A. M/s. Rayalaseema Hi-Strength Hypo Limited (Unit-I), Kurnool District is engaged in manufacture of Sulphuric Acid and its downstream products such as Chloro Sulphuric Acid, Oleum, Calcium Hypochlorite and bleaching powder etc.

B. The Board issued CFO&HWA to the industry (Unit-I) on 03.09.2015 with validity upto 31.03.2020 for manufacturing of Sulphuric Acid - 4500 TPM and stipulated a condition in Schedule-B that, the industry is permitted to use the lagoons for a period of 02 years and shall dismantle them after commissioning of the product recovery system.

C. The Board vide Task Force order dated 24.09.2018, issued a direction to the industry that “the industry shall expeditiously empty the lagoons and shall dismantle the same by 05.08.2019”.

D. The industry vide letter dated 24.07.2019 submitted a representation to the Board to extend the permission to retain the existing lagoons for further period of one year from 05.08.2019 i.e. upto 05.08.2020 as the implementation and commissioning of alternative technologies to recover chemicals from High TDS effluents will take 8 – 10 months time.

E. As per request of the industry, the officials of RO: Kurnool inspected the industry on 08.08.2019 and submitted the details as follows:

1. M/s. Rayalaseema Hi-Strength Hypo Limited (Unit-I) is located at Sy.No.16,17,23,67 & 68, Gondiparla (V), Kurnool (M), Kurnool District and is engaged in manufacture of Calcium Hypochlorite, Sulphuric Acid etc., Unit – II is Hydrogen bottling Unit, Unit – III is stable Bleaching Powder unit, Unit – IV is Sodium Hydrate, Sodium Meth-Oxide and Power Plant of 9 MW. All these units area located within a vicinity of about 0.5 Kms (max).

2. The group industries generate high TDS effluents i.e. Lean Sodium Chloride solution of about 199 KLD from Unit – I and their sister units Unit – III, Unit – IV & Power Plant and details of generation are as follows:

<table>
<thead>
<tr>
<th>S. No</th>
<th>Name &amp; Address of the Unit</th>
<th>Permitted Quantity of high TDS effluents as per Consent Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>M/s Sree Rayalaseema Hi-Strength Hypo Limited, (Unit-I)</td>
<td>138</td>
</tr>
<tr>
<td>2.</td>
<td>M/s Sree Rayalaseema Hi-Strength Hypo Limited, (Unit-III)</td>
<td>04</td>
</tr>
<tr>
<td>3.</td>
<td>M/s Sree Rayalaseema Hi-Strength Hypo Limited, (Unit-IV)</td>
<td>07</td>
</tr>
<tr>
<td>4.</td>
<td>M/s Sree Rayalaseema Hi-Strength Hypo Limited, (Power Plant)</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>Total effluent generation</td>
<td>199 KLD</td>
</tr>
</tbody>
</table>

F. Treatment Facilities:

5. The industry is disposing the High TDS effluents in their existing ETP consisting of treatment units

(i) collection tank (02 No’s of capacity 100 KL each),
(ii) Settling tank (02 No’s of capacity 200 KL each),
(iii)pumping tank (01 No of capacity 50 KL each),
(iv)De-chlorination plant of capacity – 10m³/hr,
(v) Stripper & Multiple Effect Evaporator of capacity – 10m³/hr followed by Agitated thin film drier (ATFD) of capacity 250 Kgs/hr.

6. The condensate from MEE and ATFD is being used for cooling tower makeup. The resultant salts are disposed to the secured land fill facility of their sister concern unit M/s Rayalaseema Alkalies and Allied Chemicals Limited (M/s SRAAC).

7. The Board permitted to store the effluents in lagoons. There are 16 no’s of lagoons having an average depth of about 0.5 to 0.6 mtrs and surface area of about 38,000 m² all together with a total storage capacity of 20,000KL. These lagoons are at a distance of about 0.8 Kms from the unit and the waste water is being pumped from their units to the lagoons through closed conveyance system.

8. The Board vide order dated 24.09.2018, issued a direction to the industry, directing that “the industry shall expeditiously empty the lagoons and shall dismantle the same by 05.08.2019”.

9. To implement the directions issued by the Board, the industry made all efforts to recycle the High TD effluents through pre-treatment and MEE followed by ATFD. Inspite of all the efforts due to frequent choking of evaporators tubes they are forced to stop the Plant for tube cleaning purposes, during this period the effluents are being accumulated for which they forced to store in the existing lagoons.

10. To avoid storage of high TDS effluents in the lagoons, the industry obtained CFE vide order dated 05.05.2017 to recover the products from high TDS effluents. They developed new process for the recovery of Wet Calcium Sulphate and Sodium chloride lean from the High TDS effluents for which they installed

i) 02 No’s of Double stage SO₂ Scrubbers for preparation of Calcium Sulphite Slurry by Scrubbing the SO₂ gas with Calcium hydroxide in stoichiometric ratio.

ii) MS Rubber lined Storage tank of capacity 20 KL for the storage of Calcium sulphite solution.

Recovery Process:

11. The calcium sulphite slurry is being reacted with High TDS effluents containing chlorine in Mixer tank of capacity 5 KL to form Calcium sulphate and calcium chloride. The slurry of calcium sulphate and calcium chloride is mixed with sodium sulphate in clarifier of size 6 mtrs dia and 3 mtrs height to precipitate calcium chloride. The underflow of the clarifier is taken to centrifuge/belt press filter for recovery of Wet calcium sulphate and the overflow of the clarifier Sodium chloride lean brine in MSRL Storage tanks.

12. The Board while issuing CFE for recovery of products from high TDS effluents conditioned the mode of the final disposal as “The recovered wet Calcium phosphate shall be disposed to Cement manufacturing industries as a raw material and generated lean sodium chloride solution shall be treated in the MEE followed by ATFD as permitted in the CFO orders of Unit-I, Unit-III, Unit-IV and power plants, till further orders”.

13. Further, the industry submitted a representation to Board, seeking following amendments to the CFE order dated 05.05.2017:

i) Wet Calcium Sulphate instead of Wet Calcium phosphate mentioned in the condition No.2 of schedule B (at mode of final disposal).

ii) Requested to allow them to transport lean sodium chloride to their own salt manufacturing unit located at Machilipatnam area of Krishna District instead of disposing in their existing MEE followed by ATFD as their MEE is frequently choking due to salt accumulation.

14. The above issue was reviewed in the CFE Committee meeting, Board Office, Vijayawada held on 07.02.2018. As per the minutes of the meeting “the industry permitted to dispose the Calcium Sulphate to cement industries. However, transportation of the Sodium Chloride lean to the salt manufacturing units located in coastal area is not permitted for which the industry requested for amendment”.

15. As the request of the industry to transport lean sodium chloride brine is not considered they worked out alternative technologies to recover chemicals from High TDS effluents. For that they entrusted work to M/s. National Chemical Laboratory, Pune. As per the industry’s representation the status of alternative technologies to recover the products from high TDS effluents is as follows:
i) M/s. National Chemical Laboratory, Pune made a detailed study about the method of recovery of calcium chloride and sodium chloride and submitted a detailed report for implementation of the scheme.

ii) The report submitted by M/s. National Chemical Laboratory, Pune has been forwarded to M/s. Chem process, Ahmadabad for pilot plant studies. During the pilot plant studies, they have experienced the difficulties in separation of calcium chloride and sodium chloride as per the process given by M/s. National Chemical Laboratory, Pune.

iii) To overcome the problems the M/s. Chem process conducted further experiments in their pilot plant by evaporating high TDS effluent twice in their double effect evaporator for effective separation of sodium chloride and leaving the calcium chloride based on the solubility.

iv) Based on pilot trial they designed commercial scale plant and submitted offer with a guarantee of recovered products quality suitable for commercial use.

v) As per the revised technical proposal the high TDS effluents will be processed through multiple effect evaporation. At the fourth and sixth effect evaporator sodium chloride is crystallized in the crystallizer and collected in salt box. The high TDS effluent leaving 4th effect evaporator contains 25 – 30 % calcium chloride and 5 – 6% sodium chloride. This will be further processed in 2nd stage double effect evaporator to further concentrate to separate crystallized sodium chloride in 6th effect evaporator salt box. The salt collected in boxes will be further centrifuged and the centrifuged sodium chloride in sent to chloro alkali plant. The mother liquor from the centrifuge will be further processed in dryer along with concentrated calcium chloride from 6th effector and to make calcium chloride product.

16. On 24.07.2019, the industry submitted a representation to the AP Pollution Control Board to extend the permission to retain the existing lagoons for further period of one year from 05.08.2019 i.e., upto 05.08.2020 as the implementation and commissioning of above proposal will take 8 – 10 months time. On enquiry the industry representative informed that, “after commissioning the new proposal there will not be any storage of high TDS effluent in the lagoons”.

HO Remarks:

1. The Board directed to dismantle the lagoons after commissioning product recovery system by 03.09.2017 vide CFO&HWA order dated 03.09.2015.

2. However, the industry has not complied with the above mentioned CFO condition and the Board directed the industry to empty the existing lagoons and dismantle the same by 05.08.2019 vide Task Force directions dated 24.09.2018.

3. Again the industry has not complied the task Force direction dated 24.09.2018 and now requesting to extend the permission to retain the existing lagoons for a period of 05.08.2020, stating that commissioning of alternative technologies to recover chemicals from HTDS effluents may take 8-10 months time.

4. But the industry has not submitted time bound program to commission the said implementation of alternative technology to recover chemicals from HTDS effluents.

The issue is placed before CFO Committee for Review and Recommendations

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Prepared by V. Hanumantha Rao, AEE (OS)