

thermal decomposition of limestone, by-product of sodium phosphate or directly from carbon dioxide springs.<sup>87</sup> The most common of these ways are a by-product of the steam-hydrogen reformer (Appendix T) that is used in the manufacturing of ammonia, gasoline, etc.<sup>88</sup> After, the by-product is obtained cooled with refrigerant coolants, purified using patented methods, and condensed to the liquid stage by machines exerting enormous pressure on it.<sup>89</sup> The carbon dioxide product is then sorted in insulated storage vessels until it is distributed to the PepsiCo. manufacturing plant by ways of high-pressure insulated cylinders, low-pressure liquid in rail tank cars, or dry ice in insulated boxes in the the back of boxcars.<sup>90</sup>

The main artificial sugar sucralose in Pepsi starts off as the sugar as sucrose but does not end up a sugar, but in fact a chemical.<sup>91</sup> Sucrose comes from beets, cane, or maple trees. Companies buy huge amounts of beets, cane, and maple sap to extract the sugar from them. Once inside the factory beets and cane are placed in huge quantities with a compressor squeezing the juice out of them.<sup>92</sup> Personal then place the juice in large pans with limes to neutralize the acids at relatively low temperatures.<sup>93</sup> After the water evaporates, a brown sugar forms and is then treated with animal charcoal to remove impurities and keep what

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<sup>87</sup> Carbon Dioxide, answers.com, <<http://www.answers.com/carbon%20dioxide>> April 9, 2009.

<sup>88</sup> On-site Steam Reforming, HyFleet.Cute, <<http://www.global-hydrogen-bus-platform.com/Technology/HydrogenProduction/reforming>> April 9, 2009.

<sup>89</sup> Carbon Dioxide, answers.com, <<http://www.answers.com/carbon%20dioxide>> April 9, 2009.

<sup>90</sup> Carbon Dioxide, answers.com, <<http://www.answers.com/carbon%20dioxide>> April 9, 2009.

<sup>91</sup> Columbia Encyclopedia. *The Columbia Electronic Encyclopedia, Sixth Edition* Copyright © 2003, Columbia University Press. Licensed from Columbia University Press. [www.cc.columbia.edu/cu/cup/](http://www.cc.columbia.edu/cu/cup/) April 9, 2009. April 9, 2009.

<sup>92</sup> Columbia Encyclopedia. *The Columbia Electronic Encyclopedia, Sixth Edition* Copyright © 2003, Columbia University Press. Licensed from Columbia University Press. [www.cc.columbia.edu/cu/cup/](http://www.cc.columbia.edu/cu/cup/) April 9, 2009. April 9, 2009.

<sup>93</sup> Columbia Encyclopedia. *The Columbia Electronic Encyclopedia, Sixth Edition* Copyright © 2003, Columbia University Press. Licensed from Columbia University Press. [www.cc.columbia.edu/cu/cup/](http://www.cc.columbia.edu/cu/cup/) April 9, 2009. April 9, 2009.

everyone knows sugar to be, crystal clear, and then recrystallized.<sup>94</sup> Sugar is transferred using rail cars and then transferred to silos in the manufacturing plant.<sup>95</sup>

### Environmental Aspects

Recycling aluminum and PET bottles are significant ways of going green. Recycled aluminum cans use 95% less energy to make than new aluminum cans.<sup>96</sup> 66% of the United States aluminum cans start the recycling process by consumers who drop off the cans at recycling centers, special trashcans, or can drives.<sup>97</sup> Recycling centers then make these cans compact by making them into 30 pound briquettes or 1,200 pound bales of hay and then ship it to aluminum companies for remelting.<sup>98</sup> Once inside the factory, the aluminum is again melted with the lacquered and ink printed on the cans burning off due to the high temperatures. Then workers pour the molten aluminum into 25 foot long ingots, which in turn are fed into rolling mills, which roll the aluminum from 20 inches thick all the way down to sheets 1/100<sup>th</sup> of an inch thick.<sup>99</sup> This whole cycle takes approximately 60 days to complete and then it starts all over again!<sup>100</sup>

<sup>94</sup> Columbia Encyclopedia. *The Columbia Electronic Encyclopedia, Sixth Edition* Copyright © 2003, Columbia University Press. Licensed from Columbia University Press. [www.cc.columbia.edu/cu/cup/](http://www.cc.columbia.edu/cu/cup/) April 9, 2009. April 9, 2009.

<sup>95</sup> Columbia Encyclopedia. *The Columbia Electronic Encyclopedia, Sixth Edition* Copyright © 2003, Columbia University Press. Licensed from Columbia University Press. [www.cc.columbia.edu/cu/cup/](http://www.cc.columbia.edu/cu/cup/) April 9, 2009. April 9, 2009.

<sup>96</sup> How is an Aluminum Can Recycled, Earth911, <http://earth911.com/metal/aluminum-can/how-is-an-aluminum-can-recycled/> April 9, 2009.

<sup>97</sup> How is an Aluminum Can Recycled, Earth911, <http://earth911.com/metal/aluminum-can/how-is-an-aluminum-can-recycled/> April 9, 2009.

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<sup>99</sup> How is an Aluminum Can Recycled, Earth911, <http://earth911.com/metal/aluminum-can/how-is-an-aluminum-can-recycled/> April 9, 2009.

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Plastics again start off the same way aluminum cans do and are baled into 800 to 1,400 pound of PETE bottles.<sup>101</sup> Bales are shipped to “reclaiming companies” where a bale breaker shreds the plastic and then washes and dries them.<sup>102</sup> After this the plastic is melted, with impurities melting off the top because of the high temperatures. This kind of plastic can be used to make recycled PETE bottles or into thread-like materials that can keep you warm.<sup>103</sup>

### Conclusion

This project has me interested in the business world of managing all these manufacturing steps. When I heard Research and Development, I never could understand how companies could spend millions of dollars researching and developing how to make something as simple as canned ham or yogurt. As I started my project, I didn't realize there were so many steps to making something everyone regards as simple: A can of Pepsi. Each ingredient must be manufactured by an individual or subsidiary company and each ingredient consists of many steps. I am thankful to people who started the automated process, such as Henry Ford's assembly line<sup>104</sup>, because without it “stuff” wouldn't line the supermarket walls and items would be much more expensive to purchase.

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<sup>101</sup> How Plastic Bottles are Recycled, Earth911,  
<<http://earth911.com/plastic/plastic-bottles/how-plastic-bottles-are-recycled/>> April 9, 2009.

<sup>102</sup> How Plastic Bottles are Recycled, Earth911,  
<<http://earth911.com/plastic/plastic-bottles/how-plastic-bottles-are-recycled/>> April 9, 2009.

<sup>103</sup> How Plastic Bottles are Recycled, Earth911,  
<<http://earth911.com/plastic/plastic-bottles/how-plastic-bottles-are-recycled/>> April 9, 2009.

<sup>104</sup> Henry Ford (1863-1947), about.com,  
<<http://inventors.about.com/od/fstartinventors/a/HenryFord.htm>> April 9, 2009.



Now when I look at things, I always wonder how much time and labor needs to be spent to make things that used to be regarded in simplicity to me. I now see things in parts, and wonder how they were made. I first started this project, thinking it might like an episode of “Unwrapped” on Food Network, but I have found that researching Pepsi takes long amounts of time and information is not easy to find. Although I hadn't thought I would learn from this project, I ended up learning about the connections (Appendix U) between the various subsidiaries and companies, ecologically what happens to our waste, and most of all, to appreciate how “stuff” lines our shelves every day.

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## Appendix

### Appendix A



<http://www.countymarketplaza.com/dev/images/CrowdedCheckoutLanes72.jpg>

### Appendix B



[http://farm1.static.flickr.com/94/212945263\\_35b5a66119.jpg](http://farm1.static.flickr.com/94/212945263_35b5a66119.jpg)

## Appendix C



<http://www.matts-place.com/intermodal/part4/matu6854580.jpg>

## Appendix D



[http://www.indiamart.com/shrutiengineers/pcat-gifs/products-small/milk-silo\\_10481055.jpg](http://www.indiamart.com/shrutiengineers/pcat-gifs/products-small/milk-silo_10481055.jpg)

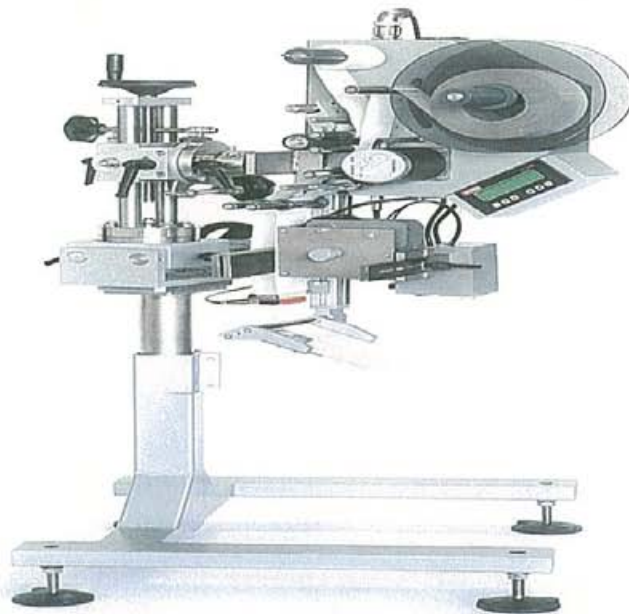


## Appendix E



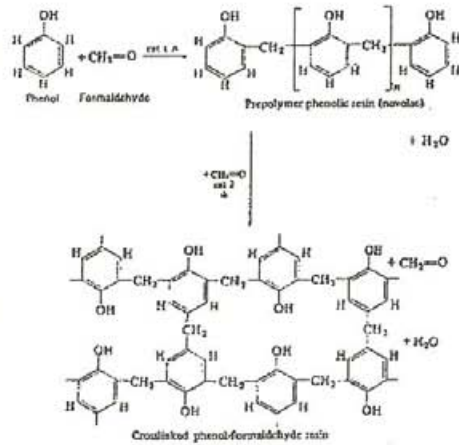
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## Appendix F



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## Appendix G



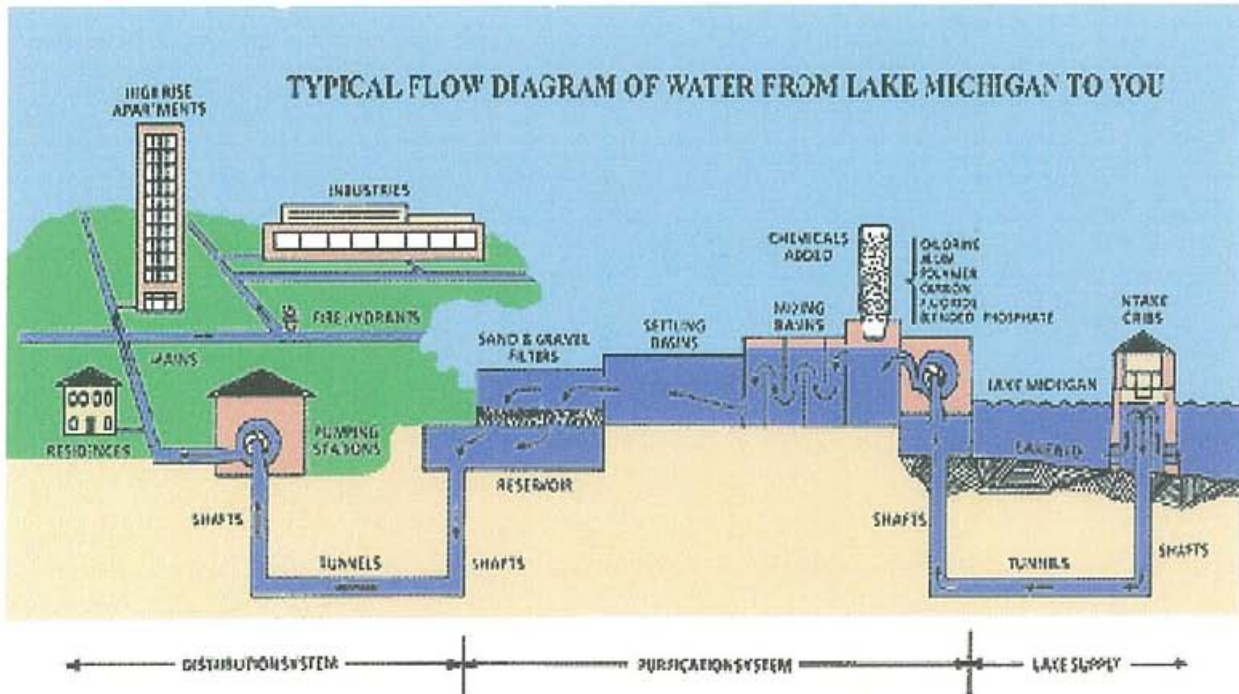
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## Appendix H



[http://sanitarystandardcorp.com/Machine%20Pics/Cherry%20Burrell%208000%20Gallon%20S%20Vertical%20Tank%20SN%208000-79-2085%20\(3\)%20-%20webpic.JPG](http://sanitarystandardcorp.com/Machine%20Pics/Cherry%20Burrell%208000%20Gallon%20S%20Vertical%20Tank%20SN%208000-79-2085%20(3)%20-%20webpic.JPG)

## Appendix I



[http://www.algor.com/news\\_pub/cust\\_app/jardine/images/DIAGRAM.gif](http://www.algor.com/news_pub/cust_app/jardine/images/DIAGRAM.gif)

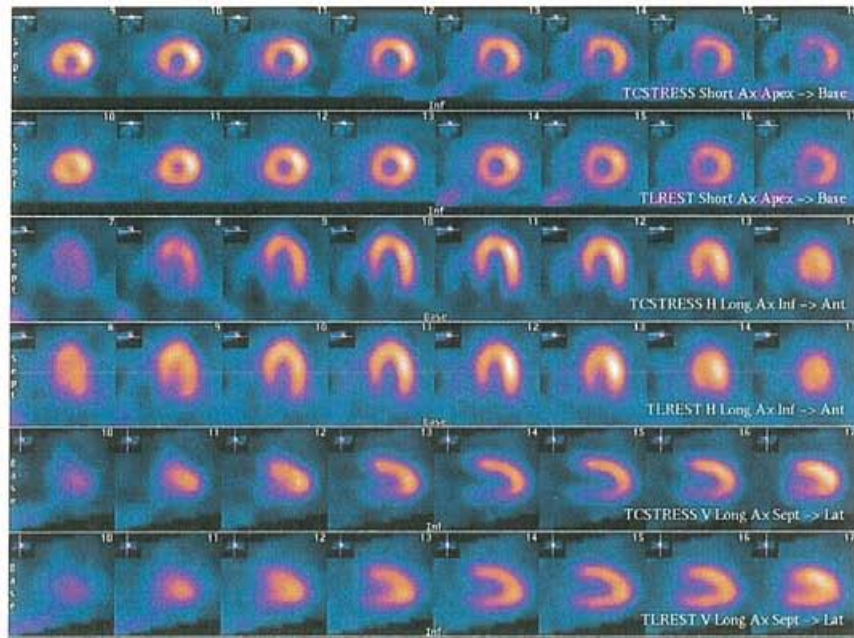
## Appendix J



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## Appendix K



<http://metacures.biz/images/4/2/a/dual-isotope-stress.7.jpg>

## appendix L



<http://www.vivekengg.com/wp-content/uploads/2008/09/filler-for-pet-bottles.jpg>

## Appendix M



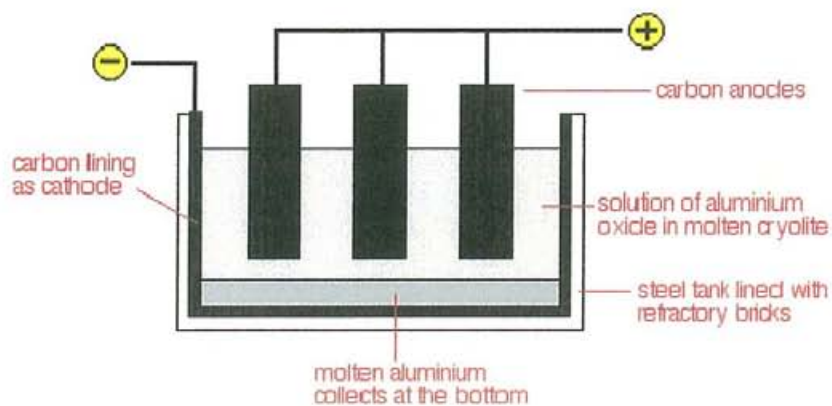
<http://www.diagraph.com/media/pdf/1106945161.pdf>

## Appendix N



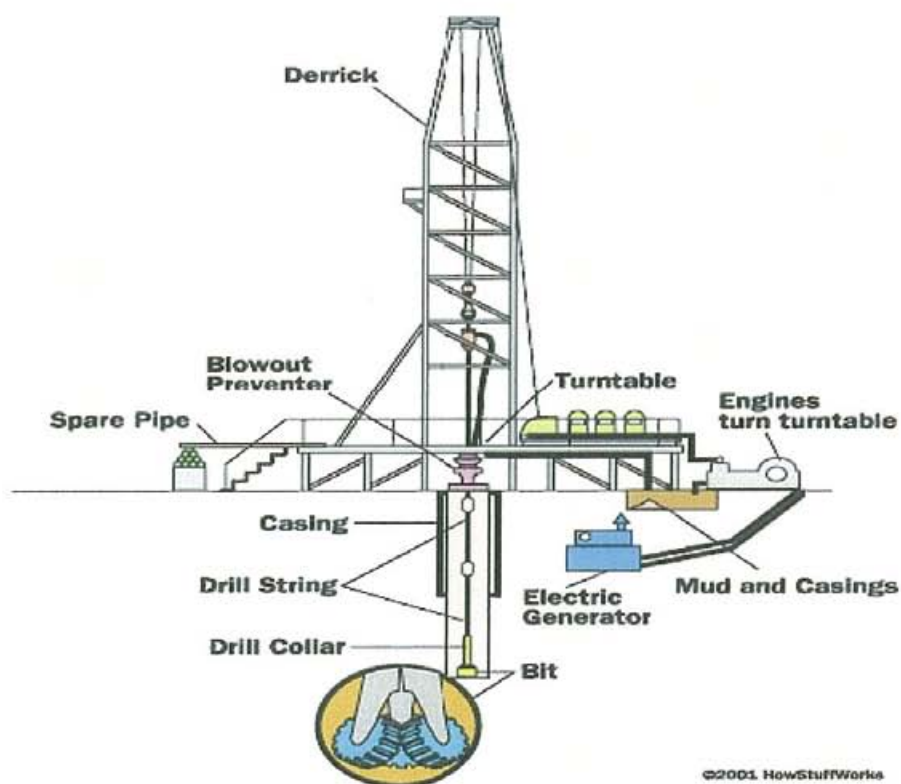
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## Appendix O



<http://www.chemguide.co.uk/inorganic/extraction/aluminium.html>

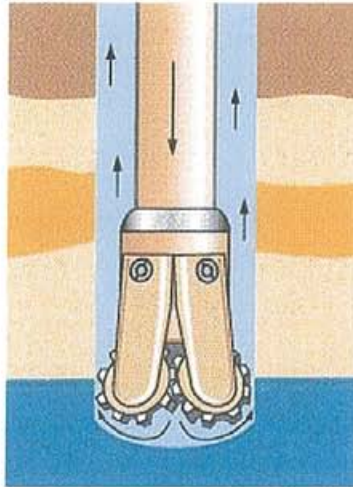
## Appendix P



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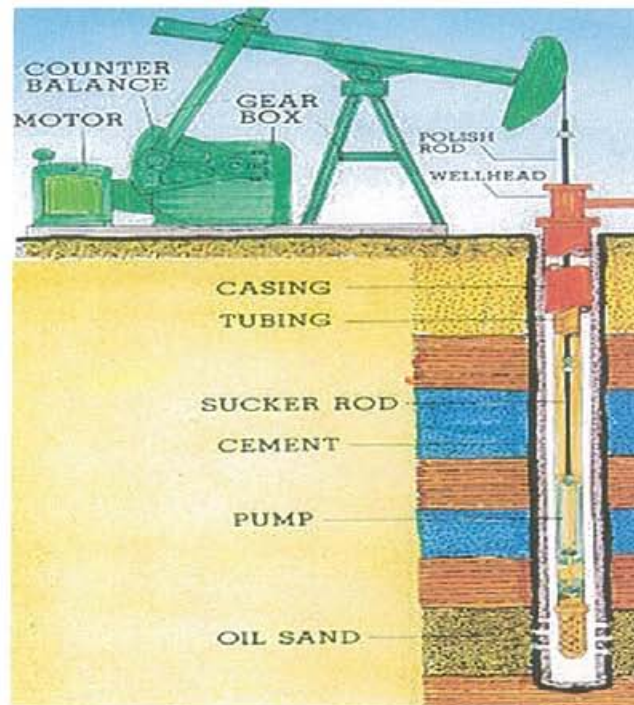


## Appendix Q



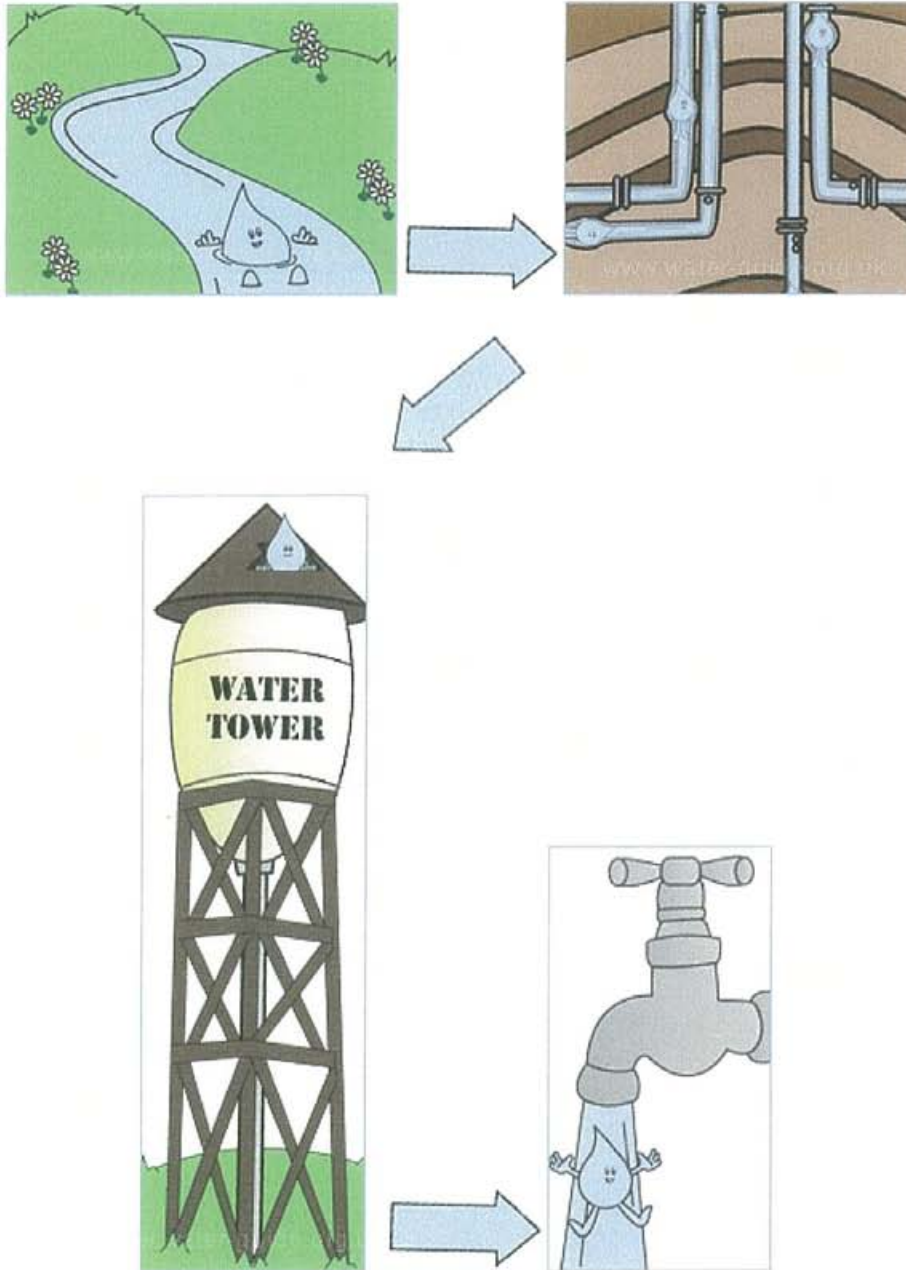
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## Appendix R



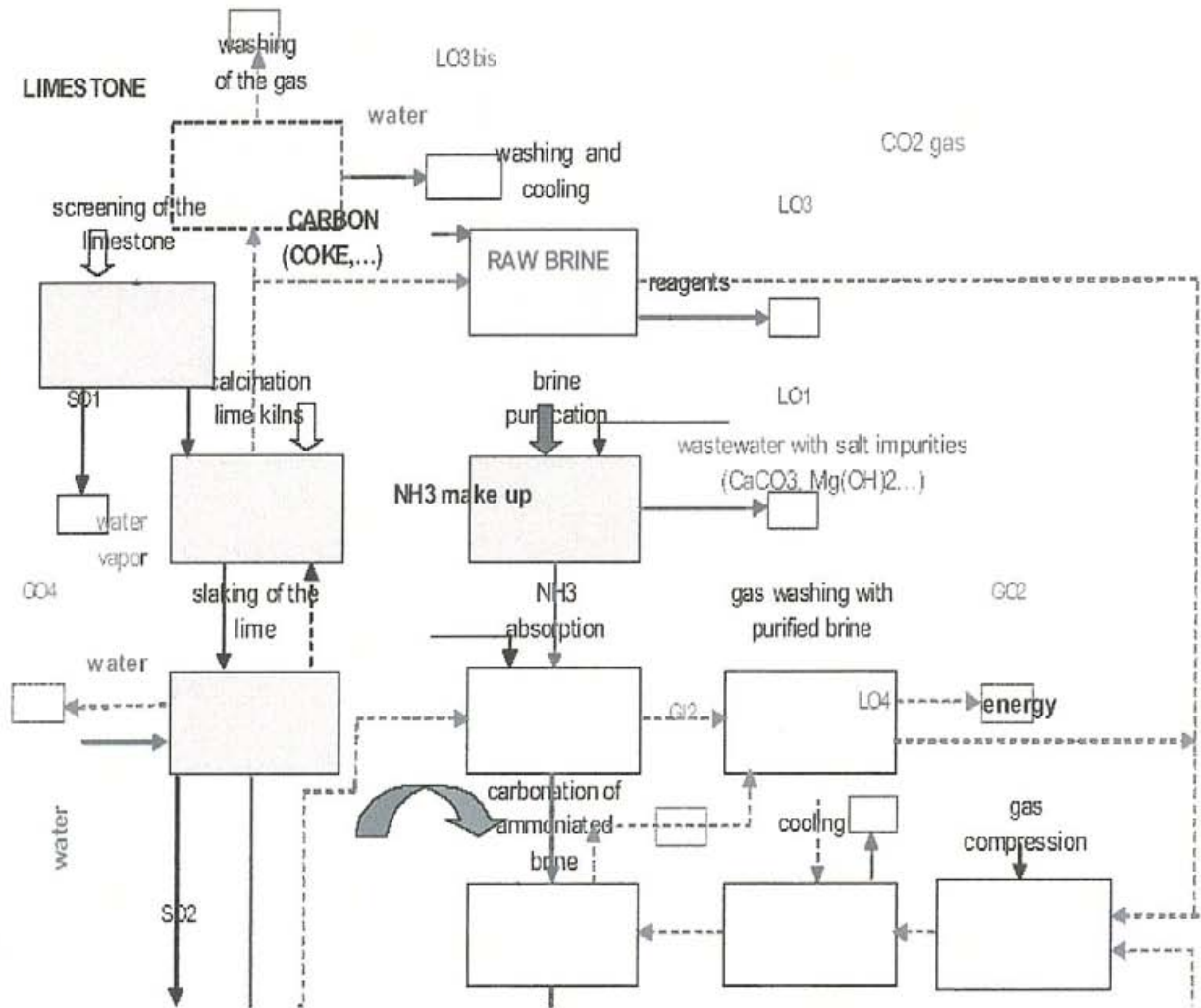
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## Appendix S



<http://www.water-guide.org.uk/science.html>

## Appendix T

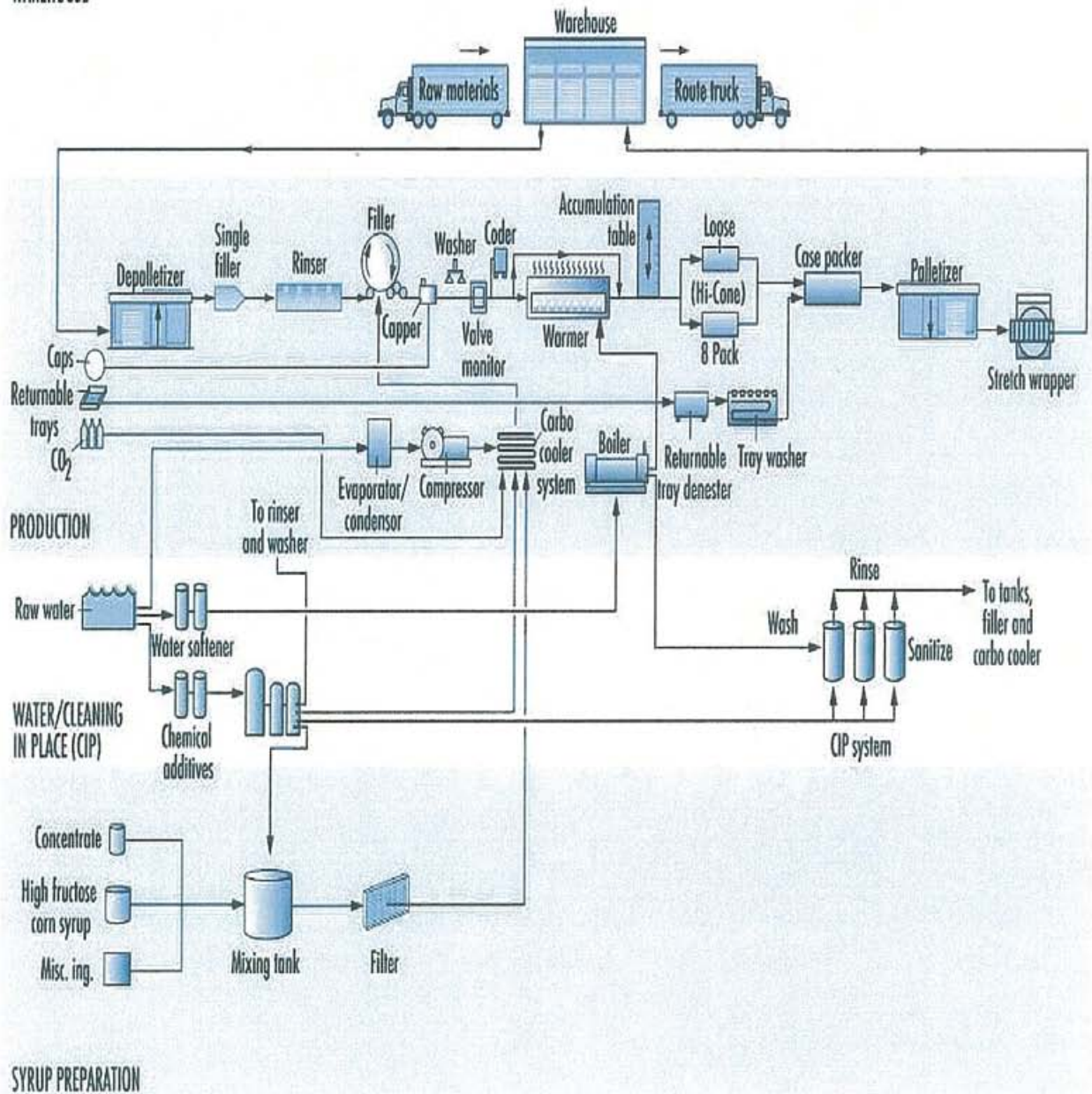


<http://www.publications.parliament.uk/pa/ld200708/ldselect/ldcom/197/197we08a.gif>



Appendix U

WAREHOUSE



[http://www.solarnavigator.net/solar\\_cola/cola\\_images/soft\\_drink\\_canning\\_factory\\_flow\\_chart.j](http://www.solarnavigator.net/solar_cola/cola_images/soft_drink_canning_factory_flow_chart.j)

## Chart



<http://images.tradingmarkets.com/2008/penn/DP0513-006.jpg>