

Sextupole Leaky Hose Fittings Fix Proposal (280 sextupoles = 560 hose assemblies)
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Problem: The storage ring sextupoles are hoses with crimp style 4 explained below. These hoses are beginning to leak and need replacing. Just touching or moving the hose can cause a leak. The probability of this hose causing storage ring downtime is high.

Types of Crimps:

- Crimp style 1 (ideal) – three barb fitting with brass ferrule with four ribbed crimp. I cannot twist it or make it leak at 250 psi.
- Crimp style 2 – one barb fitting with brass ferrule four ribbed crimp. I can twist the hose in the fitting but cannot make it leak at 250 psi.
- Crimp style 3 – one barb fitting with aluminum ferrule with double flat crimp. I can twist the hose in the fitting and make it leak at 250 psi.
- Crimp style 4 (existing) – one barb fitting with aluminum ferrule with single flat crimp (see figure 1). I can twist the hose in the fitting and make it **EASILY** leak at 250 psi.
- Crimp style 5 – replace aluminum ferrule with hose clamp. The hose clamp causes the barb to cut through the inside of the hose. If this happens it **EASILY** leaks at 250 psi.



Figure 1: Crimp style 4 - One barb fitting with aluminum ferrule with single flat crimp.

POSSIBLE SOLUTIONS TO THE PROBLEM

Method 1 (Ideal):

1. Purchase 600 brand new hose assemblies with three barb fittings and crimp style 1.
2. Replace 50 hoses per shut down.
3. Will take 4 years
4. Cost \$180,000 for hose assemblies

Method 2:

1. Purchase 50 brand new hose assemblies with three barb fittings and crimp style 1.
2. Replace 50 hoses during a shut down with hoses from step 1
3. Repair the hoses that were taken off in step 2 with new hose and crimp style 2.
4. Replace 50 hoses with hoses made from step 3

5. repeat until complete
6. Will take 4 years
7. Cost \$21,685 for hoses in step 1 plus \$6,250 per 50 hose repair $\$21,685 + 11 * (\$6,250) = \$90,435$ over 4 years
8. We could also have our technicians repair the 50 hoses each shutdown with crimp style 3 and not spend the \$6,250 to have it done outside. Crimp style 3 is not as effective as crimp style 2.

Method 3:

1. We have 7 hose assemblies and the following fittings:
 - a. 43 tees
 - b. 7 run tees
 - c. 4 elbows
 - d. 1 bulkhead
2. Purchase 3 elbows and 6 bulkheads will give us enough fittings to make 7 more hose assemblies.
3. Replace 12 hose assemblies per shutdown with crimp style 3 (this leaves 2 good hose assemblies for emergencies).
4. Our Technicians repair the hoses from step 3 with crimp style 3. If the technicians have time and can and can do this during the shutdown they could replace another 12 hose assemblies during the same shutdown.
5. Repeat until done
6. Will take 16 years
7. Cost \$3000 for fittings plus cost of new hose

COMMENT

Any crimp style mentioned above other than crimp style 1 is a poor quality fix. Method 1 is the best way to fix this problem. I recommend fixing the sextupole hoses using method 1.