

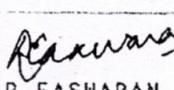
BHARAT HEAVY ELECTRICALS LIMITED  
TIRUCHIRAPALLI - 620 014

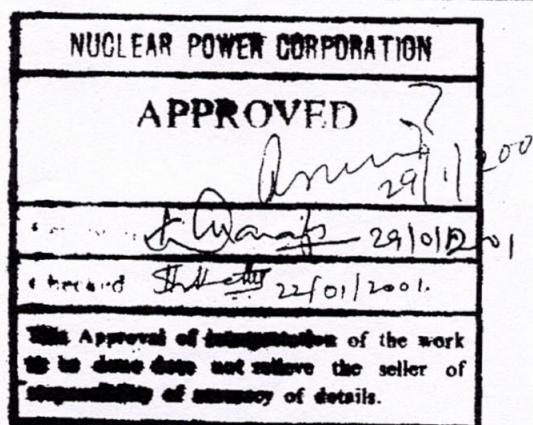
## PLANT LABORATORY

PR:CHEM:07-23/00

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NUCLEAR PROJECTS/NPC  
PROCEDURE FOR CLEANING OF TUBE INTERIOR SURFACE  
AFTER TUBE EXPANSION

REV	DATE	PREPARED	REVIEWED	APPROVED BY
00	25-06-99	 A. SUNDARAKARAJU	 M. SOMU	 R. EASWARAN
				BHEL
				NPC



## Revisions

Rev.No.	Clause Revised	Details
00	--	Generalised procedure on the subject matter for all NPC components irrespective of project/contract, based on earlier contract specific procedures.

**1.0 SCOPE:**

1.1 The following procedure details the methods for removing the excess lubricant which remain on the interior surface of the tubes, after tube expansion.

**2.0 FACILITIES:**

2.1 Two storage tanks made of Stainless Steel material with controlled heating facility (one for cleaning chemical and other for DM water).

2.2 Approved cleaning chemical, Maxiclin-2SP (a proprietary alkaline degreasing chemical of M/s. Plasti-peel Chemicals & Plastics Pvt. Ltd., Bombay) or equivalent after approval by Plant Laboratory.

2.3 The quality of DM water shall be checked before use and shall meet the following requirements:

pH - 6.5 - 7.5

Chloride - Less than 1 ppm

Conductivity - Less than 10 microsiemen/cm.

2.4 SS rods wound with lint free cotton cloth.

2.5 Filter paper strips and Phenolphthalein indicator.

2.6 Ensure that all tubes are plugged at a prefixed distance from the tube end as given in the OPS.

2.7 Position the tube sheet in a slanting level (preferably 30° from horizontal) so that the cleaning chemical and water do not go beyond the plugs.

2.8 Lance and pump set up shall also be used wherever feasible, for cleaning operation.

**3.0 CLEANING WITH ALKALINE DEGREASER:**

3.1 In the first tank, prepare the cleaning chemical solution. The concentration of the bath shall be about 5% W/V.

3.2 The temperature of the bath during the entire operation shall be maintained between 50°C and 55°C.

3.3 The cleaning shall be done either by dipping the SS rods, wound with clean cotton cloth in the hot cleaning chemical and traversing it, to and fro into the tubes without hitting the plug fixed inside the tube or by jetting the chemical into the tubes, using lance and pump set up.

3.4 Fresh cotton cloths shall be used every time.

3.5 Random checks on the tube ends shall show no oil spotting on the filter paper/tissue paper.

4.0 **RINSING WITH DM WATER:**

4.1 The second tank shall be used for heating DM water. The temperature of the water shall be maintained between 50°C and 55°C throughout the rinsing operation.

4.2 After completion of cleaning operation with alkaline degreaser, DM water rinsing shall be carried out.

4.3 The rinsing shall be done either by dipping the SS rods, wound with clean cotton cloth in the hot DM water and traversing it, to and fro into the tubes without hitting the plug fixed inside the tube or by jetting water into the tubes.

4.4 Fresh cotton cloths shall be used every time.

4.5 The rinsing operation shall be stopped when the collection of latest washing does not show pink colour with phenolphthalein indicator.

5.0 **INSPECTION:**

5.1 Plant Laboratory shall make random checks on tube ends for complete removal of lubricant ( freedom from oil spots).

5.2 After inspection, all tube ends shall be closed with plastic plugs.