Obra thermal power station is a 1000 MW plant with five units of 200 MW each (see Table 1: Compliance deadlines for units in Obra thermal power station). It is operated by UPRVUNL. The plant is situated in the critically polluted area of Singarauli – Sonbhadra, where moratorium on expansion or establishment of new project prevailed. It sources coal from nearby NCL coal mines and water from Rihand dam.

Data Quality- CEMS data is not available. Lab results show that the sulphur dioxide emissions are within the norms, but based on coal quality data, CSE stoichiometrically estimates emissions to be around 1600 mg/N. cu.m. But, the lab reported sulphur dioxide emissions in the range of 500-700 mg/N. cu.m. As both PM and SO$_2$ emissions are at a staggering level, such low levels of NO$_x$ emission (300 – 400 mg/N. cu.m) is highly unlikely. The plant has operated over 30 years. CSE suggests two options as it is a pit-head station:

- The plant can be run as back-up. However, it will have to ensure that all necessary control technologies are in place; or
- The plant can consider early retirement by 2022. The 2x660 MW Obra C is expected to be synchronized by December 2020. This could be used as an opportunity to retire units 9 to 13.

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**Table 1: Compliance deadlines for units in Obra thermal power station**

<table>
<thead>
<tr>
<th>Unit No.</th>
<th>Capacity in MW</th>
<th>Commissioning Year</th>
<th>Compliance deadline</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>200</td>
<td>1980</td>
<td>Jul 2022</td>
</tr>
<tr>
<td>10</td>
<td>200</td>
<td>1979</td>
<td>Sep 2022</td>
</tr>
<tr>
<td>11</td>
<td>200</td>
<td>1977</td>
<td>Dec 2022</td>
</tr>
</tbody>
</table>

Source: Central Electricity Authority, 2019

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**EMISSIONS AND SUGGESTED TECHNOLOGY**

- **Particulate matter**: The plant violates limits of particulate matter emissions (see Table2: Particulate Matter emissions in Obra thermal power station). Unit 12 and 13 are committed to up-grading their ESPs along with the R&M. Minor up-gradations will be required in units 9 to 11.
CURRENT STATUS

- Re-tender for pre award consultancy services/feasibility study has been floated on 25.02.2019

ACTION PLAN

- CSE has prepared unit-wise action plan for all three pollutants. The action plan is based on deadlines given under Section 5 notices sent by the Central Pollution Control Board in December, 2017, which were also submitted to the Supreme Court. In turn, the deadlines were based on the Phase-in Plan prepared by the CEA and the Regional Power Committees.

- The Action plan has been based on discussions with industry experts and manufacturers on time taken for various stages. We have converted the major project processes/stages into key milestones that can be used by PCB officials to track progress.

- A fair share of activities has been presumed to have already been undertaken. Below stage of work completion is required to meet the norms.

Table 2: Particulate Matter emissions in Obra thermal power station
All the units require up-gradation

<table>
<thead>
<tr>
<th>Unit No.</th>
<th>CEMS</th>
<th>Lab</th>
<th>Norm</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>NA</td>
<td>114</td>
<td>100</td>
</tr>
<tr>
<td>10</td>
<td>NA</td>
<td>112</td>
<td>100</td>
</tr>
<tr>
<td>11</td>
<td>NA</td>
<td>112</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Centre for Science and Environment, 2019

- Sulphur di oxide: Lab results show that the emissions are within the norms, but CSE based on coal quality data, stoichiometrically estimates emissions around 1600 mg/N.cu.m, which is one-third reported by the independent lab (see Table 3: Sulphur Dioxide emissions in Obra thermal power station). The plant will require installation of dry sorbent injection technology (DSI) to meet the norms.

Table 3: Sulphur Dioxide emissions in Obra thermal power station
All the units require up-gradation

<table>
<thead>
<tr>
<th>Unit No.</th>
<th>CEMS</th>
<th>Lab</th>
<th>CSE’s estimate</th>
<th>Norm</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>NA</td>
<td>598</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>NA</td>
<td>580</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>NA</td>
<td>608</td>
<td>600</td>
<td></td>
</tr>
</tbody>
</table>

Source: Centre for Science and Environment, 2019

- Oxides of nitrogen: According to lab data, the plant complies with the oxides of nitrogen limit (see Table 4: Oxides of nitrogen emissions in Obra thermal power station), but CSE opines, that since PM and SO\textsubscript{2} emissions are at a staggering level. There is a probability that NO\textsubscript{x} emissions are beyond the limit as well. Since these units have old boilers, low-NO\textsubscript{x} burners and over-fire air systems needs to be installed to meet the norms.

Table 4: Oxides of nitrogen emissions in Obra thermal power station
Such low emissions are not possible

<table>
<thead>
<tr>
<th>Unit No.</th>
<th>CEMS</th>
<th>Lab</th>
<th>Norm</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>NA</td>
<td>344</td>
<td>600</td>
</tr>
<tr>
<td>10</td>
<td>NA</td>
<td>335</td>
<td>600</td>
</tr>
<tr>
<td>11</td>
<td>NA</td>
<td>327</td>
<td>600</td>
</tr>
</tbody>
</table>

Source: Centre for Science and Environment, 2019
Unit 12 (200 MW)

- Particulate matter control
- Sulphur dioxide control

- Critical

- Sep-19
  - Ensure tender was awarded
  - Ensure tender was floated

- Dec-19
  - Collect details of Vendor negotiation

- 2020
  - Mar-20
    - Collect final documents of basic engineering
    - Collect details of Vendor negotiation
  - Jun-20
    - Collect final documents of detailed engineering
    - Collect details detail engineering
  - Sep-20
    - Check status of equipment delivery
    - Site mobilisation
  - Dec-20
    - Site mobilisation
    - Civil foundation – initiation

- 2021
  - Mar-21
    - Dismantling of existing equipment
    - Civil foundation – final stages

- 2022
  - Jun-21
    - Erection of new equipment

  - Mar-22
    - PG test initiation
    - PG test initiation
  - Jun-22
    - Collect documents on PG test performance
    - Collect documents on PG test performance
  - Dec-21
    - Collect documents on trial run performance
    - Collect documents on trial run performance

- 2023
  - Apr-21
    - Erection of new equipment
    - Erection of new equipment
  - Apr-22
    - PG test initiation
    - PG test initiation
  - Jan-22
    - Collect documents on PG test performance
    - Collect documents on PG test performance
  - Oct-21
    - Collect documents on trial run performance
    - Collect documents on trial run performance
  - Jul-21
    - Trial run initiation
    - Trial run initiation

Unit 13 (200 MW)

- Jan-22
  - PG test initiation
  - PG test initiation

- 2022
  - Apr-22
    - Collect documents on PG test performance
    - Collect documents on PG test performance

- 2023
  - Apr-21
    - Erection of new equipment
    - Erection of new equipment

Disclaimer – The analysis/timelines mentioned in this document for preparing action plan has been made based on the inputs provided by various technology suppliers.