

- I. 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 (baskets, scallops, cover plates and center pipes) have been fully replaced?

Perforated / Punch Plate Scallops can be replaced in sections or full replacement:

TopsScallop BodyScallop BottomOpen18 gauge (Standard)Perforated (Standard)Pipe riser16 gauge*Open*"D" riser14 gauge*Open with HeavyBox riserFull Length Stiffener*Reinforcement*

*Improvement / Upgrade Option

- 4. How long do you plan to run the Reactors when they come back online?
- 5. Do you plan to clean the scallops or center pipe during the outage?
 - Have you evaluated the time needed to perform scallop and/or center pipe cleaning versus repairs?
 - o If so, has this been built into your time schedule? (Average time to clean)
 - Have you considered the cost of cleaning versus replacement (Opportunity cost per day)
 - Options include:
 - In-place cleaning / repair
 - Removal and clean / repair
 - Wire brush and high-pressure blast
 - 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.
- 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.)
- Are your cover decks or expander rings areas of concern and/or the clips or pins that hold it together? Note: Woven Metal Products offers spare hardware and gaskets for these types of needs.



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