An operational approach for better management of chromium has been made. Studies on the various aspects of the approach like uptake of chromium, thermal stability of wet blue, chromium discharges in the post tanning operations, surface characteristics have lead to following major findings.

* Two stage tanning system is effective in reducing the chromium discharge levels in the waste streams to an extent of 85-90%. This system by linking the waste streams of tannage, to pickling affords effective management of chromium.

* Nearly 92-95% of chromium offered can be gainfully employed in this method. This is made possible by effecting direct reuse of spent tan liquors for tanning in the place of BCS. Such reuse leads to significant cost reduction in chrome tanning process.

* Being an equilibrated tannage, the new system permits pulsed basification without affecting uniformity of distribution and hence offers possibility for producing better quality leathers adopting relatively less process control measures.
* Adoption of this system for tanning helps in reduction of chromium discharges in the post tanning operations to an extent of 26-44%.

* This system can be implemented, without calling for any modifications, in the existing production systems.

* Recycling (10 cycles) studies indicate no significant changes in quality aspects of the leathers which were substantiated by the chemical analysis, surface potential and colour intensity measurements apart from physical assessment of leathers. The unaltered reaction mechanisms between chromium and collagen in the new approach when compared to conventional tanning has also been established by the isoelectric point determination studies.

* Results of thermal analysis indicate possibility to use lower chromium inputs to achieve the required thermal stability of 100° C for wet blue.

* The direct economic benefit through material savings in the form of BCS alone is about 30% for ten cycles of production.

* The two stage tanning can be extended to rechrome tanning also with significant benefits.

In the new approach, the sectional waste stream concentration has been significantly reduced to the levels of 40-60 ppm of Cr₂O₃, compared to the levels of 4000 to 5000 ppm in the conventional system. Such low chromium concentrations afford increased possibility for development of a cost effective treatment system. This can be carried out by mixing the
sectional stream of the new tanning system with other waste streams of leather processing to meet the permissible level of chromium discharges in effluents. Such low chromium concentration also facilitate adoption of effective sludge management systems. The studies indicate that by adopting the operational system suggested, chrome tanning can be made into an eco acceptable tanning system with additional economic benefits.