



Nitrogen Fertilizer Manufacturing Out of Thin Air Almost

Presented by:
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NAEHSS

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Terra Industries Inc.
Verdigris, OK

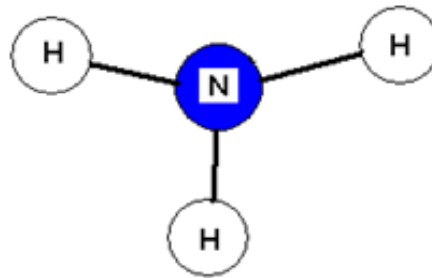


Terra Industries Inc.
Yazoo City, MS

The Ammonia Process

- Ammonia is the building block for all nitrogen fertilizer
- One Nitrogen atom is bonded to three Hydrogen atoms

Ammonia = NH₃



- The feedstocks necessary to make ammonia are very simple – natural gas and air

Natural gas



Air



carbon dioxide



The Ammonia Process

- The ammonia process is not so simple – it involves high pressure, high temperature, seven different catalytic reactions



(Ammonia Plant)



(Control Room)

- And a great deal of complicated equipment and instrumentation

The Ammonium Nitrate Process

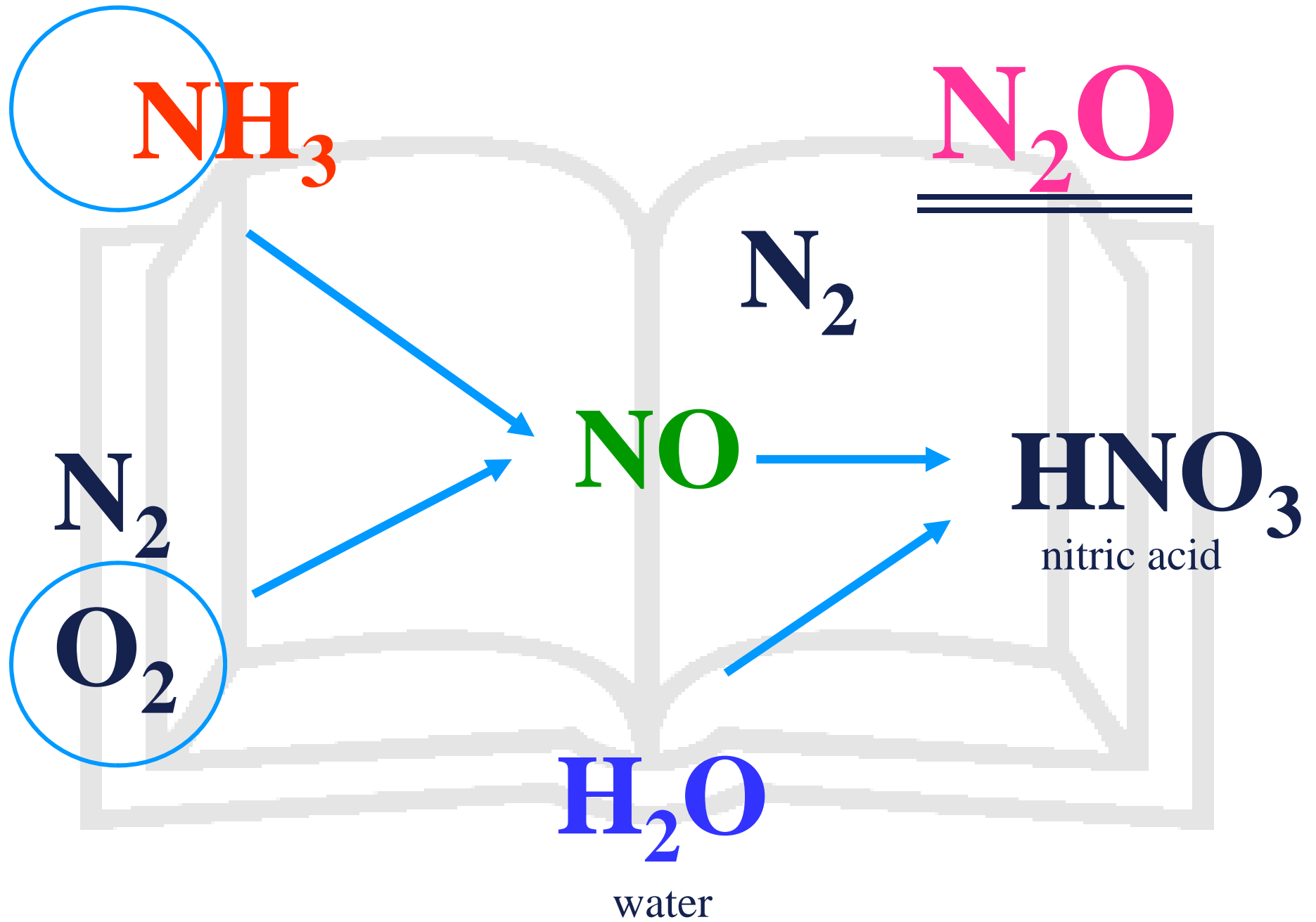
- First you need to make nitric acid



(Converter)

(Absorber)





The Ammonium Nitrate Process

- Then you react nitric acid with ammonia in a neutralizer



(AN Neutralizer)



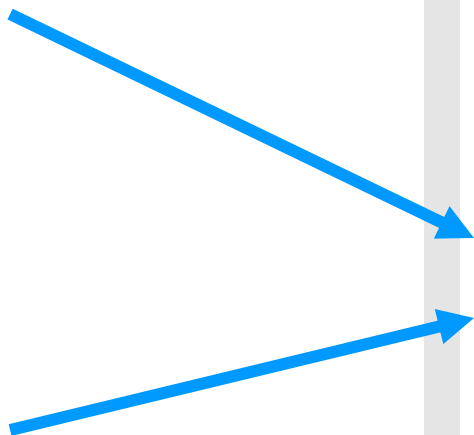
ammonia



Ammonium nitrate



nitric acid

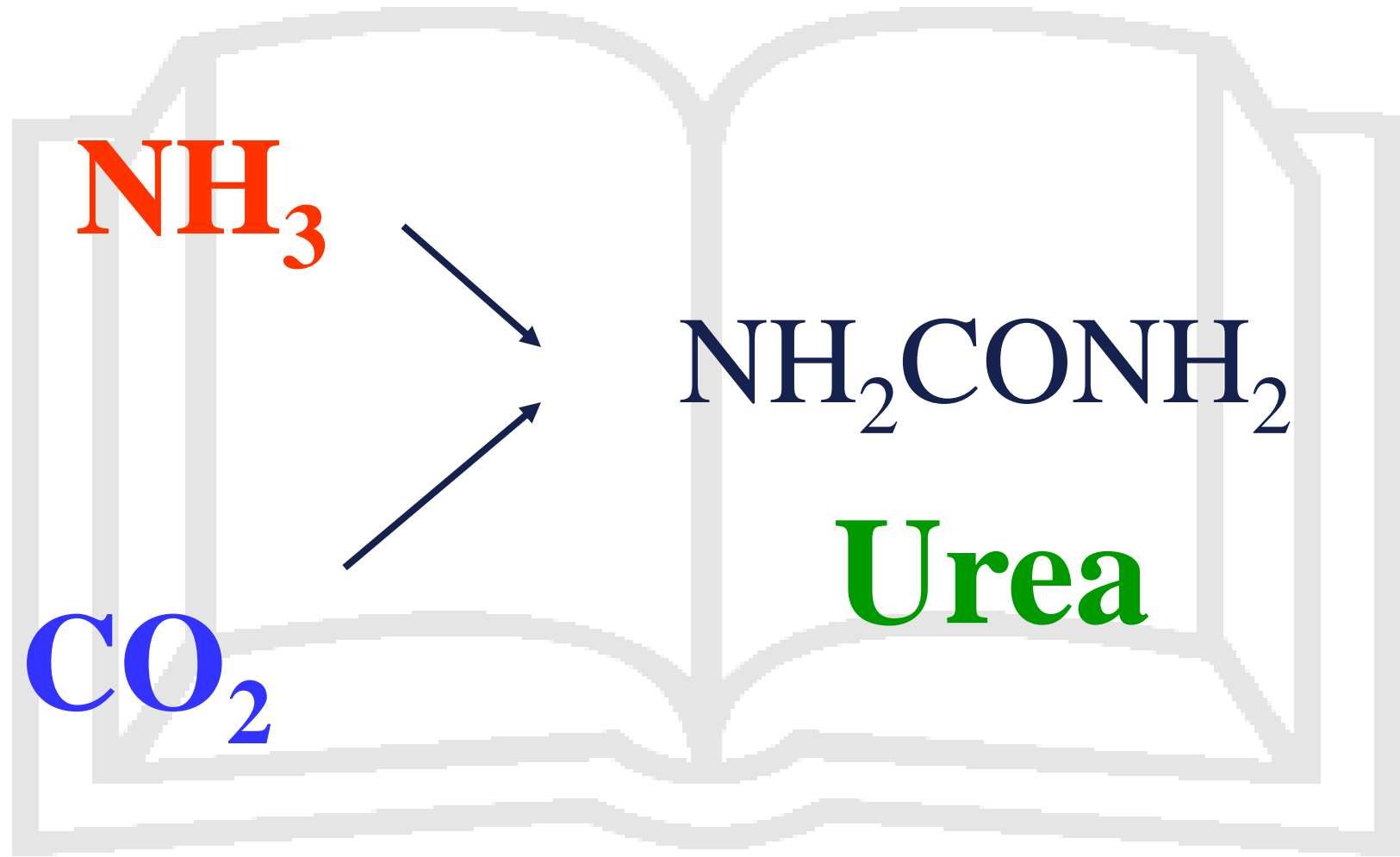


The Urea Manufacturing Process

- Urea is made by reacting ammonia and carbon dioxide from the ammonia process under high temperature and pressure



(Urea Synthesis Section)



The UAN Manufacturing Process

- Both urea and ammonium nitrate are first manufactured as solutions (78% - 87% strength)
- Mixed to make UAN
- 28% - 32% N

(UAN Plant)



The Solid Fertilizer Manufacturing Process

- Both urea and ammonium nitrate can also be concentrated and dried under controlled conditions to make granular urea or prilled ammonium nitrate



(Urea Granulation Plant)

(AN Prill Plant)



Contact Information

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QUESTIONS?