

QUESTIONS FOR REACTOR PLANNING

1. How old is the Vessel or Reactor?
2. What section of the Reactor is being replaced?
3. When was the last time (or known time) the internals (scallop and center pipes) have been fully replaced?
 - a. Perforated / Punch Plate Scallops can be replaced in sections or full replacement:

<u>Tops</u>	<u>Scallop Body</u>	<u>Scallop Bottom</u>
Open	18 gauge (Standard)	Perforated (Standard)
Pipe riser	16 gauge (Improvement)	Open (Improvement)
"D" riser	14 gauge (Improvement)	Open with Heavy
Box riser	Full Length Stiffener (Improvement / Option)	Reinforcement (Improvement)

4. How long do you plan to run the Reactors when they come back on line?
5. Do you plan to clean the scallops or center pipe during the outage?
 - a. Have you evaluated the time needed to perform scallop and/or center pipe cleaning versus repairs?
 - i. If so, has this been built into your time schedule? (Average time to clean)
 - ii. Have you considered the cost of cleaning versus replacement?
(Opportunity cost per day)
 - iii. Options include:
 - a. In-place cleaning
 - b. Removal and clean
 - c. Wire brush and high-pressure blast
 - iv. Recommendations typically include at minimum 10 - 20 % spare scallops on hand, along with pre-formed / rolled profile wire to have on hand during any outage.
Consideration should also be given to replacement scallop bottoms and scallop sections if you do not have full scallops.
 - b. Have you evaluated the time needed to perform scallop and/or center pipe cleaning versus repairs?
 - i. If so, has this been built into your time schedule? (Average time to clean)
 - ii. Have you considered the cost of cleaning versus replacement?
(Opportunity cost per day)



Woven Metal Products

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6. Do you have any prints, pictures or the most recent inspection reports either from the licensor or internal reports?
7. Who is the current licensor and catalyst provider?
8. Any known pressure drop issues, catalyst leaks, containment issues or uncontrolled events? (temperature run-away, higher than normal pressure, etc.)
9. Are your cover decks an area of concern and/or the clips or pins that hold it together?
- a. Note that Woven Metal Products offers spare hardware and gaskets for these types of needs.



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