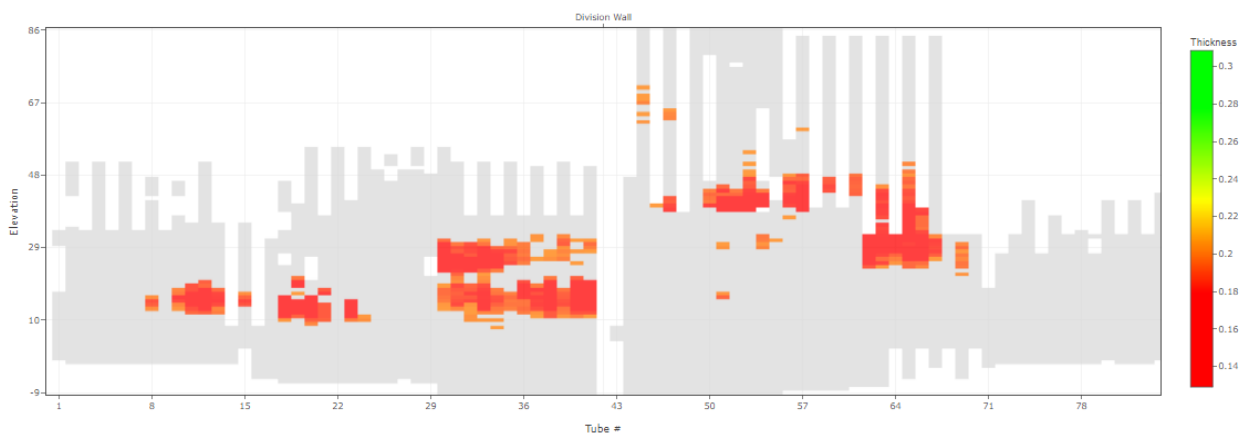
Waterwalls 0.111" - 0.185"



Slopes 0.122" - 0.171"



Division wall 0.129" - 0.203"



Gecko Job Number: 2021-02275

To access entire inspection, log on to the Gecko Portal™ at portal.geckorobotics.com with username and password.
If a username/password or any other issues arise with the Portal, please, email sales@geckorobotics.com

EQUIPMENT INFORMATION

Robot/DAQ Model		Serial Number	
TOKA 4 / AOS		MC32MN2P0731838	
Transducer Serial Number	Sled Number	Frequency	Diameter
U11060	1	10MHz	0.125"
U11MQJ	2	10MHz	0.125"
U11MQL	3	10MHz	0.125"
U11MPW	4	10MHz	0.125"
U11MPY	5	10MHz	0.125"
U11MRV	6	10MHz	0.125"
U11AGP	7	10MHz	0.125"
U11APC	8	10MHz	0.125"
U119DQ	9	10MHz	0.125"
U11MQE	10	10MHz	0.125"
U11MRF	11	10MHz	0.125"
U11MO1	12	10MHz	0.125"
U11MY7	13	10MHz	0.125"
U11M84	14	10MHz	0.125"
U11MPZ	15	10MHz	0.125"
U11MSC	16	10MHz	0.125"
U11MQ6	17	10MHz	0.125"
U11MPM	18	10MHz	0.125"

Robot/DAQ Model		Serial Number	
TOKA 4 / AOS		MC32MN2P0291535	
Transducer Serial Number	Sled Number	Frequency	Diameter
U116YD	1	10MHz	0.125"
U11913	2	10MHz	0.125"
U118WD	3	10MHz	0.125"
U1191W	4	10MHz	0.125"
U1192C	5	10MHz	0.125"
U119GU	6	10MHz	0.125"
U119LG	7	10MHz	0.125"
U11A7Y	8	10MHz	0.125"
U11A6J	9	10MHz	0.125"
U11ACN	10	10MHz	0.125"
U11AFC	11	10MHz	0.125"

Gecko Job Number: 2021-02275

EQUIPMENT INFORMATION

U119BQ	12	10MHz	0.125"
U119DS	13	10MHz	0.125"
U11A7G	14	10MHz	0.125"
U118ZI	15	10MHz	0.125"
U1193Q	16	10MHz	0.125"
U1187H	17	10MHz	0.125"
U118W1	18	10MHz	0.125"

Robot/DAQ Model		Serial Number	
TOKA 4 / AOS		MC32MN2P0671832	
Transducer Serial Number	Sled Number	Frequency	Diameter
U119CD	1	10MHz	0.125"
U1192J	2	10MHz	0.125"
U11A6V	3	10MHz	0.125"
U119EF	4	10MHz	0.125"
U119ZS	5	10MHz	0.125"
U11A18	6	10MHz	0.125"
U119MA	7	10MHz	0.125"
U118WR	8	10MHz	0.125"
U1193U	9	10MHz	0.125"
U118X6	10	10MHz	0.125"
U119UQ	11	10MHz	0.125"
U11GFQ	12	10MHz	0.125"
U119H4	13	10MHz	0.125"
U119W6	14	10MHz	0.125"
U11AQA	15	10MHz	0.125"
U119TZ	16	10MHz	0.125"
U119CA	17	10MHz	0.125"
U11ACJ	18	10MHz	0.125"

Calibration Block Size	Serial Number
1018 CS Steel .100" - .500"	3075 20

Date	Cal Block Temperature (°F)	Inspection Surface Temperature (°F)
10/18	Ambient	Ambient
10/19	Ambient	Ambient
10/20	Ambient	Ambient

Gecko Job Number: 2021-02275