



2018 April Case Study

Flexible Expansion and Assurance of Supply – Onsite N2 Plants

Long Term Supply Agreements – Enabler or Constraint?

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Case Study Introduction

Broadcom's fab expansion projects over the last 5 years have required infrastructure and capacity expansion while 2 fabs continued to operate on the same site.

Economics and Broadcom's Colorado location favor self sufficiency and on site generation of it's high purity bulk Nitrogen.

Case Study Challenge

A pre-existing air separation unit was in place and operating under a long term agreement with Air Products.

Broadcom needed to more than double it's Nitrogen generating capacity without interrupting service to it's existing wafer fabs.

Extremely limited space available for construction and operation of new N2 plants.



Case Study Approach

Market research for competitive options.

Collaboration with Air Products to consider options including a larger replacement plant, multiple plants and / or trucked in Liquid for contingency.

Contract extension negotiation to cover the proposed options.

Case Study Results

The Long Term Agreement limited the options and timing to work with other suppliers.

The established working relationship facilitated a creative solution, adding an additional plant, in a restricted space, while continuing to operate the original plant.

The two plant combination provides a degree of parallel redundancy and reduces the impact of a plant failure so that trucked in liquid can keep up during an outage.



Case Study Critical Success Factors

Nitrogen supply could not be interrupted during the expansion.

Back up Nitrogen supply must be practically available in an extended outage.

(Northern CO is relatively remote for sustained trucking of large volumes of Liquid N2)

Schedule must match aggressive expansion.

Case Study Lessons Learned

LTA's can create Inertia which can constrain commercial options.

A long term, collaborative, relationship can facilitate successful growth.

In spite of numerous constraints, no supply interruptions occurred.



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