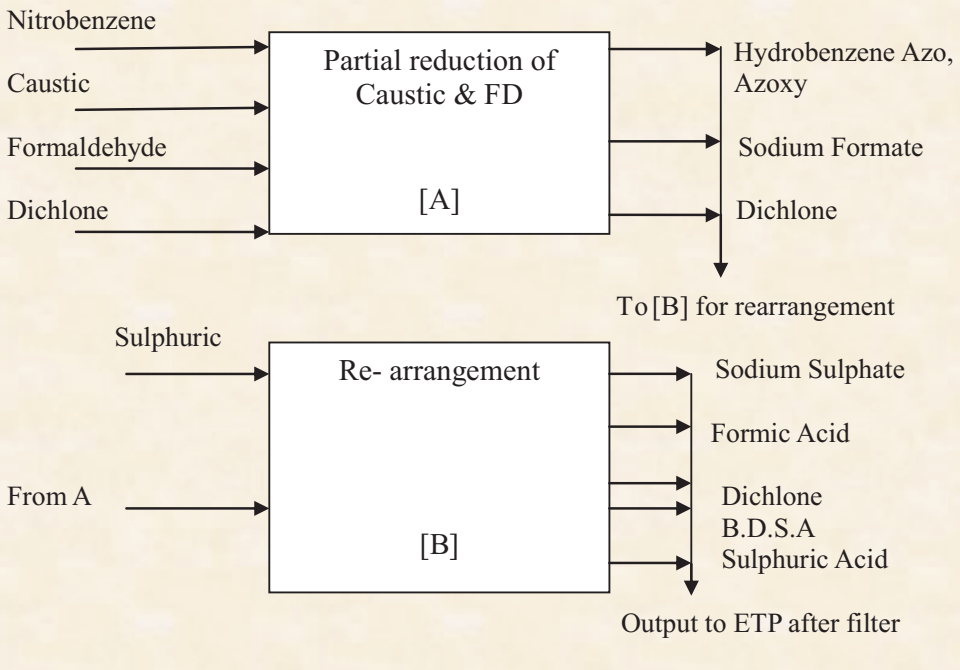
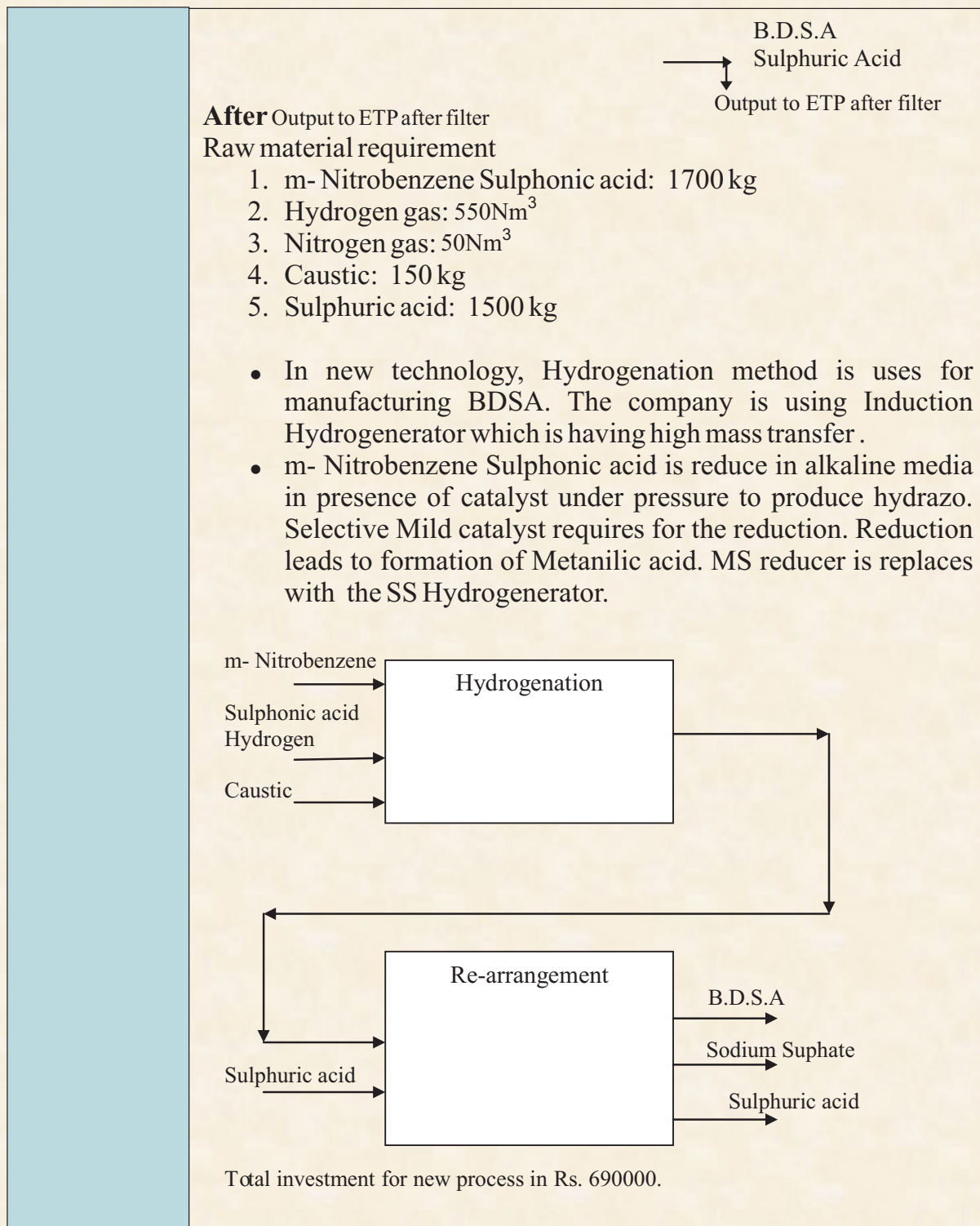


Intervening Technology/Technique	Partial Reduction replaced with Hydrogenation Method
About the Industry	M/s. Sahyog enterprise located at the GIDC Vatva, Gujarat. Company engaged in manufacturing of the dyes intermediate.
Implemented Techniques/Technology	<p>Before</p> <p>Raw material Requirement:</p> <ol style="list-style-type: none"> 1. m- Nitrobenzene Sulphonic acid: 2000 kg 2. Caustic: 1200 kg 3. Dichlone Catalyst: 20 kg 4. Formaldehyde: 2500 kg 5. Sulphuric acid: 3000 kg <ul style="list-style-type: none"> • m-Nitrobenzene sulphonic acid was reduced by caustic and formaldehyde in a MS reducer. Caustic and formaldehyde reacted together and produce Hydrogen. Requirement of Caustic and formaldehyde was about 25% excess than theoretical requirement. Dichlone used as catalyst convert the Hydrogen to nascent Hydrogen. Reaction of hydrogen was on surface of reactor. Sodium formate formed during reaction has salting effect on Hydrazo. This process proceeds slowly via intermediate product Azo, Azoxy and Hydrobenzene of nitrobenzene. Hydrobenzene of nitrobenzene was rearranged for BDSA by Benzidine Rearrangement. Reaction mass was in slurry. This reaction takes almost 48 Hrs For completion. The alkaline slurry was difficult to cool.  <pre> graph LR subgraph A [Partial reduction of Caustic & FD [A]] direction TB N1[Nitrobenzene] --> A C1[Caustic] --> A F1[Formaldehyde] --> A D1[Dichlone] --> A A --> H[Hydrobenzene Azo, Azoxy] A --> S[Na Formate] A --> D2[Dichlone] end D2 --> B[To [B] for rearrangement] subgraph B [Re-arrangement [B]] direction TB S2[Sulphuric] --> B A2[From A] --> B B --> SS[Sodium Sulphate] B --> FA[Formic Acid] B --> D3[Dichlone] B --> BDSA[B.D.S.A] B --> SA[Sulphuric Acid] end SA --> ETP[Output to ETP after filter] </pre>





Benefits	Before CP	After CP												
	<table border="1"> <tr> <td>Reaction time Hrs</td> <td>72</td> </tr> <tr> <td>HP connected</td> <td>15</td> </tr> <tr> <td>Approx Unit</td> <td>700</td> </tr> </table>	Reaction time Hrs	72	HP connected	15	Approx Unit	700	<table border="1"> <tr> <td>Reaction time Hrs</td> <td>8</td> </tr> <tr> <td>HP connected</td> <td>25</td> </tr> <tr> <td>Approx Unit</td> <td>250</td> </tr> </table>	Reaction time Hrs	8	HP connected	25	Approx Unit	250
	Reaction time Hrs	72												
	HP connected	15												
	Approx Unit	700												
Reaction time Hrs	8													
HP connected	25													
Approx Unit	250													
<ul style="list-style-type: none"> • Intermediate Formation of Azo, Azoxy.National Resources. 	<ul style="list-style-type: none"> • Reaction time is reduces by 60 hrs & 450 kw saving per MT of product. Saving in raw material per MT of Product: 1. M-Nitrobenzene: 300 kg. 2. Caustic: 1050 kg 3. Formaldehyde: 2500 kg. 4. Diclone: 20 kg. 													
<ul style="list-style-type: none"> • Intermediate Formation of Azo, Azoxy.National Resources. 	<ul style="list-style-type: none"> • There is no Intermediate formation, directly Hydrazo is produce. Savings of National Resources. 													
<ul style="list-style-type: none"> • Caustic requirement was high. Re- Arrangement reaction was carried out at high temperature. • Raw material quantity was high. 	<ul style="list-style-type: none"> • Caustic requirement is low. Sulphuric acid is also save here. The Re- arrangement reaction is carrying out at low temperature. Installing a chilling plant of 50TR. About 70Hp power which uses during chilling is save by 4Hr. saving in power about 225units per MT of product. • Savings in Raw material. • Saving in energy consumption 675kW per MT. 													
Environmental	<ul style="list-style-type: none"> • Formaldehyde was used which result in that formic acid increases, COD by 30000mg/l. • Sodium sulphate contributes to high TDS about 100000mg/l. 	<ul style="list-style-type: none"> • Formaldehyde is not used so, formic acid is not forms due to which COD reduces by 30000mg / lit. • Effluent quality improves. • Water requirement per MT of water is reduced by 5000lit. • TDS reduced by more than 100000mg/lit. 												

