

| <b>DOCKETED</b>         |                                                                                |
|-------------------------|--------------------------------------------------------------------------------|
| <b>Docket Number:</b>   | 21-AFC-01                                                                      |
| <b>Project Title:</b>   | Pecho Energy Storage Center                                                    |
| <b>TN #:</b>            | 240712-25                                                                      |
| <b>Document Title:</b>  | Pecho Energy Center's Application for Certification -<br>Psychometric Analysis |
| <b>Description:</b>     | N/A                                                                            |
| <b>Filer:</b>           | Chester Hong                                                                   |
| <b>Organization:</b>    | Golder                                                                         |
| <b>Submitter Role:</b>  | Applicant Consultant                                                           |
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| <b>Docketed Date:</b>   | 11/23/2021                                                                     |

## Appendix 5.13B - Psychrometric Analysis for Decompressed Air Discharge

The potential for formation of a visible water vapor plume can be analyzed using standard Psychrometric charts. A tangent line is drawn to intersect the saturation curve at the lowest expected ambient temperature (20° F) on a low temperature psychrometric chart. Reference points 1 and 2 are chosen to allow the same tangent line to be drawn on a standard temperature psychrometric chart. It is not possible for a visible water vapor plume to form for any air exhaust condition (defined by a combination of exit temperature and absolute humidity) that is below the tangent line to the saturation curve.

During the power generation cycle, cavern-stored air will be decompressed across multiple turbine stages. As the air decompresses, it will cool significantly and the majority of water vapor in the air will condensed and recycled for process use. After multiple stages of decompression, the air discharge through the stack will be nearly completely dry, with expected water vapor content of less than 0.1 percent by volume (equal to an absolute humidity of approximately 0.0006 pounds per pound of dry air) and an exhaust temperature of approximately 66° F. This exhaust condition is plotted on the standard temperature chart and labelled as point A. Since the anticipated air exhaust condition is well below the tangent line to the saturation curve, it is not possible for a visible water vapor plume to form under any condition.



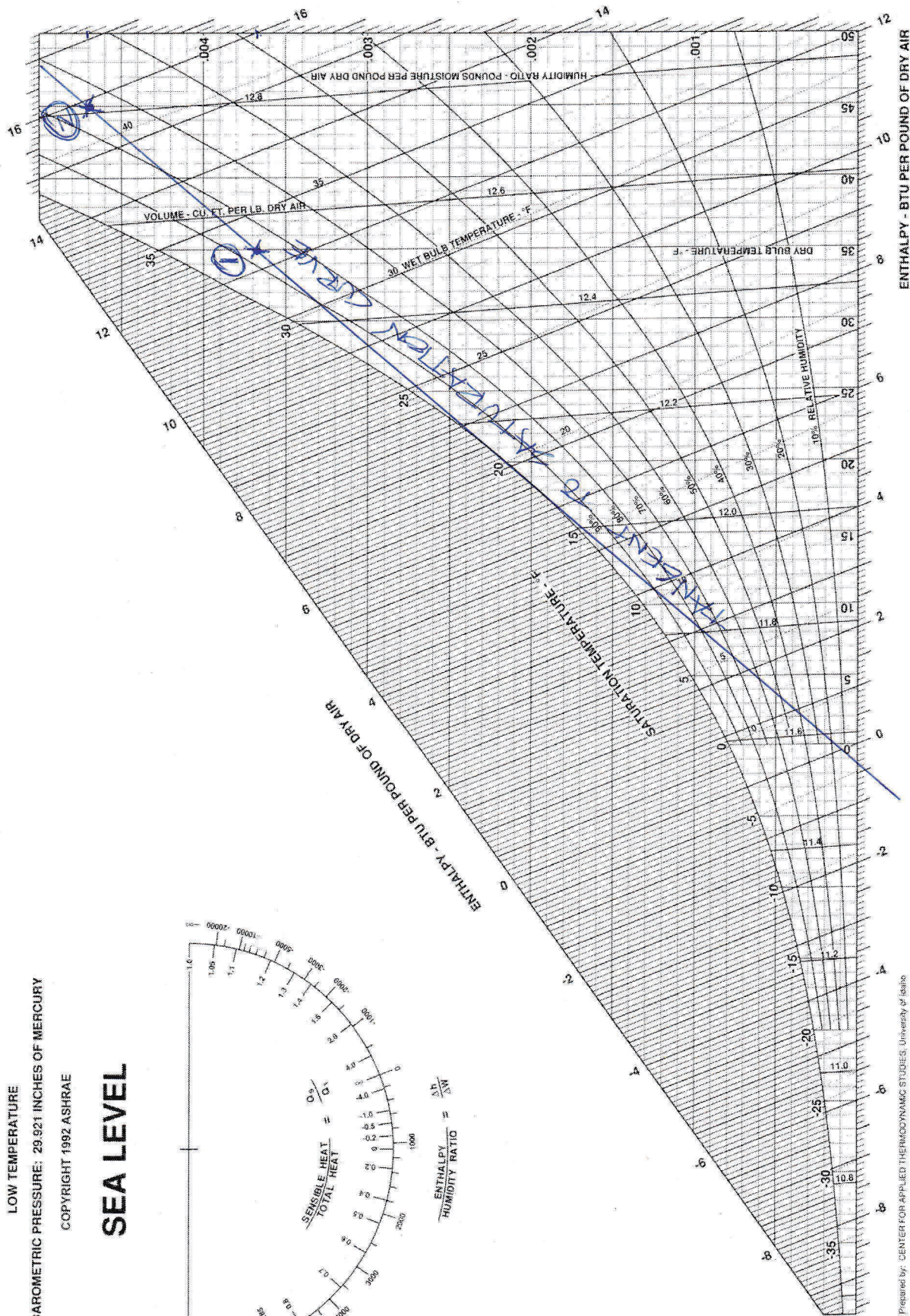
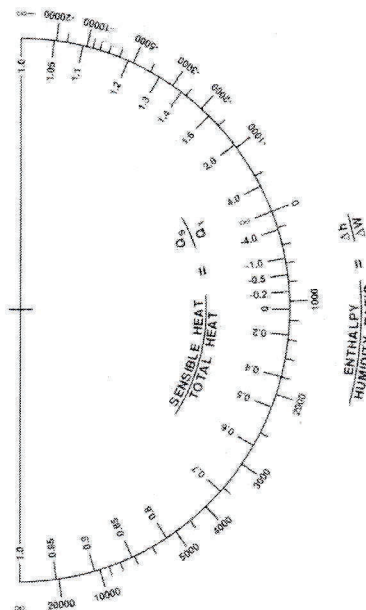
# ASHRAE PSYCHROMETRIC CHART NO. 2

LOW TEMPERATURE

BAROMETRIC PRESSURE: 29.921 INCHES OF MERCURY

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SEA LEVEL



Prepared by: CENTER FOR APPLIED THERMODYNAMIC STUDIES, University of Idaho

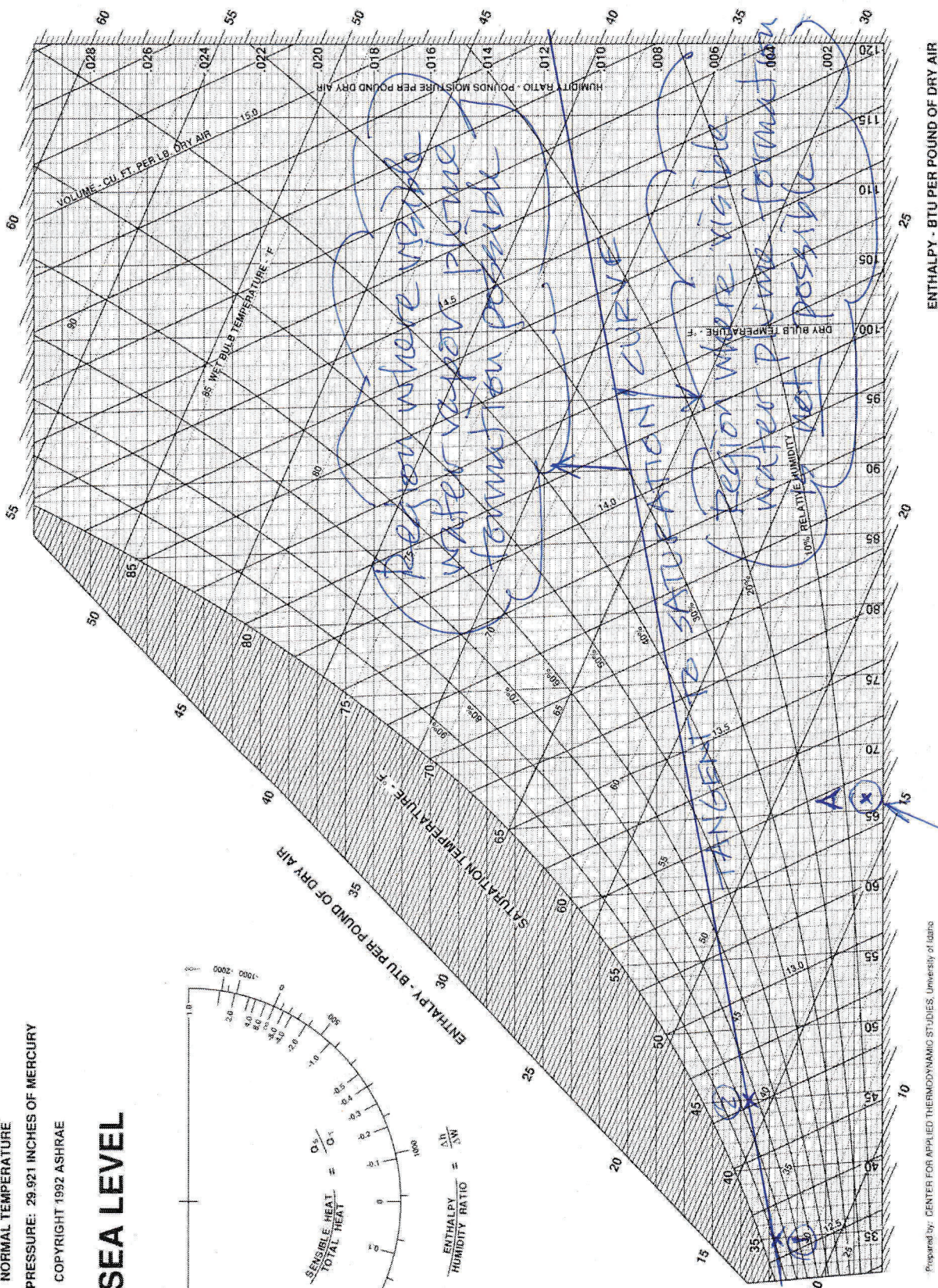
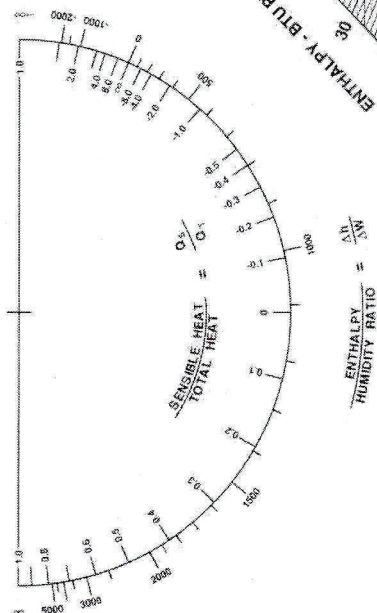


NORMAL TEMPERATURE

**BAROMETRIC PRESSURE: 29.921 INCHES OF MERCURY**

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# SEA LEVEL



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ENTHALPY - BTU PER POUND OF DRY AIR

## Pedro Exhaust Conditions