OST SERVICES

February 11, 2013

Email: c/o rlwhitlatch@aep.com

Mr. Darrell Goddard
Maintenance Superintendent
Mitchell Generating Station
Unit # 1
Moundsville WV 26041

Mr. Goddard:

Subject: OST Services (OSTS) Report No. PRELIMINARY
OST Services (OSTS) Job No. 499-12
Inspections of Piping Systems, Supports, and Restraints
Mitchell Generating Station Unit No. 1 Hot inspection January 2013

Mr. Goddard:

During January of 2013 a hot inspection was performed at Mitchell Generating Unit No. 1. The work included a walkdown of the critical piping systems along with their supports and restraints.

Based upon the inspection, the devices and the suspended equipment generally appeared to be in good operating condition and suitable for continued service. However, there were some problems that were apparent that require attention; otherwise, more serious issues could develop.

All remaining issues and recommendations such as general maintenance items, snubber replacements and NDT locations can be found in the body of this report.

If you have any questions or comments concerning the content of this report, please feel free to contact us.

Very truly yours,

OST SERVICES

Dennis Schmedinghoff

DAS/nem
Enclosure
cc: Randy Whitlatch - Mitchell
George T. Mulvaney - OSTS
Dennis Lund - OSTS
File 499-12

INSPECTION HIGHLIGHTS

Main Steam

The supports associated with the Main Steam piping appear to be acceptable for continued service.

First Reheat Steam

General Comments

There are three constant support hangers along the bottom horizontal run of piping that are bottomed out in the hot condition. A fourth constant support, is supposed to be bottomed out in the hot condition, but is not. There are a number of factors to be considered and explored before contemplating any adjustments.

First to be considered is the condition of the spring coils of the devices themselves. They could be at the end of their service lives and are no longer capable of supplying the rated loads. We recommend performing load testing on the affected supports during the next scheduled outage.

Second to be considered is the possibility of distortion present along this section of piping causing out of plane conditions. It would be advisable to rule this out while load testing was being performed. If distortion is suspected, it could have adverse consequences on line pitch, water collection and drainage, and ultimately lend itself to

INSPECTION HIGHLIGHTS

First Reheat Steam (continued)

flashing and greater distortion. If distortion is present, blindly adjusting the bottomed out supports could exacerbate the condition.

A marked up isometric of the bottomed out supports is also included.

- **FRSH-4**

  This constant support trapeze assembly has a designed hot setting of 9.5. The northernmost spring was at 10.5 hot, and the southernmost spring was bottomed out in the hot condition.

- **FRSH-6**

  This constant support has a designed hot setting of 7.0. The unit was bottomed out in the hot condition.

- **FRSH-8**

  This constant support has a designed hot setting of 8.5. The unit was bottomed out in the hot condition.

- **FRSH-7**

  This constant support assembly has a hot designed setting in the bottomed out position. The unit was at 4.0 in the hot condition. This is due to the bottomed out condition of FRSH-6.

INSPECTION HIGHLIGHTS

First Reheat Steam (continued)

- **FRSH-5**

  This constant support is almost bottomed out in the hot condition. No action is required at this time but is so mentioned in the report.

- **FRSH-3**

  This support rod on this constant support assembly has shifted to the west and is no longer engaged on the bearing located on the load arm (Figure No. 1). It is possible to work the support rod back on the bearing. The support would have to be locked out and the load taken off prior to attempting repair. The support will require some staging prior to the repair to allow access. This condition did not exist during the 2011 inspection.

Figure No. 1
FRSH-3 support rod off bearing

INSPECTION HIGHLIGHTS

First Reheat Steam (continued)

- **FRSH-1**

  This constant support may be in the process of experiencing a bearing failure. The bearing is not in view on the support rod (Figure No. 2). We will evaluate this further during the scheduled outage.

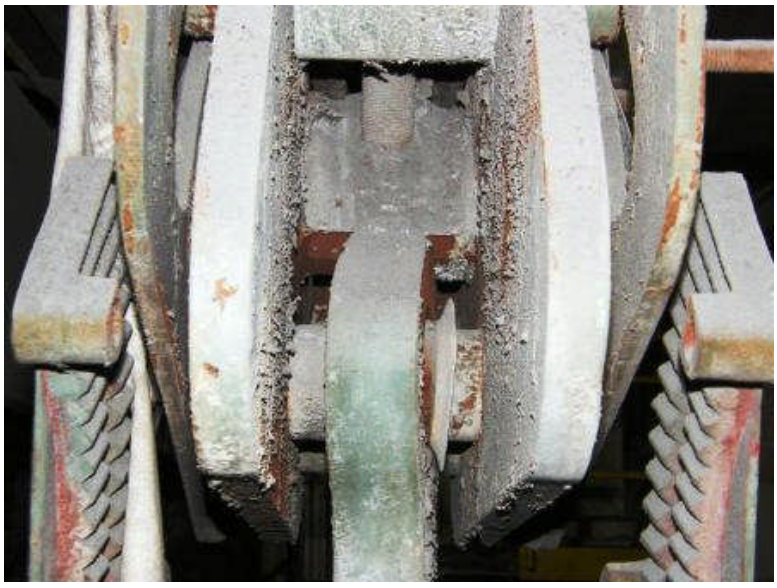


Figure No. 2
FRSH-1 off bearing failure

- **1-FRSH-16**

  This mark number is specified to be a Figure 201 hydraulic shock and sway suppressor. The device in place is a Dyn-a-Damp mechanical device that would have been available circa 1970. There is a rubber dust boot on the piston that prevents a visual reading of the hot and cold positions (Figure No. 3). It is important to state that while popular at the time of their installation, time has

INSPECTION HIGHLIGHTS

First Reheat Steam (continued)

demonstrated that these devices were unreliable in dusty environments. They typically lock up when they fail. Testing can be accomplished by unpinning one end of the device and cycling the device through its travel range. We recommend that the plant replace this unit with a hydraulic snubber as was originally intended by design.

Figure No. 3
1-FRSH-16 mechanical

Second Reheat Steam

- **SRSH-17**

  This mark number is specified to be a Figure 201 hydraulic shock and sway suppressor. The device in place is a Dyn-a-Damp mechanical device that would have been available circa 1970. There is a rubber dust boot on the piston that prevents a visual reading of the hot and cold positions. It is important to state that while popular at the time of their installation, time has demonstrated that these devices were unreliable in dusty environments. They typically lock up when they

INSPECTION HIGHLIGHTS

Second Reheat Steam (continued)

fail. Testing can be accomplished by unpinning one end of the device and cycling the device through its travel range. We recommend that the plant replace this unit with a hydraulic snubber as was originally intended by design.

H.P. Turbine Exhaust

- **TEH -5**

  The designed hot setting for this constant support is in the bottomed out condition. The unit was at 9.0 in the hot condition.

- **TEH-8**

  The support rod is not engaged with the bearing on the load arm of this constant support (Figure No. 4). It is possible to work the support rod back onto the bearing. The support would have to be locked out and the load taken off prior to attempting repair. The support will require some staging prior to the repair to allow access. This condition was not present during the 2011 inspection.

Figure No. 4
TEH-8 support rod off bearing

INSPECTION HIGHLIGHTS

First Reheat Exhaust

- **RSEH-7**

  The above mark number represents a constant support hanger. The support has a broken bearing on the load arm assembly (Figure No. 5). This condition was first reported in OSTS Report No. 1160 in 2008. The support is significantly corroded due to service conditions, and exposure to water (Figure No. 6). We recommend that the plant make budgetary considerations for replacing this support during the next scheduled outage. We recommend that the replacement unit be rated for out-door service. Such service conditions call for galvanized spring cans, and neoprene coated spring coils.

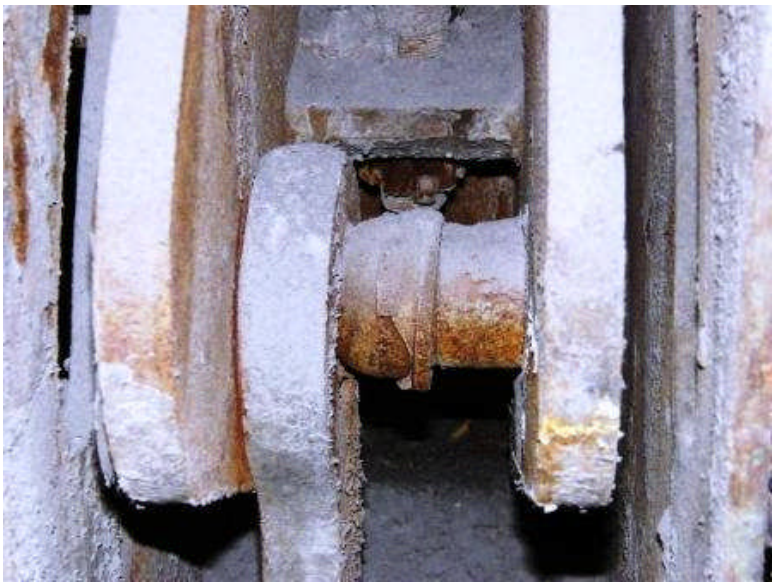


Figure No. 5
1-RSEH-7 broken bearing on load arm

INSPECTION HIGHLIGHTS

First Reheat Exhaust (continued)

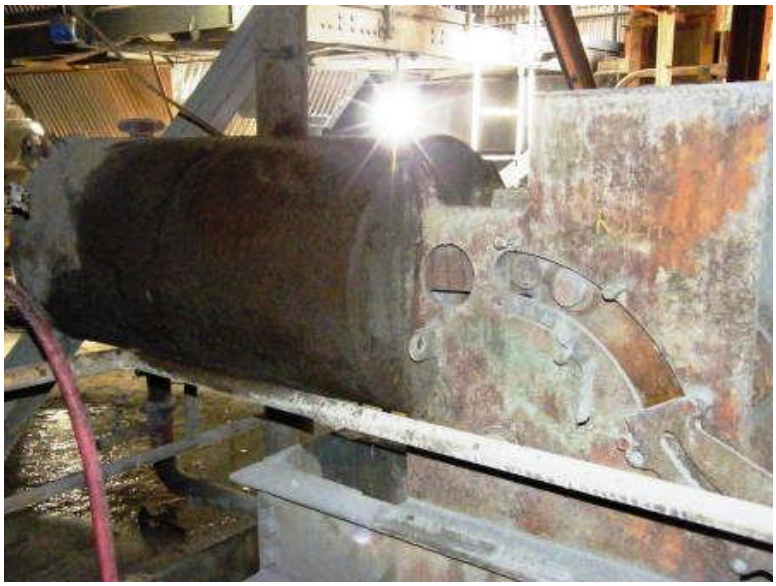


Figure No. 6
1-RSEH-7weathering

- **1-RSEH-8E, 1-RSEH8W, HBS-15**

  The above mark numbers represents a trapeze assembly that is rather unique. It utilizes two constant support hangers to provide support during normal operating parameters (Figure No. 7), and four variable spring cans to accommodate the increased loads seen during hydro testing and boil-off conditions. The supports are in generally poor condition due to service conditions. The constant supports are rusted, and the variable spring coils are corroded. It is advised to inspect the condition of the spring coils inside the spring can casing.

INSPECTION HIGHLIGHTS

First Reheat Exhaust (continued)

Figure No. 7
1-RSEH-8E

The variable springs associated with the hydro and boil off support are filled with ash and debris (Figure Nos. 8 and 9). Their effectiveness at this time is doubtful. The spring coils are in poor condition. We recommend that the plant evaluate the likelihood of this support being used again in the future before replacing it.

Figure No. 8
1-RSEH-15

INSPECTION HIGHLIGHTS

First Reheat Exhaust (continued)

Figure No. 9
1-RSEH-HBS-15 corroded spring coils

Boiler Feedwater Suction

The supports associated with the Main Steam piping appear to be acceptable for continued service.

Heaters 7A and 7B to Feedwater Pump

There is some inconsistency with the hanger design sketches at the plant. In some cases, modifications have been made to the originally supplied supports, and the originally supplied design sketches have not been revised. In another case, a restraint has been added to the line and then disconnected and rendered inoperable.

INSPECTION HIGHLIGHTS

Heaters 7A and 7B to Feedwater Pump (continued)

Position indicators placed on the spring cans to indicate designed hot and cold settings are obscured. The "G" dimensions on the record sheets indicate the gap from the bottom of the indicator to the bottom of the indicator slot.

- **1-FWH-X**

  The above mark number represents a restraint that utilizes a pipe clamp with two rigid struts employed on a horizontal plane, in a north and south direction (Figure No. 10). The restraint is located between 1-FWH-19 and 1-FWH-20. The struts are currently disconnected from the pipe clamp. No design data could be located at the plant at the time of the inspection. We speculate that this device was introduced to control unwanted movement of the piping due to surges or periodic shock loading. We further speculate that after the modifications to supports 1-FWH-23 and 1-FWH-24 were made, the restraint was no longer necessary and was abandoned. In any event this should be confirmed and documented accordingly.

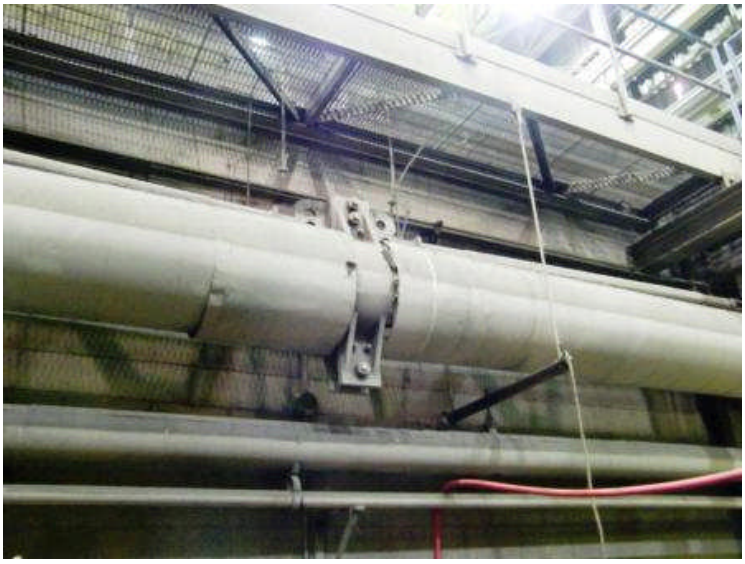


Figure No. 10
FWH #7 mystery restraint

INSPECTION HIGHLIGHTS

Heaters 7A and 7B to Feedwater Pump (continued)

- **1-FWH-23, 1-FWH-24**

  The above mark numbers represent two trapeze assemblies suspended by rigid rods (Figure Nos. 11 and 12). Originally, the piping was secured to the trapeze by U-bolts. Currently, the U-bolts have been removed and two very substantial struts have been introduced into the support scheme attached with clamps. The current hanger design sketch on file at the plant does not reflect this revision.

Figure No. 11
FWH-23 modifications

Figure No. 12
FWH-24 modifications

INSPECTION HIGHLIGHTS

Heaters 7A and 7B to Feedwater Pump (continued)

- **1-FWH-32**

The above mark number represents a restraint that utilizes a pipe clamp with two rod assemblies employed on a horizontal plane, in a north and south direction. The upper section of the clamp at the point of the rod attachment is damaged and bent to the south (Figure No. 13). There is also a lifting lug incorporated in the clamp assembly that may have caused the damage while being used in an undisclosed way. We recommend that the plant make budgetary provisions to erect staging, strip the insulation, and inspect the clamp to determine the extent of the damage. This activity could be performed during the next outage.

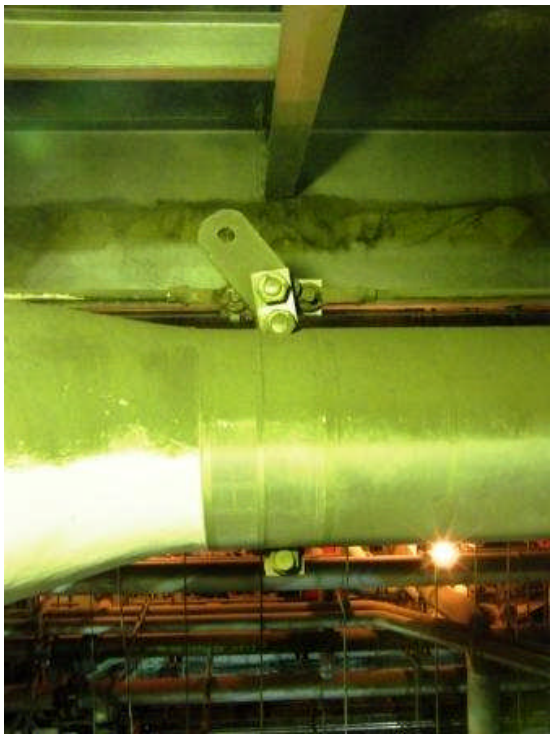


Figure No. 13
1-FWH-32 distorted clamp

- **1-FWH-31**

This trapeze assembly may have a loose U-bolt, due to a gap at the washer plate on the easternmost side of the U-bolt assembly (Figure No. 14). We recommend that this location be monitored for signs of unwanted lateral movement.

INSPECTION HIGHLIGHTS

Heaters 7A and 7B to Feedwater Pump (continued)

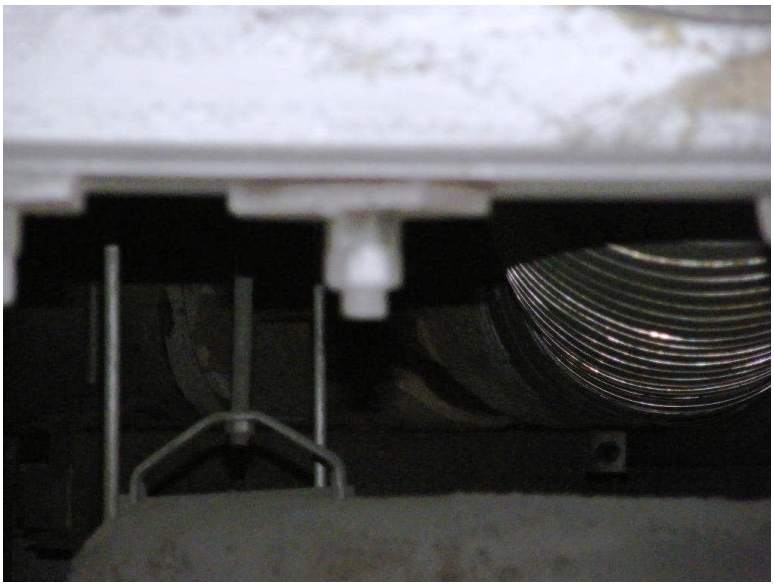


Figure No. 14
1-FWH-31 loose washer plate

- **1-FWH-22**

  This trapeze assembly is missing the locknuts on the rod assemblies (Figure No. 15). Design sketches for the supports associated with the Feedwater supports could not be located at the plant at the time of the inspection. We will monitor this condition in the future.

  The supports associated with the #8 Heaters piping appear to be acceptable for continued service.

INSPECTION HIGHLIGHTS

Heaters 7A and 7B to Feedwater Pump (continued)

Figure No. 15
1-FWH-22 single nuts on support rods

Safety Valve Vent Stack Piping

Main Steam

The Safety Valve discharge lines do not have support under the elbows (Figure No. 16). Without being supported from below, the elbow is driven downward when subjected to discharge conditions.

Figure No. 16
MS SV disc elbow

INSPECTION HIGHLIGHTS

Safety Valve Vent Stack Piping (continued)

There are no visible supports on the discharge line to the roof penetration (Figure Nos. 17 and 18).

We recommend that the plant review the discharge piping system to ensure that the design is adequate when subjected to discharge conditions.

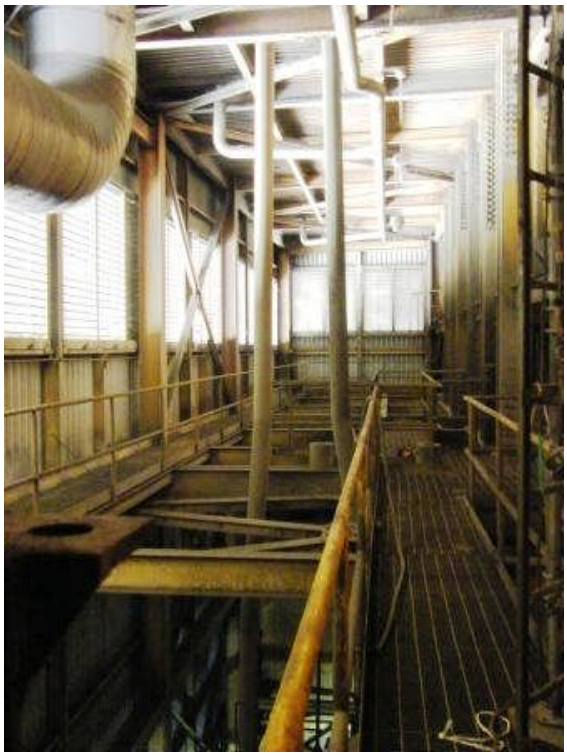


Figure No. 17
MS SV config

Figure No. 18
MS SV roof

INSPECTION HIGHLIGHTS

First Reheat

The Safety Valve discharge lines do not have support under the elbows (Figure No. 19). Without being supported from below, the elbow is driven downward when subjected to discharge conditions. We recommend that the plant review the discharge piping system to ensure that the design is adequate when subjected to discharge conditions.

Figure No. 19
Safety valve at First Reheat Steam

Second Reheat

The three Safety Valve discharge lines at Elevation 147'- 0" do not have supports under the elbows (Figure No. 20). Without being supported from below, the elbow is driven downward when subjected to discharge conditions. There are no visible supports on the discharge line to the side of the building penetration. We recommend that the plant review the discharge piping system to ensure that the design is adequate when subjected to discharge conditions.

INSPECTION HIGHLIGHTS

Second Reheat (continued)

Figure No. 20
SRSH safety valve

HP Turbine Exhaust

The six Safety Valve discharge lines at Elevation 25'- 8-7/8" do not have supports under the elbows (Figure No. 21). Without being supported from below, the elbow is driven downward when subjected to discharge conditions. There are no visible supports on the discharge line to the side of the building penetration (Figure No. 22). We recommend that the plant review the discharge piping system to ensure that the design is adequate when subjected to discharge conditions.

INSPECTION HIGHLIGHTS

HP Turbine Exhaust

Figure No. 21
TEH SV1

Figure No. 22
TEH SV1

INSPECTION HIGHLIGHTS

1st Reheat Exhaust

The twelve Safety Valve discharge lines at Elevation 20' 7-7/8" do not have supports under the elbows (Figure No. 23). Without being supported from below, the elbow is driven downward when subjected to discharge conditions. There are no visible supports on the discharge lines to the roof penetration (Figure No. 24). We recommend that the plant review the discharge piping system to ensure that the design is adequate when subjected to discharge conditions.

Figure No. 23
RSEH SV 2

INSPECTION HIGHLIGHTS

1st Reheat Exhaust (continued)

Figure No. 24
RSEH vent stack

Recommended NDE Locations

We recommend that the plant establish a program to inspect the welded hanger attachments associated with the high energy piping. We recommend the following locations based on service conditions, age of the plant, and the amount of piping that would be left unsupported should a failure occur. We also recommend that the bolting be inspected in the below listed locations.

First Reheat

- FRSH-1
- FRSH-14

INSPECTION HIGHLIGHTS

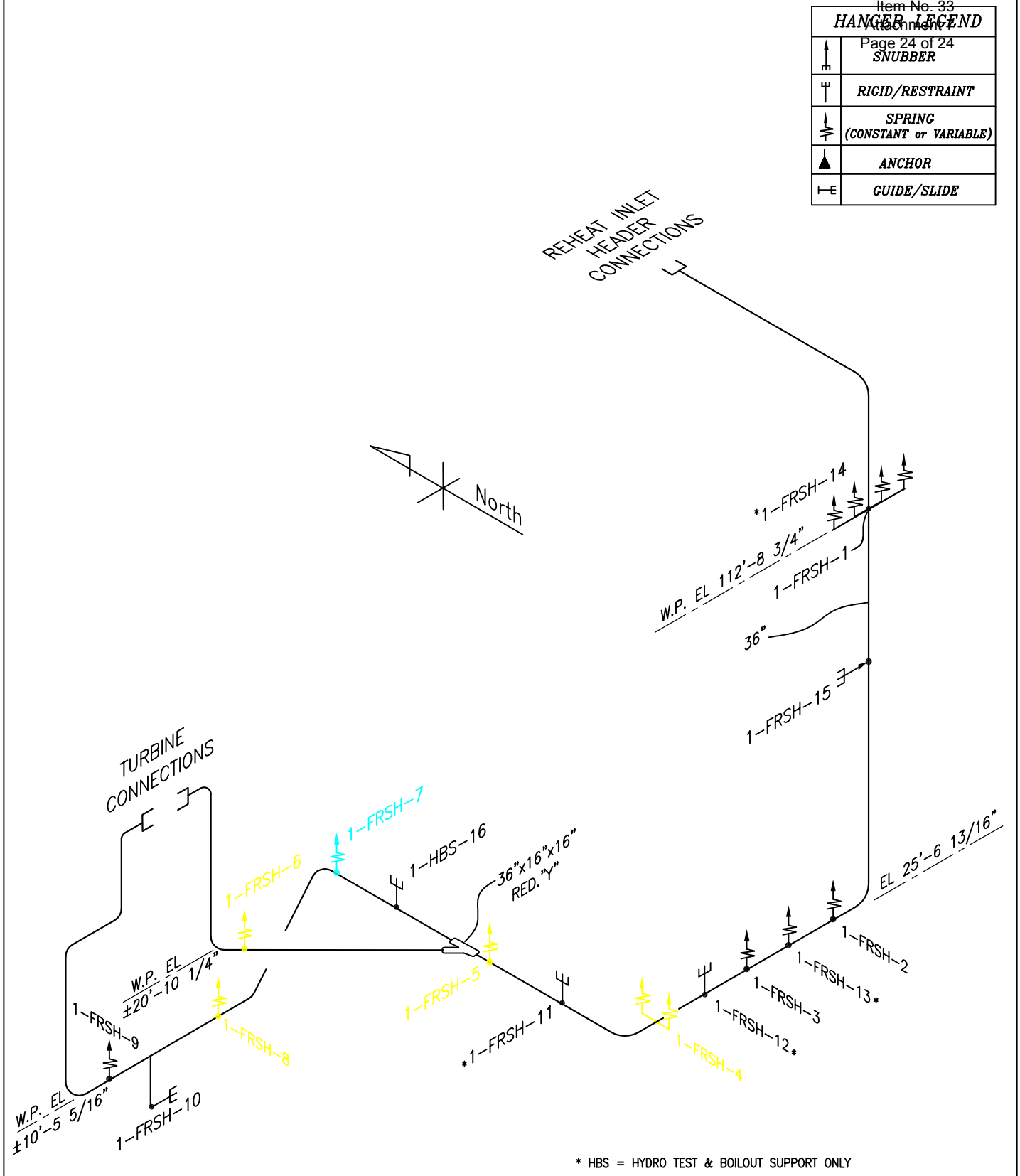
Second Reheat

- SRSH-1
- SRSH-16

Cursory Inspection

While performing the inspection broken pieces of insulation were found under the Turbine (Figure No. 25). The origin of the debris could not be determined.

Figure No. 25
Insulation under turbine



* HBS = HYDRO TEST & BOILOUT SUPPORT ONLY

AEP MITCHELL – UNIT NO. 1
1st REHEAT STEAM SYSTEM
OSTS DWG.# MIT1-1RHBO REV. 0 1-5-09

OST SERVICES
55 CHAPMAN STREET • PROVIDENCE, R.I. 02905