Purpose:
In this work, a H&N IMRT QA plan was created and then utilized as the benchmark to monitor all subsequent IMRT processes. This benchmark plan is delivered as a consistency check on the same day when a Patient Specific QA (PSQA) fails the passing criteria. The establishment of such an QA benchmark allows to determine whether the failure of a PSQA is due to the TPS or MLC performance.

Methods:
A changeling QA plan was generated as benchmark for a 7-beam IMRT for H&N cancer in Pinnacle TPS. Prior to benchmarking of this QA case, the accelerator is serviced to ensure MLC positioning accuracy and output calibration. The composite dose distribution of the benchmark plan was measured with IMRTrix® and then compared with the fluence map generated from TPS. This plan is delivered to check the consistency of imrt process whenever a PSQA fails the passing criteria.

Results:
For the baseline measurement, the point dose discrepancy was found to be 2.5% and Gamma passing rate was 97.3% and is then setup as our benchmark for IMRT process consistency check. 74 PSQA have been analyzed since the establishment of the benchmark. Seven cases failed the passing criteria, the benchmark plan was delivered to check the system consistency. Of the two cases, the benchmark case passed, thus required replanning. For the other five cases, the benchmark was substantially lower than the initial passing rate, thus the MLC performance may cause the failure and required MLC recalibration.

Conclusions:
We have established a benchmark QA plan for consistency check of IMRT process. The IMRT consistency check can be performed as a periodic QA check (monthly QA), after MLC recalibration or whenever a PSQA failure occurs. This will help to maintain the best performance of IMRT process.