

ATTACHMENT 2

CATAWBA DIESELS-IDI OWNERS GROUP  
DESIGN REVIEW/QUALITY REVALIDATION  
FINAL REPORT  
SUMMARY OF RECOMMENDATIONS

8507080075 850621  
PDR ADOCK 05000413  
S PDR

## STATUS CODE LEGEND

### Status Code

- |   |  |
|---|--|
| 1 | Duke Power has accomplished this item through quality revalidation testing, design modification or preventive maintenance schedules. |
| 2 | Duke Power will accomplish this item by the end of the first refueling outage.   |
| 3 | Duke Power ammends the Owners Group recommendation.  |
| 4 | Duke Power is reviewing the Owners Group recommendation.   |

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75	OFF ENGINE ALARM SENSORS	02-691A
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95	JACKET WATER STANDPIPE:SUPPORTS	00-700C
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97	JACKET WATER STANDPIPE: BOLTING	00-700F
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111	FUEL PUMP CONTROL SHAFT	02-371A/B
112	FUEL PUMP LINKAGE-AUTO SHUTDOWN	02-413B
113	FUEL OIL BOOSTER PUMP	02-445
114	FUEL OIL HEADER PIPING AND TUBING	02-450B
115	FUEL OIL HEADER SUPPORTS	02-450D
116	FUEL OIL FILTERS	02-455A
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126	CONTROL PANEL SOLENOID VALVES	02-500K
127	CONTROL PANEL PIPING, TUBING, FITTING	02-500M
128	CONTROL PANEL TERMINAL BOARDS	02-500N
129	FOUNDATION BOLTS AND ANCHORS	02-550
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134	CIRCUIT BREAKERS AND CONTACT BLOCKS	02-500C
135	BARRING DEVICE AIR FILTER	02-525C
136	AIR DRYERS AND MOISTURE TRAPS	02-835A
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Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. CN-106  
Part Name INTAKE AIR FILTER  
Class B

DRQR Sequence

1

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. CLEAN/REPLACE FILTER 3-6 MOS	1. In compliance	1.	1.	1
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Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. CN-107  
Part Name INTAKE AIR SILENCER  
Class

DRQR Sequence

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Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. CN-121  
Part Name FLEX CONNECTIONS  
Class C

DRQR Sequence

3

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. VIS INSPECT EVERY 5 YEARS	1.	1. Maint	1. Add to P/M-Vis insp/5Y	2
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Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. F-068  
Part Name INTERCOOLER  
Class B

DRQR Sequence

4

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. DISASSEMBLE/CLEAN EACH OUTAGE	1. PM done 10Y	1. Maint	1. Use PM	3
2. VIS. INSP. FOR LEAKS MONTHLY	2. PM done during operation	2. Maint	2. In compliance	1
3. CHECK AIR DRAIN DAILY	3. Done during operation	3. Maint	3. Use PM	3
4. CHECK OPERATION PARA./MONTH	4. Done during operation	4. Oper.	4. In compliance	1

Modification Recommendations

1. AS PER SIM 365	1. Done on all units	1. Maint	1. In compliance	1
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Quality Revalidation Recommendations

None

Remarks

MAINT- 1. The intercoolers are cooled with treated jacket water. This reduces the chances of corrosion in the system. A heat balance will be taken at refueling outages to ascertain heat exchanger performance. Intercoolers will be disassembled at 10 years for cleaning if the heat balance results do not indicate a more frequent cleaning.

MAINT- 3. The outlet plenum (air) drain is open to atmosphere. Hence it will be inspected during operation of the engine where the presence of air escaping indicates that the drain is open. In addition daily inspections of the engine for leakage and the jacket water standpipe will indicate whether the intercooler is intact. (Rev.1)

# Catawba Diesels-Owners Group DRQR Final Report Summary of Recommendations

Part No. MP/022/3  
Part Name TURBOCHARGER  
Class A

DRQR Sequence

5

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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## Owners Group Design Review Status

Completed

## Maintenance Recommendations

1. INSP ROTOR AXIAL CLEARANCE PER OUTAGE	1. PM done/5Y	1. Maint	1. Use PM	3
2. INSP THRUST BEARINGS AFTER 100 STARTS	2. PM checks 1A at 1st outage	2. Maint	2. Use PM	3
3. MEASURE VIBRATION/OUTAGE	3. PM done/6 months	3. Maint	3. In compliance	1
4. DISASSEMBLE/INSPECT/5Y	4. In compliance	4. Maint	4. In compliance	1

## Modification Recommendations

1. INST. FULL FLOW PRELUBE SYSTEM	1. Done on all units	1. Maint	1. In compliance	1
2. RETAIN DRIP LUBE SYSTEM	2. Done on all units	2. Maint	2. In compliance	1

## Quality Revalidation Recommendations

1. INSP BEARINGS/NOZZLE RING	1. Done	1. Maint	1. In compliance	1
2. INSP END CLEARANCES	2. Done	2. Maint	2. In compliance	1
3. INSP AMOUNT OF BOLTS	3. Done	3. Maint	3. In compliance	1
4. INSP BOLT TORQUE	4. Done	4. Maint	4. In compliance	1
5. PT INSP STA NOZZLE RING	5. Done by Elliott	5. Maint	5. In compliance	1

## Remarks

MAINT-1.&2. The turbochargers currently installed are new units installed after the endurance run. These new units incorporate a modified thrust bearing lubrication system. The 1A engine turbochargers will be checked during the first refueling outage to assure that the lubrication system is adequately lubricating the thrust bearings. This along with the modification in operational testing to decrease the number of non-prelubricated starts will make more frequent inspections than every five years unnecessary. Vibration monitoring of the turbochargers at 6 month intervals is to provide adequate indication of unexpected failure.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-CFR DRQR Sequence  
Part Name TURBO THRUST BRNG DRIP LUBE SYSTEM  
Class B

6

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

Completed

Maintenance Recommendations

None

Modification Recommendations

1. ADD TWO WAY SUPPORTS	1. Will accomplish by 1st outage	1. Design	1. Will comply	2
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Quality Revalidation Recommendations

1. LINE WALKDOWN	1. Done	1. Maint	1. In compliance	1
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Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-375  
Part Name INTAKE MANIFOLD AND PIPING (LG BOR)  
Class B

DRQR Sequence

7

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

1. VERIFY INSTALLATION INTAKE MANIFOLD	1. Done	1. Maint	1. In compliance	1
2. INSP MANIFOLD FLANGE	2. Done	2. Maint	2. In compliance	1
3. ENSURE U-BOLTS PROPERLY INSTALLED	3. Accomplished during reassembly	3. Maint	3. In compliance	1

Remarks

# Catawba Diesels-Owners Group DRQR Final Report Summary of Recommendations

Part No. 02-380A  
Part Name EXHAUST MANIFOLD: MANIFOLD  
Class B

DRQR Sequence

8

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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## Owners Group Design Review Status

None Required

## Maintenance Recommendations

1. INSP PIPE WELDS/ALT OUT	1. Visual done during QR(at 750H)	1. Maint	1. Put in PM-/10Y	3
2. MT PIPE WELDS/ALT OUT	2.	2. Maint	2. Will not do	3

## Modification Recommendations

1. REPLACE SLIP JTS WITH FLANGES	1. Under review	1. Design	1. Under review	4
2. REPLACE FLANGE BOLTING	2. Needs to be done on 1A	2. Design	2. Will do at 1st outage-1A	2

## Quality Revalidation Recommendations

None

## Remarks

MAINT-1.&2. The exhaust manifold flange welds were inspected on both diesels as part of the quality revalidation program with no signs of cracks. In light of the performance of this part with over 750 hours and over 120 start-stops, it is considered adequate for extended service. We will visually inspect the exhaust manifold welds at 10 years where the engine will have approximately 310 hours and 160 start-stops.

MOD.-1. The modification recommendation indicates that the slip joints should be removed and replaced with flanged connections. We are in the process of reviewing the Owners Group analytical data supporting this recommendation.



# Catawba Diesels-Owners Group DRQR Final Report Summary of Recommendations

Part No. 02-380B DRQR Sequence  
Part Name EXHAUST MANIFOLD: GASKETS AND BOLTS  
Class B

9

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

1. INSP TORQUE EX PIPE FLNG BLTS	1. Done	1. Maint	1. In compliance	1
2. INSP GASKET MATL/BOLTS	2. Done during installation	2. Maint	2. In compliance	1
3. INSP FOR PROPER INSTALLATION	3. Done	3. Maint	3. In compliance	1

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-475A/D  
Part Name TURBO BRACKET: BOLTS AND GASKETS  
Class B

DRQR Sequence

10

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. CHECK CAPSCREW PRELOAD/MONTH (1ST 3 MONTHS)	1.	1. Maint	1. Will not accomplish	3
2. CHECK CAPSCREW PRELOAD/OUTAGE	2.	2. Maint	2. Add to PM	2
3. RETORQUE/REPLACE AS NECESSARY	3.	3. Maint	3. Inc in reassembly procedure	2

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

MAINT-1. These bolts were part of the quality revalidation inspection of the diesels. The bolts were replaced by grade 8 bolts during reassembly. In lieu of checking these bolt torques for the first three months, the vibration measurements which are taken on the turbocharger will indicate whether the bolts are loosening. Hence, we will not accomplish these torque measurements. If vibration measurements are satisfactory, we will check bolting at first outage and assure that torques are 125 ft-lbs for the bracket to engine and 75 ft-lbs for the bracket to turbo. Following this we will adjust the PM schedule to assure that the bolts remain tight.

# Catawba Diesels-Owners Group DRQR Final Report Summary of Recommendations

Part No. 02-475B  
Part Name AIR BUTTERFLY VALVE ASSEMBLY  
Class A

DRQR Sequence

11

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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## Owners Group Design Review Status

None Required

## Maintenance Recommendations

1. CHECK VALVE LINK LOCKS MONTHLY	1. Jam nut torqued at install.	1. Maint	1. Put in PM -Check torq/Outage	3
2. LUBE VALVE SHAFT/OUTAGE	2.	2. Maint	2. Put in PM	2
3. CHECK OPERATION OF VALVE DISKS PER MONTH	3. In compliance	3. Maint	3. In compliance	1

## Modification Recommendations

1. INSTALL GREASE FITTINGS/SIM322	1. Done	1. Maint	1. In compliance	1
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## Quality Revalidation Recommendations

1. INSP ALIGNMENT PINS	1. Done	1. Maint	1. In compliance	1
2. INSP SHAFT	2. Done	2. Maint	2. In compliance	1
3. INSP INSTALLATION	3. Done	3. Maint	3. In compliance	
4. INSP HARD.-ROLL PINS&SHAFT	4. Visual inspections were sat	4. Maint	4. Will not do	3

## Remarks

MAINT- 1.This part was inspected after the endurance run with no sign of looseness. Jam nuts are torqued during installation. As the jam nuts have not loosened during service, jam nut torques will be checked at each outage.

Q/R- 4. The recommendation to inspect the hardness of the shaft is considered unnecessary in light of favorable inspections during quality revalidation. Shafts were visually inspected with no signs of distress.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. CN-109  
Part Name BEFORE AND AFTER LUBE OIL PUMP  
Class A

DRQR Sequence

12

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. CHECK OPERATION MONTHLY FOR LEAKS DAILY	1. Done	1. Maint	1. In compliance	1
2. CHECK ALIGNMENT AND VIBRATION PER OUTAGE	2. Align during maint-No vibrat.	2. Maint	2. Will not do	3
3. RECORD DISCHARGE PRESSURE MONTHLY	3. Done	3. Maint	3. In compliance	1

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

MAINT- 2. Routine alignment of this pump is considered unnecessary and will only be done when other maintenance requires pump disassembly. No vibration measurements will be taken. A spare pump is kept in stock and replacement can be affected in less than 72 hours should the need arise.

# Catawba Diesels-Owners Group DRQR Final Report Summary of Recommendations

Part No. CN-110  
Part Name FULL FLOW LUBE OIL FILTER  
Class A

DRQR Sequence

13

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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## Owners Group Design Review Status

None Required

## Maintenance Recommendations

1. INSPECT FILTER AND DRAIN MONTHLY	1. Based on DP	1. Maint.	1. Use PM	3
2. REPLACE FILTER/OUTAGE	2. PM-replace per DP	2. Maint	2. Use PM	3
3. CHECK GAUGE CALIB/OUTAGE	3. In compliance	3. Maint	3. In compliance	1

## Modification Recommendations

None

## Quality Revalidation Recommendations

None

## Remarks

MAINT-1&2 The Owners Group recommendations are based on specific time limits where the Catawba actions are based on performance requirements. Maintenance on Catawba filter is based on differential pressure (DP) measurements. Catawba is considered to be in full compliance with the intent of the Owners Group recommendations.



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. CN-111  
Part Name LUBE OIL HEAT EXCHANGER  
Class B

DRQR Sequence

14

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. INSPECT HE TUBES EACH OUTAGE	1. PM done/10Y	1. Maint	1. Use PM	3
2. REPLACE TS PACKING EACH OUTAGE	2.	2. Maint	2. Use PM	3
3. INSP OIL FOR WATER/3 MONTHS	3. PM done/month	3. Maint	3. In compliance	1

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

MAINT-1&2. This component has performed well in service and all inspections were within normal limits. The water in the heat exchanger is treated to reduce the probability of corrosion, and this treated water runs continuously through the system, greatly reducing corrosion. Accordingly, a heat balance will be run on the heat exchange at each outage. If the results of the heat balance indicate that the heat exchanger is performing satisfactorily, then the heat exchanger will be routinely inspected at 10 years. During the heat exchanger inspection, tube sheet (TS) packing will be replaced.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. CN-122  
Part Name OIL PRELUBE FILTER  
Class A

DRQR Sequence

15

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. INSPECT FILTER D.P. MONTHLY	1. PM- check DP during operation	1. Maint	1. In compliance	1
2. CHANGE FILTER/OUTAGE	2. PM-change filter as req. by DP	2. Maint	2. Use PM	3

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

MAINT-2. The filter is replaced based on differential pressure. Hence, the preventive maintenance program proposed by Catawba complies with intent of the Owners Group recommendation.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. CN-131  
Part Name LUBE OIL KEEPWARM STRAINER  
Class A

DRQR Sequence

16

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. INSP STRAINER D.P. DAILY	1.	1. Oper	1. Add to oper. inst.-check/week	3
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Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

MAINT-1. Catawba procedure OMP 2-19 will be modified to require a check of the lube oil keep warm strainer weekly. If required maintenance indicates that this period should be shortened to daily it will be.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. SE-025 DRQR Sequence  
Part Name LUBE OIL FULL PRESSURE STRAINER  
Class A

17

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. INSP STRAINER D.P. MONTHLY	1.	1. Oper	1. Verify in checklist	2
2. INSP AND CLEAN ELEMENTS/OUTAGE	2. PM-Cleaning based on DP	2. Maint	2. Use current PM	3

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

MAINT-1. Catawba procedure PT/1/A/4350/10 will be modified to require recording DP during operation.

This preventive maintenance program complies with the intent of the Owners Group recommendation.

MAINT-2. Inspection and cleaning of the strainer will be based on differential pressure.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 00-420 DRQR Sequence  
Part Name LUBE OIL PRESSURE REGULATING VALVE  
Class A

18

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. DISSASSEMBLE-CLEAN/OUTAGE	1.	1. Maint	1. Add to PM-/10Y	3
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Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

MAINT-1. This part performed well during the over 750 hours of operation. Problems with this valve will become evident by oil pressure readings. For these reasons, more frequent disassembly then 10 years are considered unnecessary.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-307A  
Part Name LUBE OIL INTERNAL HEADERS  
Class A

DRQR Sequence

19

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

1. MODIFY SUPPORTS/DR/QR 02-307D	1.	1. Design	1. Will comply by 1st outage	2
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Quality Revalidation Recommendations

None

Remarks



# Catawba Diesels-Owners Group DRQR Final Report Summary of Recommendations

Part No. 02-307B  
Part Name LUBE OIL FITTINGS-INTERNAL:TUBING  
Class A

DRQR Sequence

20

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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## Owners Group Design Review Status

None Required

## Maintenance Recommendations

1. INSPECT TUBING/OUTAGE	1. PM-Gen vis insp/10Y	1. Maint	1. Use PM	3
2. PERFORM GEAR-TRAIN SPRAY CHECK/OUTAGE	2. Will inspect/alt outage	2. Maint	2. Add to PM	3

## Modification Recommendations

None

## Quality Revalidation Recommendations

None

## Remarks

MAINT-1. Lube oil tubing has performed well during the 750 hour extended run, with no signs of distress. Accordingly, it will be inspected every 10 years.

MAINT-2. No signs of lube oil contamination has been experienced of the Catawba diesels. Hence gear sprays should remain clean and functional. Therefore, gear sprays will be inspected every alternate outage which is approximately after 100 hours of operation.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-307D  
Part Name LUBE OIL FITTINGS-INTERNAL:SUPPORTS  
Class B

DRQR Sequence

21

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

Completed

Maintenance Recommendations

None

Modification Recommendations

1. REPLACE 1/4" BOLTS WITH 3/8"	1.	1. Design	1. Will comply by 1st outage	2
2. TORQUE/LOCK BOLTS	2.	2. Design	2. Will comply by 1st outage	2
3. ENSURE FIT OF UBOLT TO PIPE	3.	3. Design	3. Will comply by 1st outage	2

Quality Revalidation Recommendations

1. LINE WALKDOWN	1. Done	1. Maint	1. In compliance	1
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Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-420  
Part Name LUBE OIL PUMPS  
Class A

DRQR Sequence

22

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
<hr/>				
Owners Group Design Review Status				
<hr/>				
None Required				
Maintenance Recommendations				
<hr/>				
None				
Modification Recommendations				
<hr/>				
None				
Quality Revalidation Recommendations				
<hr/>				
None				
Remarks				

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-465A  
Part Name EXTERNAL LUBE OIL LINES  
Class A

DRQR Sequence

23

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

Completed

Maintenance Recommendations

None

Modification Recommendations

1. ADD 2 DRESSER COUPLINGS	1.	1. Design	1. Will comply by 1st outage	2
2. ENSURE COUPLING REASSEMBLY OK	2. Done	2. Maint	2. In compliance	1

Quality Revalidation Recommendations

1. LINE WALKDOWN	1. Done	1. Maint	1. In compliance	1
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Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-465B DRQR Sequence  
Part Name EXTERNAL LUBE OIL LINE SUPPORTS  
Class A

24

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

Completed

Maintenance Recommendations

None

Modification Recommendations

1. REINFORCE 3/8" UBOLT ON 2" LINE	1.	1. Design	1. Will comply by end 1st outage	2
2. ADD 3D REST. ON 1.5" L.O. LINE	2.	2. Design	2. Will comply by end 1st outage	2

Quality Revalidation Recommendations

1. LINE WALKDOWN	1. Done	1. Maint	1. In compliance	1
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Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-465C  
Part Name LUBE OIL LINES-EXTERNAL:VALVES  
Class A

DRQR Sequence

25

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-467A  
Part Name TURBOCHARGER L.O. PIPING  
Class B

DRQR Sequence

26

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

Completed

Maintenance Recommendations

None

Modification Recommendations

1. ADD 2 SUPPORTS	1.	1. Design	1. Will comply by end 1st outage	2
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Quality Revalidation Recommendations

1. LINE WALKDOWN	1. Done	1. Maint	1. In compliance	1
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Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-467B  
Part Name TURBO LUBE OIL PIPING SUPPORTS  
Class B

DRQR Sequence

27

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

Completed

Maintenance Recommendations

None

Modification Recommendations

1. ADD 3D RESTRAINT -L.O.LINE-1B	1.	1. Design	1. Will comply by end 1st outage	2
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Quality Revalidation Recommendations

1. LINE WALKDOWN	1. Done	1. Maint	1. In compliance	1
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Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-540A  
Part Name LUBE OIL SUMP TANK  
Class B

DRQR Sequence

28

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

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None Required

Maintenance Recommendations

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None

Modification Recommendations

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None

Quality Revalidation Recommendations

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None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-540B DRQR Sequence  
Part Name LUBE OIL SUMP TANK:MISC. FITTINGS  
Class B

29

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

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None Required

Maintenance Recommendations

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None

Modification Recommendations

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None

Quality Revalidation Recommendations

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None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-540C  
Part Name LUBE OIL SUMP TANK MOUNTING HRDWRE  
Class B

DRQR Sequence

30

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

1. VERIFY TORQUE MOUNT BOLTS	1. Done (Insp as 540B-Bolting)	1. Maint	1. In compliance	1
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Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-540D  
Part Name LUBE OIL SUMP TANK:HEATER  
Class

DRQR Sequence

31

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. MEASURE INSULATION RESISTANCE PER OUTAGE	1. Not in PM program	1. Maint	1. Will replace if required	3
2. CHECK THERMOSTAT CALIBRATION PER OUTAGE	2. In PM program	2. Maint	2. In compliance	1
3. INSP AND CLEAN HEATER ELEMENT PER OUTAGE	3. Not in PM program	3. Maint	3. Will replace if required	3

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

MAINT-1&3. This part is easily replaceable within 72 hours and a spare part is in stock. The performance of this part is monitored by lube oil temperature, so potential failure of the part can be predicted. For these reasons, the Owners Group inspections will not be performed.



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-305 DRQR Sequence  
Part Name MAIN BEARING: BASE, STUDS AND NUTS  
Class A

32

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. INSP M.B. NUT POCKETS/OUTAGE	1.	1. Maint	1. Inspect at 10 years	3
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Modification Recommendations

None

Quality Revalidation Recommendations

1. INSP. BREAKAWAY TORQUE	1. Done	1. Maint	1. In compliance	1
2. INSP FOR FRETTING	2. Done	2. Maint	2. In compliance	1
3. PT #5 M.B. SADDLE AREA	3. Done	3. Maint	3. In compliance	1
4. MATL COMP- STUDS AND NUTS	4.	4. Maint	4. Will not accomplish	3

Remarks

MAINT-1. This part was inspected after the 750 hour endurance run of the engine and all inspections were satisfactory. The results of these inspections indicate that more frequent inspections than 10 years are unnecessary.

Q/R-4. All results of quality revalidation inspections in terms of main bearings, bearing caps, nut breakaway torques and visual examination of nuts were satisfactory. The main bearings mounted with the Catawba studs and nuts are behaving satisfactorily. Hence, we will not verify the material of the studs and nuts.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-310A  
Part Name CRANKSHAFT  
Class A

DRQR Sequence

33

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

Completed

Maintenance Recommendations

1. MEASURE WEB DEFL/OUTAGE	1. In PM	1. Maint	1. In compliance	1
2. MEASURE DIA OF CR JRNL/ALT OT	2. Not in PM	2. Maint	2. Will not accomplish	3

Modification Recommendations

None

Quality Revalidation Recommendations

1. INSP CRANKPIN JOURNALS	1. Done	1. Maint	1. In compliance	1
2. ECT MAIN JRNL OIL HOLE #4,6,8	2. Done	2. Maint	2. In compliance	1
3. PERFORM TORSIOGRAPH	3. Done	3. Maint	3. In compliance	1

Remarks

MAINT-2. Crankshaft web deflections are to be performed every outage. These inspections will predict crankshaft misalignment that could eventually lead to journal wear. In addition, analysis of the lube oil for wear material will demonstrate any unusual wear of either the crankshaft journals or the bearings. Visual inspection of crankshaft journals and measurement of the shell thickness every ten years will provide sufficient documentation that the crankshaft is not experiencing significant wear.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-310B  
Part Name MAIN BEARING SHELLS  
Class A

DRQR Sequence

34

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. MEASURE THICK.-INT TO BE DET.	1.	1. Maint	1. Add PM	2
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Modification Recommendations

None

Quality Revalidation Recommendations

1. INSP SHELLS FOR THICKNESS	1. Done	1. Maint	1. In compliance	1
2. INSP FOR SCORING, CRACK(#5)	2. Done	2. Maint	2. In compliance	1
3. INSP 1B SHELLS FOR MISALIG.	3. Done	3. Maint	3. In compliance	1

Remarks

MAINT-1. The preventive maintenance program will be modified to measure the thickness of a sample (2 main bearings) at 10 year intervals.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-310C DRQR Sequence  
Part Name CRANKSHAFT THRUST BEARING RINGS  
Class A

35

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. MEASURE THRUST CLEARANCE	1. In PM /outage	1. Maint	1. In compliance	1
2. INSP FOR WEAR/ALT OUTAGE	2. Not in PM	2. Maint	2. Will not accomplish	3

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

MAINT-2. The crankshaft is inspected for thrust clearance every outage. This gives a direct indication of the wear of the thrust bearing ring and makes the inspection above unnecessary.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-311A  
Part Name CRANKCASE ASSEMBLY  
Class A

DRQR Sequence

36

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. INSP CRANKCASE BOLT HOLES FOR CRACKING AT 185 HRS	1.	1. Maint	1. Unit 1-Done, Unit 2-insp at 5Y 2	
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Modification Recommendations

None

Quality Revalidation Recommendations

1. INSP CRANKCASE FOR CRACKING	1. Done	1. Maint	1. In compliance	1
2. MATERIAL VERIFICATION	2. Not done	2. QA	2. Verify from foundry records	2

Remarks

MAINT-1. The Unit 1 diesels were inspected after the endurance run (greater than 750 hours) with satisfactory results. Hence, we do not consider that this preventive maintenance action is applicable to Unit 1. The PM procedure will be modified to require inspection of the Unit 2 diesels at 5 years.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-311D  
Part Name CRANKCASE MOUNTING HARDWARE  
Class A

DRQR Sequence

37

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

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None Required

Maintenance Recommendations

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None

Modification Recommendations

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None

Quality Revalidation Recommendations

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None

Remarks



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-386B  
Part Name CRANKCASE COVERS AND GASKETS  
Class C

DRQR Sequence

38

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

1. INSP COVERS FOR CRACKS	1. Done	1. Maint	1. In compliance	1
2. VERIFY CORRECT BOLT TORQUES	2. Done	2. Maint	2. In compliance	1

Remarks

# Catawba Diesels-Owners Group DRQR Final Report Summary of Recommendations

Part No. 02-315A  
Part Name CYLINDER BLOCK  
Class A

DRQR Sequence

39

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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## Owners Group Design Review Status

Completed

## Maintenance Recommendations

None

## Modification Recommendations

None

## Quality Revalidation Recommendations

1. INSP DIMENSIONS OF LINER	1. Done	1. Maint	1. In compliance	1
2. PT OR MT CYL LINER LAND. AREA	2. Done	2. Maint	2. In compliance	1
3. PT OR MT CYL HD MATING SURF	3. Done	3. Maint	3. In compliance	1
4. ECT CYL HEAD STUD HOLES	4. Done	4. Maint	4. In compliance	1
5. REMOVE A SAMPLE FROM BLOCK	5. Partially done	5. Maint	5. Sample for matl-1A-R 1st Out.	2

## Remarks

QR-5. Unit 1 diesels with the exception of 1A right cylinder block have had microstructures taken of the block. The 1A right cylinder block microstructure will be taken by the end of the 1st refueling outage. Unit 2 diesel cylinder block microstructure will be taken during quality revalidation inspections.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-315C  
Part Name CYLINDER LINERS  
Class A

DRQR Sequence

40

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. INSP FOR WEAR/OUTAGE	1. PM, 4 at 1st outage, 16 at 10Y	1. Maint	1. Use current PM	3
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Modification Recommendations

None

Quality Revalidation Recommendations

1. INSP DIMENSIONS	1. Done	1. Maint	1. In compliance	1
2. INSP O.D. CONTACT AREA	2. Done	2. Maint	2. In compliance	1
3. INSP I.D. OVER AREA OF TRAVEL	3. Done	3. Maint	3. In compliance	1
4. CHECK MATERIAL OF SPARE LINER	4. Done	4. Maint	4. In compliance	1

Remarks

MAINT-1. This part was inspected extensively after the extended run, and all inspections were within normal limits. For this reason, more frequent inspections than a sample of 4 liners at the first refueling outage and all cylinder liners at 10 years is considered unnecessary.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-315D DRQR Sequence  
Part Name JACKET WATER MANIFOLD AND PIPING  
Class B

41

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

Completed

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

1. LINE WALKDOWN	1. Done	1. Maint	1. In compliance	1
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Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-315E  
Part Name CYLINDER HEAD STUDS  
Class B

DRQR Sequence

42

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
<hr/>				
Owners Group Design Review Status				
<hr/>				
None Required				
Maintenance Recommendations				
<hr/>				
None				
Modification Recommendations				
<hr/>				
None				
Quality Revalidation Recommendations				
<hr/>				
1. INSP STUDS FOR DISTRESS	1. Done	1. Maint	1. In compliance	1
2. VERIFY CORRECT MATERIAL	2. Done	2. Maint	2. In compliance	1
3. VERIFY HARDNESS	3. Done	3. Maint	3. In compliance	1
4. VERIFY STUDS BACKED OFF ONE TURN	4. Done	4. Maint	4. In compliance	1
Remarks				

# Catawba Diesels-Owners Group DRQR Final Report Summary of Recommendations

Part No. 02-315F  
Part Name CYLINDER HEAD NUTS  
Class B

DRQR Sequence

43

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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## Owners Group Design Review Status

None Required

## Maintenance Recommendations

None

## Modification Recommendations

None

## Quality Revalidation Recommendations

1. INSP FOR ID MARKINGS	1.	1. Maint	1. Add to PM -sapl/1st OT,all/10Y	3
2. VERIFY PROPER INSTALLATION	2. Done	2. Maint	2. In compliance	1
3. INSP FOR FORGING LAPS	3.	3. Maint	3. Add to PM-sapl/1st OT,all/10Y	3

## Remarks

MAINT 1&3. The quality revalidation of the cylinder head nuts is a new inspection for Catawba. This will be accomplished on Unit 2 during revalidation. On Unit 1, cylinder head breakaway torques were measured after the endurance run. All breakaway torques were within normal limits attesting to the fact that the nuts were fine. Accordingly, a sample inspection of four cylinders will be accomplished during the first refueling outage and all cylinder head nuts will be inspected at 10 years.



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-315G  
Part Name CYL HEAD GASKETS  
Class B

DRQR Sequence

44

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-385B  
Part Name CYL BLOCK COVERS: GASKETS AND BOLTS  
Class C

DRQR Sequence

45

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

1. VERIFY GASKETS ARE ADEQ.	1. Done	1. Maint	1. In compliance	1
2. VERIFY PROPER BOLT TORQUES	2. Done	2. Maint	2. In compliance	1

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-359  
Part Name AIR START VALVE  
Class A

DRQR Sequence

46

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. INSP AND CLEAN/OUTAGE	1. PM done/Alt outage	1. Maint	1. Use current PM	3
2. CHECK DESSICANT DRYER DAILY	2. Done automatically	2. Maint	2. In compliance	1

Modification Recommendations

None

Quality Revalidation Recommendations

1. INSP SEATING OF VALVE	1. Done	1. Maint	1. In compliance	1
2. INSP FOR CARBON DEPOSITS	2. Done	2. Maint	2. In compliance	1
3. CHECK HOT AND COLD TORQUE	3. Done	3. Maint	3. In compliance	1
4. INSP DIMENSIONS OF CAPSCREWS	4. Done	4. Maint	4. In compliance	1
5. VERIFY MATERIAL OF CAPSCREWS	5.	5. Maint	5. Will not check	3

Remarks

MAINT-1. As the air start valves were extensively inspected after the endurance run with no adverse findings, we will remove, clean and inspect the air start valves every other outage when the engine will have approximately 50 starts on it.

Q/R-5. Breakaway torques of the air starting valve capscrews were measured following the endurance run with satisfactory results. Capscrew lengths were measured during the quality revalidation of the engine with satisfactory results. Accordingly it is believed that the capscrews are correct for the intended service and additional material tests will not be performed.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-441A  
Part Name START AIR MANIFOLD PIPING  
Class B

DRQR Sequence

47

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

Completed

Maintenance Recommendations

1. CHECK VENT IS OPEN/MONTH	1.	1. Maint	1. Add to PM-check at outage	3
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Modification Recommendations

1. MODIFY SUPPORTS TO STIFFEN	1.	1. Design	1. Will comply by 1st outage	2
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Quality Revalidation Recommendations

1. LINE WALKDOWN	1. Done	1. Maint	1. In compliance	1
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Remarks

MAINT-1. The starting air system is clean as inspections of the strainers showed no debris. In addition, we have seen no plugging of the crossover vents which are always open to atmosphere. Finally, there are two vents installed giving redundancy to venting the manifold downstream of the solenoid valves. Hence, an addition to the PM will be made to check that the vent is open each outage.

# Catawba Diesels-Owners Group DRQR Final Report Summary of Recommendations

Part No. 02-441B  
Part Name START AIR MANIFOLD: VALVES, FILTERS  
Class A

DRQR Sequence

48

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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## Owners Group Design Review Status

None Required

## Maintenance Recommendations

1. INSP, CLEAN, REP. O-RING IN AIR ADMISS & SHUTTLE VALVE/OUTAGE	1.	1. Maint	1. PM per 5 years	3
2. TEST VALVES FOR TIGHTNESS PER OUTAGE	2.	2. Maint	2. PM per 5 years	3
3. REPLACE FILTER PER OUTAGE	3.	3. Maint	3. Verify in PM	2
4. BLOW OUT STRAINER DAILY	4. No blowdown points	4. Maint	4. In compliance	1
5. INSPECT STRAINER/MONTH	5.	5. Maint	5. Rev PM-clean & insp/outage	3

## Modification Recommendations

None

## Quality Revalidation Recommendations

None

## Remarks

MAINT-1. Catawba has not seen any O-ring leakage problems. Hence the preventive maintenance schedule will inspect, clean and replace O-rings on the admission and shuttle valves every 5 years.

MAINT-2. To date, Catawba air start manifold valves have been tight with no signs of leakage. Hence this preventive maintenance inspection will be accomplished at 5 year intervals.

MAINT-4. The Catawba air start strainers have no blowdown points. The air banks, however, are blown down daily at a point immediately upstream of the strainers. We believe that this action complies with the Owners Group recommendation.

MAINT-5. To date, Catawba has not seen any debris in the air start strainers. Accordingly, the strainers will be cleaned out every outage.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-441C  
Part Name START AIR MANIFOLD PIPE SUPPORTS  
Class B

DRQR Sequence

49

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

Completed

Maintenance Recommendations

None

Modification Recommendations

1. MODIFY SUPPORTS TO STIFFEN	1.	1. Design	1. Modify by end of 1st outage	2
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Quality Revalidation Recommendations

1. LINE WALKDOWN	1. Done	1. Maint	1. In compliance	1
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Remarks



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-442A  
Part Name START AIR DISTRIBUTOR ASSEMBLY  
Class A

DRQR Sequence

50

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. VERIFY MANIFOLD VENT IS OPEN	1.	1. Maint	1. See 02-441A	-
2. INSP VALVES AND CAMS/OUTAGE	2. PM-done/10 yrs	2. Maint	2. Use current PM	3

Modification Recommendations

None

Quality Revalidation Recommendations

1. INSPECT POPPETS FOR WEAR	1. Done	1. Maint	1. In compliance	1
2. INSP DIMENSIONS OF POPPETS	2. Done	2. Maint	2. In compliance	1

Remarks

MAINT-2. The air start distributor was inspected after the extended run and the results of all inspections were satisfactory. For this reason, more frequent inspections than 10 years (approximately 160 starts) are considered unnecessary.

**Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations**

**Part No.** 02-340A  
**Part Name** CONNECTING RODS AND BUSHINGS  
**Class** A

**DRQR Sequence**

**51**

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

Completed

Maintenance Recommendations

1. MEASURE CLEARANCE-LINK ROD & LINK PIN/10Y	1.	1. Maint	1. Incorporate into PM	2
2. INSPECT SERRATION CONTACT AREA PER 10Y	2.	2. Maint	2. Incorporate into PM	2
3. INSPECT AND MEASURE CONNECTING RODS/10Y	3.	3. Maint	3. Incorporate into PM	2

Modification Recommendations

None

Quality Revalidation Recommendations

1. VERIFY MATERIAL/HARDNESS	1. Done	1. Maint	1. In compliance	1
2. ECT ROD BOX THREADS	2. Done on 1A	2. Maint	2. 1B will not be inspected	3
3. MT CON ROD BOLTS-VISUAL INSP WASHERS, VERIFY ELONGATION	3. Done	3. Maint	3. In compliance	1
4. PT WRIST PIN BUSH	4. Done	4. Maint	4. In compliance	1
5. INSP RACK TEETH FOR FRETTING	5. Done	5. Maint	5. In compliance	1
6. CHECK LINK ROD AND PIN	6.	6. Maint	6. Will insp 25% 1st outage	3

Remarks

Q/R-2. Based on successful ECT tests of the Unit 1A diesel and MT tests, visual inspections and torque loads on the 1B diesel connecting rod bolts, ECT tests were not run on the rod box threads on Unit 1B. It is believed that the 1B bolts and rod box female threads were satisfactory and that the ECT tests will not provide any new information.

Q/R-6. Clearance of the link rod bushing and link rod pin were measured during the QR inspection and all clearances were satisfactory. Also, visual inspection of pins and bushings indicated no distress. OG requirements indicate that this inspection now must be done with a bolt torque applied. Since visual inspections and clearances were satisfactory, the OG inspection will be performed on a sample basis of four connecting rods removed from each Unit 1 engine at the first refueling outage. This additional inspection will be accomplished on all Unit 2 rods.

# Catawba Diesels-Owners Group DRQR Final Report Summary of Recommendations

Part No. 02-340B  
Part Name CONNECTING ROD BEARING SHELLS  
Class A

DRQR Sequence

52

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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## Owners Group Design Review Status

None Required

## Maintenance Recommendations

1. INSP FOR WEAR/OUTAGE	1. PM-/10Y	1. Maint	1. Accomplish PM	3
2. RADIOGRAPH REPLACEMENT BEARING SHELLS	2. Done	2. Maint	2. In compliance	1

## Modification Recommendations

None

## Quality Revalidation Recommendations

1. INSP BEARING SHELLS	1. Done	1. Maint	1. In compliance	1
2. PT,RT,DIMENS CHECK SHELLS	2. Done	2. Maint	2. In compliance	1
3. ECT INSP SHELLS	3. Not done	3. Maint	3. Will not accomplish	3

## Remarks

MAINT-1. The bearing shells performed well throughout the extended run and bearing thickness measurements made at the end of the endurance run were within manufacturers recommendations. Premature bearing wear will be indicated by such tests as web deflection readings and analysis of the engine oil for wear material. For these reasons, more frequent inspections then 10 years are considered unnecessary.

QR-3. The bearings were inspected during the quality revalidation by liquid penetrant techniques and radiography. All shells passed the liquid penetrant examination. Five shells did not meet the radiography acceptance standards and were replaced. It is considered that the eddy current inspections will not add any new information based on the results of liquid penetrant and radiography inspections. Accordingly, eddy current inspections will not be accomplished.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-341A  
Part Name PISTONS  
Class A

DRQR Sequence

53

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. INSP AND MEAS PISTON SKIRT	1. PM-Insp,MT;4-1st out& all/10Y	1. Maint	1. PM in compliance	2
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Modification Recommendations

None

Quality Revalidation Recommendations

1. PT INSP PISTON SKIRTS	1. Done	1. Maint	1. In compliance	1
2. PT INSP WRIST PIN BOSSES	2. Done	2. Maint	2. In compliance	1
3. INSP SKIRT FOR PITTING/SCUFFS	3. Done	3. Maint	3. In compliance	1

Remarks

MAINT-1. A sample check of four pistons which will be visually and magnetic particle inspected will be done at the first outage. These same inspections will be accomplished on all pistons at 10 year intervals.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-341B  
Part Name PISTON RINGS  
Class A

DRQR Sequence

54

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
Owners Group Design Review Status				
None Required				
Maintenance Recommendations				
1. INSP AND MEASURE REPL. RINGS PER 10Y	1. Accomplished	1. Maint	1. In compliance	1
2. USE HIGH DETERGENT OIL	2. Tromare SD40 is used	2. Maint	2. In compliance	1
Modification Recommendations				
None				
Quality Revalidation Recommendations				
1. VERIFY CORRECT INSTALLATION	1. Done	1. Maint	1. In compliance	1
Remarks				

# Catawba Diesels-Owners Group DRQR Final Report Summary of Recommendations

Part No. 02-341C  
Part Name PISTON PINS  
Class A

DRQR Sequence

55

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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## Owners Group Design Review Status

None Required

## Maintenance Recommendations

1. INSP CHROME PLATING/10Y	1. PM complies	1. Maint	1. In compliance	1
2. INSP END PLUGS	2.	2. Maint	2. Inc. piston PM	2
3. PT OR MT REPLACEMENT PINS	3. PM complies	3. Maint	3. In compliance	1

## Modification Recommendations

1. INSTALL NEW SNAP RINGS	1.	1. Maint	1. Will not accomplish	3
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## Quality Revalidation Recommendations

1. VERIFY MATL AND HARDNESS	1. Done	1. Maint	1. In compliance	1
2. INSP OIL PLUG INSTALLATION	2. Not done	2. Maint	2. Insp per PM	3
3. INSP WRIST PIN FOR DISTRESS	3. Done	3. Maint	3. In compliance	1
4. CHECK DIMENSIONS OF PINS	4. Done	4. Maint	4. In compliance	1

## Remarks

MOQ-1. The current procedure for securing the retaining rings is to use Locktite during assembly. At disassembly after the extended run, this bond was secure and intact and the retaining ring had to be broken loose. It is considered that the current retaining rings, locked in place are satisfactory and replacement with a new snap rings is unnecessary.

QR-2. The piston pins have performed well during the extended run with no signs of loss of lubrication which would arise if an oil plug were loose. Hence, inspections of the oil plugs will be done when the pistons are removed from the engine for other maintenance.



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-345A  
Part Name INTAKE AND EXHAUST TAPPETS  
Class A

DRQR Sequence

56

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. VERIFY FREE ROTATION/OUTAGE	1. PM complies	1. Maint	1. In compliance	1
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Modification Recommendations

None

Quality Revalidation Recommendations

1. VERIFY FREE ROTATION	1. Done	1. Maint	1. In compliance	1
2. CHECK PIN/ROLLER CLEARANCE	2. Done	2. Maint	2. In compliance	1

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-345B  
Part Name FUEL TAPPETS  
Class A

DRQR Sequence

57

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. VERIFY FREE ROTATION/OUTAGE	1. PM complies	1. Maint	1. In compliance	1
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Modification Recommendations

None

Quality Revalidation Recommendations

1. VERIFY FREE ROTATION	1. Done	1. Maint	1. In compliance	1
2. CHECK PIN/ROLLER CLEARANCE	2. Done	2. Maint	2. In compliance	1

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-345C  
Part Name FUEL PUMP BASE ASSEMBLY  
Class B

DRQR Sequence

58

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-350A  
Part Name CAMSHAFT ASSEMBLY  
Class A

DRQR Sequence

59

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. INSP FOR CRACKS,PITS,SPALLS PER OUTAGE	1.	1. Maint	1. Will insp at 5 years	3
2. CHECK EFF. ON LIFT OF DEFECTS	2.	2. Maint	2. Will evaluate as required	3

Modification Recommendations

None

Quality Revalidation Recommendations

1. INSP LOBES FOR WEAR	1. Done	1. Maint	1. In compliance	1
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Remarks

MAINT-1&2. Camshaft lobes were inspected after the endurance run with satisfactory results. Hence will inspect lobes at 5 years when the engine will have about 160 hours on it. Should any lobes have defects at this time, the effect of these defects on the valve train will be checked.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-305B  
Part Name CAMSHAFT BEARING  
Class A

DRQR Sequence

60

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
Owners Group Design Review Status				
None Required				
Maintenance Recommendations				
1. INSPECT BEARINGS/10Y	1.	1. Maint	1. Incorporate into PM	1
Modification Recommendations				
None				
Quality Revalidation Recommendations				
None				
Remarks				

# Catawba Diesels-Owners Group DRQR Final Report Summary of Recommendations

Part No. 02-350C  
Part Name CAMSHAFT GEAR TRAIN ASSEMB.  
Class A

DRQR Sequence

61

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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## Owners Group Design Review Status

None Required

## Maintenance Recommendations

1. INSP CAM GEAR PER OUTAGE	1. PM/5Y	1. Maint	1. Inspect at 5Y	3
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## Modification Recommendations

1. INCREASE TORQUE ON BOLTS	1.	1. Maint	1. Will accomp. if gear removed	3
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## Quality Revalidation Recommendations

1. VERIFY TORQUE	1. Not Done	1. Maint	1. Will not accomplish	3
2. INSP CAM GEAR	2. Done	2. Maint	2. In compliance	1
3. VERIFY MATERIAL CAM GEAR	3. Done	3. Maint	3. In compliance	1
4. VERIFY HARDNESS CAM GEAR	4. Done	4. Maint	4. In compliance	1

## Remarks

MAINT-1. As the gears performed well during the extended run, inspections more frequent than every five years are considered unnecessary. In addition, gear sprays will be checked at alternate outages to ensure proper lubrication. At these checks, the gear in the immediate proximity to the spray nozzle will be visually inspected.

MOD-1. The gears were visually inspected and their backlash measured after the extended run with satisfactory results. This would indicate that the bolts are properly retaining the gear. In addition, the nuts on the bolts have cotter pin locking devices which prevent the bolts from untorquing. Hence, as the parts have performed well in service, no modifications are considered necessary at this time with respect to bolt torque Q/R-1. If the cam gear is removed for other maintenance, the bolts will be retorqued to the Owners Group specifications.



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-390A/B  
Part Name ROCKER ARMS  
Class B

DRQR Sequence

62

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

1. INSP ROCKER ARMS FOR DISTRESS	1. Done	1. Maint	1. In compliance	1
2. VERIFY MATL OF R.A.SHAFT	2. Done	2. Maint	2. In compliance	1

Remarks

# Catawba Diesels-Owners Group DRQR Final Report Summary of Recommendations

Part No. 02-390C/D  
Part Name PUSHRODS  
Class B

DRQR Sequence

63

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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## Owners Group Design Review Status

None Required

## Maintenance Recommendations

1. SPECIFY DEST. VER. OF WELD QUALITY FOR REPLACEMENTS	1. PT during receipt inspection	1. QA	1. Use receipt inspection	3
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## Modification Recommendations

None

## Quality Revalidation Recommendations

1. VERIFY FRICTION WELDED DESIGN	1. Done	1. Maint	1. In compliance	1
2. PT OR MT FRICTION WELDS	2. Done	2. Maint	2. In compliance	1

## Remarks

MAINT-1. The Owners Group recommends specifying destructive verification to be accomplished on one pushrod of each lot ordered of replacement friction welded pushrods. The friction welded pushrods installed on the Catawba diesels have been liquid penetrant inspected upon receipt at Catawba. Further, the lead friction welded pushrods which were installed on both Unit 1A and 1B for their endurance runs were liquid penetrant inspected following each endurance run. Accordingly, we believe that using the liquid penetrant inspection at receipt of a part provides ample indication that the friction welding process is under control. Hence, we will not destructively verify the friction weld soundness.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-390E  
Part Name ROCKER ARM BUSHINGS  
Class B

DRQR Sequence

64

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

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None Required

Maintenance Recommendations

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1. INSP BUSHINGS/10Y	1. PM in accordance	1. Maint	1. In compliance	1
2. MEASURE CLEARANCES/10Y	2.	2. Maint	2. Add to PM	2

Modification Recommendations

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None

Quality Revalidation Recommendations

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None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-390G  
Part Name ROCKER ARM BOLTING  
Class B

DRQR Sequence

65

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. VERIFY CORRECT TORQUE/OUTAGE	1. PM in accordance	1. Maint	1. In compliance	1
2. VERIFY DRIVE STUDS ARE INTACT AND TIGHT	2.	2. Maint	2. Add to PM/outage	2

Modification Recommendations

None

Quality Revalidation Recommendations

1. MT CAPSCREW THREAD ROOT	1. Done	1. Maint	1. In compliance	1
2. INSP DRIVE STUDS	2. Not done	2. Maint	2. Add to PM	2
3. VERIFY CORRECT TORQUE	3. Done	3. Maint	3. In compliance	1
4. VERIFY HARDNESS	4. Done	4. Maint	4. In compliance	1
5. VERIFY MATERIAL	5. Done	5. Maint	5. In compliance	1

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No.	02-335B	DRQR Sequence	66
Part Name	FRONT GEAR CASE GASKETS AND BOLTING		
Class	A		

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

1. VERIFY BOLTING AND TORQUE	1. All bolts torqued to TDI spec	1. Maint	1. In compliance	1
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Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-330A  
Part Name FLYWHEEL  
Class A

DRQR Sequence

67

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
<hr/>				
Owners Group Design Review Status				
<hr/>				
None Required				
Maintenance Recommendations				
<hr/>				
None				
Modification Recommendations				
<hr/>				
None				
Quality Revalidation Recommendations				
<hr/>				
None				
Remarks				



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-330B  
Part Name FLYWHEEL BOLTING  
Class A

DRQR Sequence

68

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

1. VERIFY BOLT TORQUE IS TO SPEC	1. Done	1. Maint	1. In compliance	1
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Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No.	02-688A	DRQR Sequence	69
Part Name	ENGINE/AUX WIRING/CONDUIT/SUPPORTS		
Class	A		

Owners Group Recommendation	Comments	Ref. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

1. LINE W/LKDOWN TO REP COND SUPPT	1.	1. Design	1. Will do by 1st outage	2
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Quality Revalidation Recommendations

None

Remarks

**Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations**

Part No. 02-630D  
Part Name PYROMETER THERMOCOUPLES  
Class B

DRQR Sequence

70

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

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Maintenance Recommendations

1. CHECK TEMP IS CONSISTENT/OUT	1. Done per calib. tests	1. Maint	1. In compliance	1
2. INSP AND CLEAN THERMO AND SHIELD ALTERNATE OUTAGES	2.	2. Maint	2. Clean if temp inconsistent	3

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Modification Recommendations

None

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Quality Revalidation Recommendations

None

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Remarks

MAINT-2. As the thermocouples are used to monitor diesel engine performance and do not prevent the diesel from starting or continuing to run, it is believed that cleaning the shields when temperatures become inconsistent is adequate maintenance.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-688B  
Part Name ENG./AUX MODULE WIRING  
Class A

DRQR Sequence

71

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

1. AS PER S&W QUALIF. REPORT	1.	1. Design	1. Will be done by 1st outage	2
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Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-688C  
Part Name ENG/AUX WIRING: BOXES AND TERMIN.  
Class

DRQR Sequence

72

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
<hr/>				
Owners Group Design Review Status				
<hr/>				
None Required				
Maintenance Recommendations				
<hr/>				
None				
Modification Recommendations				
<hr/>				
None				
Quality Revalidation Recommendations				
<hr/>				
None				
Remarks				

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-689  
Part Name OFF ENG SAFETY ALARM WIRING  
Class B

DRQR Sequence

73

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

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None Required

Maintenance Recommendations

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None

Modification Recommendations

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None

Quality Revalidation Recommendations

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None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-690  
Part Name ON ENGINE ALARM SENSORS  
Class B

DRQR Sequence

74

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
<hr/>				
Owners Group Design Review Status				
<hr/>				
None Required				
Maintenance Recommendations				
<hr/>				
None				
Modification Recommendations				
<hr/>				
None				
Quality Revalidation Recommendations				
<hr/>				
None				
Remarks				



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-691A DRQR Sequence  
Part Name OFF ENGINE ALARM SENSORS  
Class B

75

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-410A  
Part Name OVERSPEED TRIP GOVERNOR  
Class A

DRQR Sequence

76

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. VERIFY TRIP SET POINT/OUTAGE	1. Done per calib. test	1. Maint	1. In compliance	1
2. MARK TRIP SCREW SETTINGS	2.	2. Maint	2. Jam nuts locktited	3

Modification Recommendations

None

Quality Revalidation Recommendations

1. VERIFY PROPER INSTALLATION	1. Done in return to serv test	1. Oper	1. In compliance	1
2. VERIFY OP PROCERURES	2. Done in return to serv test	2. Oper	2. In compliance	1

Remarks

MAINT-2. The procedure proposed by the Owners Group is intended to indicate inadvertent resetting of the governor. The procedure used by Duke is intended to prevent any resetting as well as indicate resetting.

**Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations**

**Part No.** 02-410B  
**Part Name** OVERSPEED TRIP AND ACCESSORY DRIVE  
**Class** A

**DRQR Sequence**

77

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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**Owners Group Design Review Status**

None Required

**Maintenance Recommendations**

1. INSP SHAFT, GEAR FOR WEAR/10Y	1.	1. Maint	1. Verify in PM	2
2. CHECK FOR PARTICLE CONTAM/10Y	2.	2. Maint	2. Verify in PM	2

**Modification Recommendations**

None

**Quality Revalidation Recommendations**

1. VERIFY MATL AND HARDNESS	1. Done	1. Maint	1. In compliance	1
2. VERIFY DIM-SHAFT TO BRNG	2. Done	2. Maint	2. In compliance	1
3. INSP DRIVE GEAR TEETH	3. Done	3. Maint	3. In compliance	1
4. PT GOV DRIVE SHAFT	4. Done	4. Maint	4. In compliance	1
5. VERIFY DIM. GOV DRIVE SHAFT	5.	5. Maint	5. Will not accomplish	3

**Remarks**

Q/R-5. This part was subject to numerous inspections as part of the quality revalidation following the endurance run. Inspection included visual, liquid penetrant, and materials test. The results of the visual tests indicated that there was no excessive wear in the bearing areas, no cracking at geometric discontinuities, no enlargement of taper pin holes or other signs of relative motion. Liquid penetrant tests were also satisfactory. Accordingly, it is believed that the shaft is behaving properly and that there is no need to measure shaft dimensions.

# Catawba Diesels-Owners Group DRQR Final Report Summary of Recommendations

Part No. 02-410C  
Part Name OVERSPEED TRIP:FLEXIBLE COUPLING  
Class A

DRQR Sequence

78

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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## Owners Group Design Review Status

None Required

## Maintenance Recommendations

1. REPLACE COUPLINGS/OUTAGE	1. PM-replace/5Y	1. Maint	1. Use current PM	3
2. VERIFY COUPLING IS TIGHT/OUT	2. PM-done during elast.replace	2. Maint	2. Use current PM	3

## Modification Recommendations

1. REPLACE COUP.& ACCOMP.SIM 363	1. Sim 363 done	1. Design	1. Will not replace couplings	3
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## Quality Revalidation Recommendations

None

## Remarks

MAINT-1&2. Experience on operating diesels indicates coupling spiders under prolonged exposure (15000 hrs) to hot oil (150F) become brittle and fail. The majority of the time, the Catawba diesels will be on standby. During standby the overspeed drive accessory gears will be sprayed by oil. However, since the engine is not running the coupling spider will not be splashed by the oil. Hence, under this service, the coupling spiders will be replaced and the couplings checked for tightness every 5 years.

MOD-1. SIM 363 deals with assuring that the drive couplings are mechanically tight on the shafts and provides a procedure for using loctite to assure that the coupling remains tight on the shaft. SIM 363 was done on diesel 1A as part of the QR. The equivalent of SIM 363 was done on diesels 1B,2A, and 2B as a 10CFR21 action. All engines had tight couplings on shafts that were not undersized. The OG recommendation requires removing the couplings examined under SIM 363, obtaining new couplings, and machining these couplings to a maximum interference of .0005 in. As we have already inspected the couplings per SIM 363, we will not replace the couplings.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-410D  
Part Name OVERSPEED TRIP:VENT VALVE  
Class A

DRQR Sequence

79

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. DISASS. AND REPLACE O-RING/5Y	1.	1. Maint	1. Add to PM	2
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Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No.	02-411A	DRQR Sequence	80
Part Name	GOVERNOR DRIVE GEAR AND SHAFT		
Class	A		

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. VIS INSP DRIVE GEAR&SHAFT/OUT	1.	1. Maint	1. Change PM to per 5Y	3
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Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

MAINT-1. These parts were inspected after the endurance run with no signs of distress. Accordingly, it is considered that the preventive maintenance schedule should be accomplished every 5 years.



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-411B  
Part Name GOVERNOR DRIVE COUPLING  
Class A

DRQR Sequence

81

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. REPLACE NEDPRENE INSERTS	1. Done	1. Maint	1. In compliance	1
2. CHECK COUP TIGHTNESS/OUTAGE	2. In compliance	2. Maint	2. In compliance	1
3. REPLACE INSERT/OUTAGE	3. In compliance	3. Maint	3. In compliance	1

Modification Recommendations

None

Quality Revalidation Recommendations

1. INSP COUPLING FOR DEGRADATION	1. Done	1. Maint	1. In compliance	1
2. VERIFY COUPLING MATERIAL	2. Acc to TDI-matl is neoprene	2. Maint	2. In compliance	1
3. VERIFY SET SCREWS/PINS-LOCKED	3. Done	3. Maint	3. In compliance	1

Remarks



**Catawba Diesels-Owners Group DRQR Final Report**  
**Summary of Recommendations**

Part No. 02-413A  
 Part Name GOVERNOR:LINKAGE  
 Class A

DRQR Sequence

82

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. INSPECT FOR LOOSE PARTS/MONTH	1. PM-done during outage	1. Maint	1. Use PM	3
2. LUBRICATE MONTHLY&PER OUTAGE	2. PM-done/6M and/outage	2. Maint	2. Use PM	3

Modification Recommendations

1. INST LOCK HARDWARE AS NEEDED	1.	1. Design	1. No need to date	1
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Quality Revalidation Recommendations

1. VERIFY LOCKTITE IS PRESENT	1. Done	1. Maint	1. In compliance	1
2. INSP LINKAGE FOR WEAR	2. Done	2. Maint	2. In compliance	1

Remarks

MAINT-1. No loose parts were found on either engine after the extended runs. Since vibration will cause parts to loosen, it is considered that this inspection should be accomplished at each outage where the engine will have about 50 hours of operation.

MAINT-2. On the inspection following the endurance run there were no signs of inadequate lubrication.

Duke Power preventive maintenance calls for lubrication every 6 months. As the part appears adequately lubricated with this interval the preventive maintenance schedule will not be changed.

**Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations**

Part No. 02-415A  
Part Name SPEED REGULATING GOVERNOR  
Class A

DRQR Sequence

83

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. VERIFY CORRECT SETTINGS/MONTH	1. Comply via tech spec testing	1. Maint	1. In compliance	1
2. VENT HYD. ACT. AFTER OIL ADDIT. AND MODIFY OIL REPL. PROC.	2. In PM	2. Maint	2. In compliance	1
3. VERIFY SPEED<484 RPM ON LOAD REJECTION DURING TESTING	3. Have demonstrated by test	3. Mnt/Lic	3. Requires tech spec change	1
4. REPLACE OIL/ALTERNATE OUTAGE	4. In compliance	4. Maint	4. In compliance	1
5. REFURBISH ACTUATOR/SY	5.	5. Maint	5. Will replace at 10 years	3

Modification Recommendations

None

Quality Revalidation Recommendations

1. ENSURE ALIGNMENT PROC ADEQUACY	1. Demo. by tech spec tests	1. Maint	1. In compliance	1
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Remarks

MAINT-5. This part has performed well in service and all inspections after the extended run of over 750 hours were within normal limits. In addition, technical specification tests of the engine monthly and at each outage will assure that the governor is controlling within specifications. Accordingly, it is intended to replace the governor every 10 years rather than refurbish it at 5 years.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-415B  
Part Name GOVERNOR BOOSTER SERVOMOTOR  
Class B

DRQR Sequence

84

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. CLEAN, INSP, REPLACE O RINGS PER 10Y	1. Not in PM	1. Maint	1. Add to PM or replace at 10Y	2
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Modification Recommendations

None

Quality Revalidation Recommendations

1. VERIFY MOUNT. IS BELOW GOV.	1. Done	1. Maint	1. In compliance	1
2. INLET LINE=3/8, OUTLET=1/4	2. Check	2. Maint	2. Verify compliance	2
3. OIL LINES SLOPE UP TO GOV.	3. Done	3. Maint	3. In compliance	1

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-415C  
Part Name GOVERNOR HEAT EXCHANGER ASSEMBLY  
Class A

DRQR Sequence

85

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. INSP AND CLEAN/10Y	1. Not in PM	1. Maint	1. Add to PM	2
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Modification Recommendations

None

Quality Revalidation Recommendations

1. VERIFY COOLER IS BELOW GOV.	1. Done	1. Maint	1. In compliance	1
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Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No.	02-695A	DRQR Sequence	86
Part Name	ENGINE SHUTDOWN TUBING AND FITTINGS		
Class	B		

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
<hr/>				
Owners Group Design Review Status				
<hr/>				
Completed				
Maintenance Recommendations				
<hr/>				
None				
Modification Recommendations				
<hr/>				
1. ADD SUPPORTS TO CONDUIT	1.	1. Design	1. Will do by 1st outage	2
Quality Revalidation Recommendations				
<hr/>				
1. LINE WALKDOWN	1. Done	1. Maint	1. In compliance	1
Remarks				

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No.	02-695B	DRQR Sequence	87
Part Name	ENGINE SHUTDOWN-VALVES, REGULATORS		
Class	A		

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

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None Required

Maintenance Recommendations

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1. INSP/CLEAN SHUTDOWN EQUIPMENT PER OUTAGE	1.	1. I&E	1. Add to I&E PM	2
2. REPLACE ELAST PARTS&GASKETS PRESS REG&VALVES PER " :"	2.	2. I&E	2. Will not accomplish	3

Modification Recommendations

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None

Quality Revalidation Recommendations

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None

Remarks

MAINT-2. The elastomeric parts will be replaced if required by functional testing. These tests consist of the 18 month technical specification testing and the calibration testing done per outage.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-695C  
Part Name ENGINE SHUTDOWN:TRIP SWITCHES  
Class A

DRQR Sequence

88

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. CHECK SET POINTS/OUTAGE	1. Per calibration tests	1. I&E	1. In compliance	1
2. REPLACE ELAST PARTS/SY	2.	2. I&E	2. Will not accomplish	3

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

MAINT-2. The elastomeric parts will be replaced if required by the 18 month technical specification testing or if required based on calibration which is done per outage.



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. CN-102  
Part Name JACKET WATER STDBY HEATER PUMP  
Class C

DRQR Sequence

89

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

# Catawba Diesels-Owners Group DRQR Final Report Summary of Recommendations

Part No. CN-120  
Part Name JACKET WATER HEAT EXCHANGER  
Class B

DRQR Sequence

90

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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## Owners Group Design Review Status

None Required

## Maintenance Recommendations

1. FLUSH/DAILY OR PROVIDE CONT. FLOW THROUGH HX	1. PM Complies	1. Maint	1. In compliance	1
2. INSP TUBES AND TUBESHT/OUTAGE	2. PM-ht.bal/out,corr insp/alt ot	2. Maint	2. Use current PM	3
3. INSPECT PACKING FOR LEAKS/DAY	3. PM complies	3. Maint	3. In compliance	1
4. RECORD OPERATING PARAMETERS/M AND-EVALUATE/OUTAGE	4. PM complies	4. Maint	4. In compliance	1

## Modification Recommendations

None

## Quality Revalidation Recommendations

None

## Remarks

The jacket water heat exchanger heat transfer surface is made of admiralty brass. The heat exchanger uses lake water on the shell side and jacket water on the tube side. The jacket water is treated with corrosion inhibitor. Historically, copper alloyed heat exchangers have not been a corrosion problem with lake water in the Duke Power Co. system. Hence, the probability of corrosion damage on both the shell and tube side is low. Accordingly, the tubes will be inspected for corrosion every alternate outage (about 3 years). Following the second corrosion inspection (at about 6 years) the time interval for corrosion inspection will be assessed. To check for fouling in the heat exchanger, a heat balance will be performed at each outage. This heat balance will be compared to base line data to ascertain whether the heat exchanger has to be opened for cleaning at the outage. (Rev.1)

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. CN-128  
Part Name JACKET WATER HEATER  
Class

DRQR Sequence

91

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. MEGGER TEST INSULATION/OUTAGE	1.	1. Maint	1. Will not accomplish	3
2. CLEAN HEATER ELEMENTS/OUTAGE	2.	2. Maint	2. Will not accomplish	3
3. CHECK THERMOSTAT CALIBRATION PER OUTAGE	3. PM Complies	3. Maint	3. In compliance	1

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

MAINT-1&2. The performance of this part is monitored daily by instrumentation. This part is easily replaceable within 72 hours and a spare is kept in stock. If poor performance warrants, this part will be replaced.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. CN-136/40  
Part Name THERMOSTATIC VALVE  
Class B

DRQR Sequence

92

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. INSPECT FOR LEAKS DAILY	1. PM complies	1. Maint	1. In compliance	1
2. REPLACE THERMAL POWER EL/3-5 Y	2.	2. Maint	2. Replacement based on perform.	3

Modification Recommendations

None

Quality Revalidation Recommendations

1. CHECK ORIENTATION OF VALVE	1. Done	1. Maint	1. In compliance	1
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Remarks

MAINT-2. The function of this part is monitored daily by instrumentation and the part will be replaced if found defective.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 00-700A DRQR Sequence  
Part Name JACKET WATER STDP:PIPE/FITTINGS  
Class B

93

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

1. INSTALL JACK.WTR.VENT LINES	1. Done	1. Maint	1. In compliance	1
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Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 00-700B  
Part Name JACKET WATER STANDPIPE: VALVES  
Class B

DRQR Sequence

94

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
<hr/>				
Owners Group Design Review Status				
<hr/>				
None Required				
Maintenance Recommendations				
<hr/>				
None				
Modification Recommendations				
<hr/>				
None				
Quality Revalidation Recommendations				
<hr/>				
None				
Remarks				

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 00-700C DRQR Sequence 95  
Part Name JACKET WATER STANDPIPE:SUPPORTS  
Class B

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 00-700E DRQR Sequence  
Part Name JACKET WATER STANDPIPE: SWITCHES  
Class B

96

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

## Catawba Diesels-Owners Group DRGR Final Report

### Summary of Recommendations

Part No. 00-700F  
Part Name JACKET WATER STANDPIPE: BOLTING  
Class A

### DRQR Sequence

97

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

### Maintenance Recommendations

None

### Modification Recommendations

None

### Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-316A  
Part Name JACKET WATER MANIFOLD ASSEMBLY  
Class B

DRQR Sequence

98

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

Completed

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

1. LINE WALKDOWN	1. Done	1. Maint	1. In compliance	1
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Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-317A  
Part Name JACKET WATER MANIFOLD: PIPING  
Class B

DRQR Sequence

99

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

Completed

Maintenance Recommendations

1. VIS INSP FOR LEAKS/MONTH	1. PM complies	1. Maint	1. In compliance	1
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Modification Recommendations

1. INSTALL DRESSER ELBOW/COUPLING	1.	1. Design	1. Under review	4
2. REINFORCE SUPPORTS	2.	2. Design	2. Under review	4

Quality Revalidation Recommendations

1. LINE WALKDOWN	1. Done	1. Maint	1. In compliance	1
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Remarks

MOD-1&2. The Owners Group recommendations will be reviewed with Duke Power Design personnel to determine Duke's action on this recommendation.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-425A  
Part Name JACKET WATER PUMP  
Class A

DRQR Sequence

100

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. CHECK KEY/KEYWAY INTERFACE	1.	1. Maint	1. Add to reassembly procedure	2
2. ENSURE TORQUE IS 120-660 FT-LB	2. Completed-1A,1B-1st outage	2. Maint	2. Add to reassembly procedure	2
3. CHECK GEAR FOR WEAR/OUTAGE	3.	3. Maint	3. Check at 10Y	3

Modification Recommendations

None

Quality Revalidation Recommendations

1. VERIFY HARDNESS/MATERIAL	1. Done	1. Maint	1. In compliance	1
2. INSP SHAFT FOR WEAR	2. Done	2. Maint	2. In compliance	1
3. INSP GEARS FOR WEAR	3. Done	3. Maint	3. In compliance	1
4. PT GEAR TEETH/TRANS AREA	4. Done	4. Maint	4. In compliance	1
5. INSP WEAR RING FOR EX.WEAR	5. Done	5. Maint	5. In compliance	1

Remarks

MAINT-3. This part performed well during the extended run and inspection of the gear and spline were within normal limits. In light of the results of the quality revalidation, inspections at an interval more frequent than every ten years are considered unnecessary.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-437A DRQR Sequence 101  
Part Name TURBO WATER PIPING PIPE/FITTINGS  
Class B

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-360A  
Part Name CYLINDER HEAD  
Class A

DRQR Sequence

102

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. BAR ENGINE OVER AFTER OPER.	1. PM complies	1. Maint	1. In compliance	1
2. INSP INJ PORT FOR WATER LEAKS DURING OPERATION	2. PM complies	2. Maint	2. In compliance	1
3. RECORD COLD COMPRESSION/OUTAGE	3. PM complies	3. Maint	3. In compliance	1

Modification Recommendations

None

Quality Revalidation Recommendations

1. PT VALVE SEATS	1. Done	1. Maint	1. In compliance	1
2. MT FIRE DECK AREA	2. Done by PT	2. Maint	2. PT is equiv to MT for fire dk	1
3. INSP FIRE DECK THICKNESS	3. Done	3. Maint	3. In compliance	1

Remarks



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No.	02-360B	DRQR Sequence	103
Part Name	INTAKE AND EXHAUST VALVES		
Class	B		

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

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None Required

Maintenance Recommendations

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1. INSP SUBCOVERS FOR SOOT/10Y	1.	1. Maint	1. Add to PM/outage when adj tapp	2
2. INSP. & MEASURE/10Y	2.	2. Maint	2. Add to PM	2

Modification Recommendations

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None

Quality Revalidation Recommendations

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1. INSP VALVE, RING AND STEMS	1. Done	1. Maint	1. In compliance	1
2. INSP FOR ADEQUATE SEATING	2. Done	2. Maint	2. In compliance	1
3. CHECK DIMNS OF VALVE TO GUIDE CLEARANCE	3. Done	3. Maint	3. In compliance	1
4. PT OF STEM HEAD RADIUS	4. Done	4. Maint	4. In compliance	1
5. VERIFY MATERIAL OF VALVES	5. Done	5. Maint	5. In compliance	1

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No.	02-360C	DRQR Sequence	104
Part Name	CYL HEAD BOLTING AND GASKETS		
Class	B		

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

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None Required

Maintenance Recommendations

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None

Modification Recommendations

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None

Quality Revalidation Recommendations

1. VERIFY GASKET INSTALLATION	1. Done	1. Maint	1. In compliance	1
2. INSP GASKET FOR DISTRESS	2. Cold comp checks verify adeq.	2. Maint	2. In compliance	1

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-360D  
Part Name VALVE SPRINGS  
Class A

DRQR Sequence

105

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

1. VERIFY CORRECT COLOR CODE	1. Done	1. Maint	1. In compliance	1
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Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-362A  
Part Name SUBCOVER ASSEMBLY  
Class B

DRQR Sequence

106

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. PT RA PEDESTAL WEBS/5 YRS	1. PM-samp 1st out & 100% at 10Y	1. Maint	1. Use current PM	3
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Modification Recommendations

None

Quality Revalidation Recommendations

1. INSP WEB AREAS FOR CRACKS	1. Done	1. Maint	1. In compliance	1
2. PT RA BOLT BOSS AREA	2. Done	2. Maint	2. In compliance	1

Remarks

MAINT-1. Cracks found on inspections after the extended runs did not impair engine performance. The cracks were found to be resultant of improper installation of the subcovers, and improved installation procedures should prevent further occurrence of this problem. In light of this information, it is intended to accomplish a sample inspection of the first refueling outage and all subcovers at 10 years.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-365A  
Part Name FUEL INJECTION PUMP  
Class A

DRQR Sequence

107

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. INSP 1 PUMP/ALT OUTAGE	1. PM complies	1. Maint	1. In compliance	1
2. CHECK BLEED SCREWS/OUTAGE	2. Will check 1 screw/alt outage	2. Maint	2. Will not accomplish OG recom.	3

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

MAINT-2. This part is subject to a general visual inspection during operation that will check for leakage from the bleed screws. This part performed well during the extended run and all inspections performed as part of the quality revalidation were within normal limits. In light of the above information, the bleed screw will be checked on the fuel injection pump disassembled every alternate outage.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-365B  
Part Name FUEL INJECTION TIPS  
Class A

DRQR Sequence

108

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. CHECK FOR LEAKAGE MONTHLY	1. PM complies	1. Maint	1. In compliance	1
2. INSPECT;CHECK PRESS;SPRAY PATTERN PER OUTAGE	2. PM complies	2. Maint	2. In compliance	1
3. REASSEMBLE PER SIM 108	3.	3. Maint	3. Verify in reassembly procedure 2	

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-365C  
Part Name FUEL INJECTION TUBING  
Class B

DRQR Sequence

109

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. INSP COMPRESSION FTTNGS/MONTH	1. PM complies	1. Maint	1. In compliance	1
2. INSP TUBING/MONTH	2. PM complies	2. Maint	2. In compliance	1

Modification Recommendations

None

Quality Revalidation Recommendations

1. ECT ID OF TUBING	1. Done	1. Maint	1. In compliance	1
2. INSP FOR LEAKAGE	2. Done	2. Maint	2. In compliance	1

Remarks



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-365D  
Part Name FUEL INJ TUBING:SUPPORTS  
Class B

DRQR Sequence

110

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status				
-----				
None Required				
Maintenance Recommendations				
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None				
Modification Recommendations				
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None				
Quality Revalidation Recommendations				
-----				
None				
Remarks				

**Catawba Diesels-Owner's Group DRQR Final Report  
Summary of Recommendations**

Part No.	02-371A/B	DRQR Sequence	111
Part Name	FUEL PUMP CONTROL SHAFT		
Class	A		

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

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None Required

Maintenance Recommendations

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1. INSP LUBE OIL CUPS MONTHLY	1. PM-lube/6M,check during oper	1. Maint	1. PM meets OG requirements	1
2. GREASE F.O. PUMP/OUTAGE	2. No grease fittings	2. Maint	2. N/A	1

Modification Recommendations

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None

Quality Revalidation Recommendations

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1. VERIFY SHAFT HARDNESS	1. Done	1. Maint	1. In compliance	1
2. INSP LINKAGE AND BEARINGS	2. Done	2. Maint	2. In compliance	1
3. VERIFY SITE LUBE SCHED TO SPEC	3. Done	3. Maint	3. In compliance	1

Remarks

MAINT-2. There are no grease fittings installed on the fuel pumps at the Catawba station.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-413B  
Part Name FUEL PUMP LINKAGE-AUTO SHUTDOWN  
Class B

DRQR Sequence

112

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. CHECK CYLINDER/OUTAGE	1.	1. Maint	1. Verify in PM	2
2. CHECK TAILROD VENT/OUTAGE	2.	2. Maint	2. Verify in PM	2

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-445  
Part Name FUEL OIL BOOSTER PUMP  
Class A

DRQR Sequence

113

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-4508

DRQR Sequence

114

Part Name FUEL OIL HEADER PIPING AND TUBING

Class A

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

1. REPLACE THREDOLET WITH TEE	1.	1. Design	1. Will incorporate by 1st outage 2
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Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No.	02-450D	DRQR Sequence	115
Part Name	FUEL OIL HEADER SUPPORTS		
Class	A		

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

Completed

Maintenance Recommendations

None

Modification Recommendations

1. ADD SUPPORTS/RESTRIANTS	1. Done	1. Design	1. In compliance	1
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Quality Revalidation Recommendations

1. LINE WALKDOWN	1. Done	1. Maint	1. In compliance	1
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Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-455A  
Part Name FUEL OIL FILTERS  
Class B

DRQR Sequence

116

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. REPLACE FILTER AT DP=20 PSI/M	1. PM complies	1. Maint	1. In compliance	1
2. INSP CANNISTER GASKETS/OUTAGE	2.	2. Maint	2. Insp during filter replacement	3
3. INSP TUBING/MONTH	3. PM complies	3. Maint	3. In compliance	1

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

MAINT-2. Filter replacement is based on differential pressure at which time gaskets are inspected or replaced. A general visual inspection for leakage is done during engine operation which will assure that the gaskets are not leaking.



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-455B  
Part Name FUEL OIL STRAINERS  
Class B

DRQR Sequence

117

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. CLEAN/REPLACE AT 5 PSID	1. PM complies	1. Maint	1. In compliance	1
2. RECORD DP/MONTH	2.	2. Maint	2. Verify on checklist	2
3. PURGE AIR AS REQUIRED	3. PM complies	3. Maint	3. In compliance	1

Modification Recommendations

1. INSTALL VENT PETCOCKS	1.	1. Design	1. Will comply by 1st outage	2
2. ENSURE PROPER BOLT TORQUE	2. Reassembly complies	2. Maint	2. In compliance	1

Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-455C DRQR Sequence 118  
Part Name FUEL OIL FILTER MOUNTING HARDWARE  
Class A

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-825D  
Part Name FUEL OIL DUPLEX STRAINER  
Class

DPQR Sequence

119

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. CN-115  
Part Name BATTERY CHARGER  
Class A

DRQR Sequence

120

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
-----------------------------	----------	-------------	-------------	--------

Owners Group Design Review Status

Completed

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

1. VERIFY AS-BUILT CONDITION	1.	1. Design	1. Will comply by 1st outage	2
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Remarks

# Catawba Diesels-Owners Group DRQR Final Report Summary of Recommendations

Part No. 02-500A DRQR Sequence 121  
Part Name CONTROL PANEL ASSEMBLY  
Class A

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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## Owners Group Design Review Status

None Required

## Maintenance Recommendations

1. INSP CABINET INTERIOR/OUTAGE	1. Not in PM	1. I&E	1. Add to PM	2
2. CHECK WIRING&TUBING/OUTAGE	2. Not in PM	2. I&E	2. Add to PM	2
3. CHECK CALIB OF THERMOSTAT/OUT	3. Calibrate/outage	3. I&E	3. In compliance	1
4. REPLACE FILTER & GASKET IN PRESSURE REGULATOR	4. Not in PM	4. I&E	4. Add to PM	2

## Modification Recommendations

None

## Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-500F  
Part Name CONTROL PANEL ACCUMULATOR  
Class A

DRQR Sequence

122

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

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None Required

Maintenance Recommendations

-----  
None

Modification Recommendations

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None

Quality Revalidation Recommendations

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None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No.	02-500G	DRQR Sequence	123
Part Name	CONTROL PANEL VALVES		
Class	A		

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. INSPECT/CLEAN SHUTDOWN EQUIP. PER OUTAGE	1.	1. I&E	1. Add to PM	2
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Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-500H  
Part Name CONTROL PANEL PRESSURE SWITCHES  
Class B

DRQR Sequence

124

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
<hr/>				
Owners Group Design Review Status				
<hr/>				
None Required				
Maintenance Recommendations				
<hr/>				
None				
Modification Recommendations				
<hr/>				
None				
Quality Revalidation Recommendations				
<hr/>				
None				
Remarks				

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-500J  
Part Name CONTROL PANEL RELAYS  
Class A

DRQR Sequence

125

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

Completed

Maintenance Recommendations

1. INSP WIRING AND CONTACTS/OUT	1.	1. I&E	1. Add to PM	2
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Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-500K DRQR Sequence 126  
Part Name CONTROL PANEL SOLENOID VALVES  
Class A

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

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None Required

Maintenance Recommendations

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None

Modification Recommendations

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None

Quality Revalidation Recommendations

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None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-500M DRQR Sequence 127  
Part Name CONTROL PANEL PIPING,TUBING,FITTING  
Class

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

None

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No.	02-500N	DRQR Sequence	128
Part Name	CONTROL PANEL TERMINAL BOARDS		
Class			

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

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None Required

Maintenance Recommendations

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1. INSP AND CLEAN/OUTAGE	1.	1. I&E	1. Add to PM	2
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Modification Recommendations

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None

Quality Revalidation Recommendations

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None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No.	02-550	DRQR Sequence	129
Part Name	FOUNDATION BOLTS AND ANCHORS		
Class	B		

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

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None Required

Maintenance Recommendations

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1. RETORQ BOLTS AFTER SHORT CIR.	1. Add to PM	1. Maint	1. Add to PM	2
2. INSPECT/OUTAGE	2. PM-Insp/10Y	2. Maint	2. Use PM	3

Modification Recommendations

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None

Quality Revalidation Recommendations

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None

Remarks

MAINT-2. The foundation was inspected after the extended run and was found in satisfactory condition. The crankcase web deflections taken per outage and general vibration monitoring taken at six months will demonstrate any abnormal conditions that will lead to damage to the foundation. For these reasons, inspections at a more frequent interval are considered unnecessary.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No.	02-385A	DRQR Sequence	130
Part Name	CRANKCASE RELIEF VALVE		
Class			

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. CLEAN FLAME ARRESTORS/OUTAGE	1.	1. Maint	1. Will accomplish/alt outage	3
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Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

MAINT-1. These parts were inspected after the extended run and found to be clean. The crankcase pressure is monitored during operation and any malfunction in this part will be easily detected. For the above reasons, more frequent inspections than every alternate outage are considered unnecessary. (Rev.1)



Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-355A  
Part Name CRANKSHAFT PUMP DRIVE GEAR  
Class A

DRQR Sequence

131

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. INSP CRANK TO PUMP GEAR/OUTAGE	1. PM/5Y	1. Maint	1. Use current PM	3
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Modification Recommendations

None

Quality Revalidation Recommendations

1. VERIFY HARDNESS	1. Done	1. Maint	1. In compliance	1
2. VERIFY MATERIAL	2. Done	2. Maint	2. In compliance	1
3. VISUALLY INSPECT GEAR	3. Done	3. Maint	3. In compliance	1

Remarks

MAINT-1. These parts performed well during the extended run and all inspections performed as part of the quality revalidation were satisfactory. As with the cam shafts gears (02 350C), it is considered that inspecting the crank case pump drive gear and idler gear assembly at five year intervals should suffice to forewarn of wear.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-355B  
Part Name IDLER GEAR ASSEMBLY  
Class A

DRQR Sequence

132

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. INSPECT IDLER GEARS/OUTAGE	1. PM/SY	1. Maint	1. Use current PM	3
2. INSPECT JW PUMP GEAR/OUTAGE	2. PM/SY	2. Maint	2. Use current PM	3

Modification Recommendations

None

Quality Revalidation Recommendations

1. VERIFY HARD IDLER GEARS	1. Done	1. Maint	1. In compliance	1
2. VERIFY MATL IDLER GEARS	2. Done	2. Maint	2. In compliance	1
3. VISUALLY INSPECT IDLER GEARS	3. Done	3. Maint	3. In compliance	1

Remarks

MAINT-1&2. These parts performed well during the extended run and all inspections performed as part of the quality revalidation were satisfactory. As with the cam shafts gears (02-350C), it is considered that inspecting the jacket water pump gear and the idler gear assembly at five year intervals should suffice to forewarn of wear.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-387A  
Part Name CRANKCASE VACUUM FAN  
Class

DRQR Sequence

133

Owners Group Recommendation	Comments	Resp. Group	Disposition	Status
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Owners Group Design Review Status

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None Required

Maintenance Recommendations

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1. CLEAN AND INSP FAN/ALT OUTAGE	1. Not Applicable	1. Maint	1. In compliance	1
2. CHECK BEARINGS/ALT OUTAGE	2. Not Applicable	2. Maint	2. In compliance	1

Modification Recommendations

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None

Quality Revalidation Recommendations

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None

Remarks

MAINT-1&2. This part is not installed on the TDI  
DSRV-16 diesels at Catawba.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No.	02-500C	DRQR Sequence	134
Part Name	CIRCUIT BREAKERS AND CONTACT BLOCKS		
Class			

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

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None Required

Maintenance Recommendations

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1. CHECK TERMINALS-CLEAN&TIGHT. PER OUTAGE	1.	1. I&E	1. Add to PM	2
2. INSP WIRING INSULATION/OUTAGE	2.	2. I&E	2. Add to PM	2
3. TRIP CHECK CIRC BREAK/OUTAGE	3. PM does per alt. outage	3. Trans	3. Use PM	3

Modification Recommendations

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None

Quality Revalidation Recommendations

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None

Remarks

MAINT-3. This component performed well during the extended run of the engine and with over 750 hours and over 120 start/stops. Accordingly, it is intended to accomplish the Duke Power preventive maintenance schedule which requires relay checks per outage and trip checks of the circuit breakers every alternate outage.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No.	02-525C	DRQR Sequence	135
Part Name	BARRING DEVICE AIR FILTER		
Class			

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. REPLACE FILTER/OUTAGE	1. Not Applicable	1. Maint	1. In compliance	1
2. DRAIN AIR FLTR/DAY DURING USE	2. Not Applicable	2. Maint	2. In compliance	1

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

MAINT-1&2. This part is not installed on the TDI  
DSRV-16 diesels at Catawba.

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. 02-835A  
Part Name AIR DRYERS AND MOISTURE TRAPS  
Class

DRQR Sequence

136

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. BLOW DOWN TRAP BOWLS/MONTH	1. PM complies	1. Maint	1. In compliance	1
2. INSP AND SERVICE MOISTURE TRAPS/OUTAGE	2.	2. Maint	2. Verify in PM	2
3. CHECK OPERATION OF DESSICANT DRYER/MONTH	3.	3. Maint	3. Verify in PM	2

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks

Catawba Diesels-Owners Group DRQR Final Report  
Summary of Recommendations

Part No. CN-112  
Part Name STARTING AIR STORAGE TANK  
Class

DRQR Sequence

137

Owners Group Recommendation	Comments	Resp.Group	Disposition	Status
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Owners Group Design Review Status

None Required

Maintenance Recommendations

1. DRAIN AIR RECEV. TRAPS DAILY AND MONITOR MOISTURE QUANTITY	1. PM complies	1. Maint	1. In compliance	1
2. CHECK CALIB START AIR TANK PRESSURE GAUGES/OUTAGE	2. PM complies	2. Maint	2. In compliance	1
3. CHECK CALIB START AIR TANK PRESSURE SWITCHES/OUTAGE	3. PM complies	3. Maint	3. In compliance	1

Modification Recommendations

None

Quality Revalidation Recommendations

None

Remarks



SUMMARY 10CFR21 REPORTS BY TDI  
FOR CATAWBA NUCLEAR STATION

	<u>DESCRIPTION</u>	<u>DUKE POWER REPORT TO NRC</u>	<u>COMMENTS</u>
102	9/19/80 RV Engine Link Rod Assembly Dowel Counterbore	Not reportable for either unit.	Inspected and verified. No problem exists with link rod assembly dowel counterbore.
103	12/16/80 R & RV Eng. Turbocharger Thrust Bearing Lubrication	SD 413-414/81-01 1/28/81	Installed modified turbo lube oil system.
106	11/5/81 R & RV Eng. Spherical Washer Piston Assembly	Not reportable for either unit.	Verified spherical washers at Catawba were correct.
108	12/9/81 R & RV Eng. Governor Lube Oil Cooler Assembly Location	Not reportable for either unit.	Verified lube oil cooler location was correct.
111	5/13/82 R & RV Eng. Starting Air Valve Assembly Fasteners	SD 413-414/82-14 7/23/82	Replaced fasteners per TDI recommendation.
112	6/23/82 R & RV Eng. Governor Drive Coupling Material	SD 413-414/82-20 10/8/82	Replaced couplings per TDI recommendations.
113	10/28/82 R & RV Eng. Piston Skirt Casting Improper Heat Treat	SD 413-414/82-26 1/17/83	Changed to improved design piston skirt. Installed in Unit 1; to be installed in Unit 2 by 9/1/85.
117	9/21/83 R & RV Eng. Engine Mounted Fuel Oil Line	Not reportable.	Installed fuel oil line supports per TDI recommendation.

SUMMARY 10CFR21 REPORTS BY TDI  
FOR CATAWBA NUCLEAR STATION

	<u>DESCRIPTION</u>	<u>DUKE POWER REPORT TO NRC</u>	<u>COMMENTS</u>
118	9/27/83 R & RV Eng. Engine Mounted Electrical Cables	Not reportable.	New cables ordered & installed per recommendation by TDI.
120	1/9/84 R & RV Eng. Overspeed Governor & Fuel Transfer Pump Drive	SD 413-414/84-03 3/23/84	Inspected and verified correct.
121	2/15/84 R & RV Eng. Turbocharger Thrust Bearing Lubrication	SD 413-414/84-05 4/26/84	Installed modified turbo lube oil system.
123	7/13/84 R & RV Eng. Valve Spring Failure	Not reportable for either unit.	No recommended action from TDI.
124	7/13/84 R & RV Eng. High Pressure Fuel Injection Pump	Not reportable for either unit.	One pump replaced. Verified Catawba pumps are acceptable by inspection.
126	10/2/84 R & RV Eng. Engine Fuel Control Shaft - Pinning	Not reportable for either unit.	Verified fuel oil control shaft pinning is acceptable.
127	1/22/85 R & RV Eng. Air Filter - Engine Control Panel Bowl	Not reportable for either unit.	Verified bowls were acceptable.
128	3/12/85 R & RV Eng. Starting Air System Check Valve - Clow	Not reportable for Unit 1. SD 414/85-05 5/17/85	Inspected Unit 2 Engines and Unit 1 1A - No indication of failure or damage. Unit 2B to be inspected at first refueling outage.

SUMMARY 10CFR21 REPORTS BY TDI  
FOR CATAWBA NUCLEAR STATION

<u>DESCRIPTION</u>	<u>DUKE POWER REPORT TO NRC</u>	<u>COMMENTS</u>
129 3/18/85 R & RV Eng. Crankshaft Oil Plugs Wall Thickness	Not reportable for either unit.	Inspected and verified no failure or damage.
130 5/17/85 R & RV Eng. Switchgear Over- heating	Not reportable for either.	No problems with panels at Catawba, but have installed fans per TDI Recommendation.