

The Importance of Minerals and Mining

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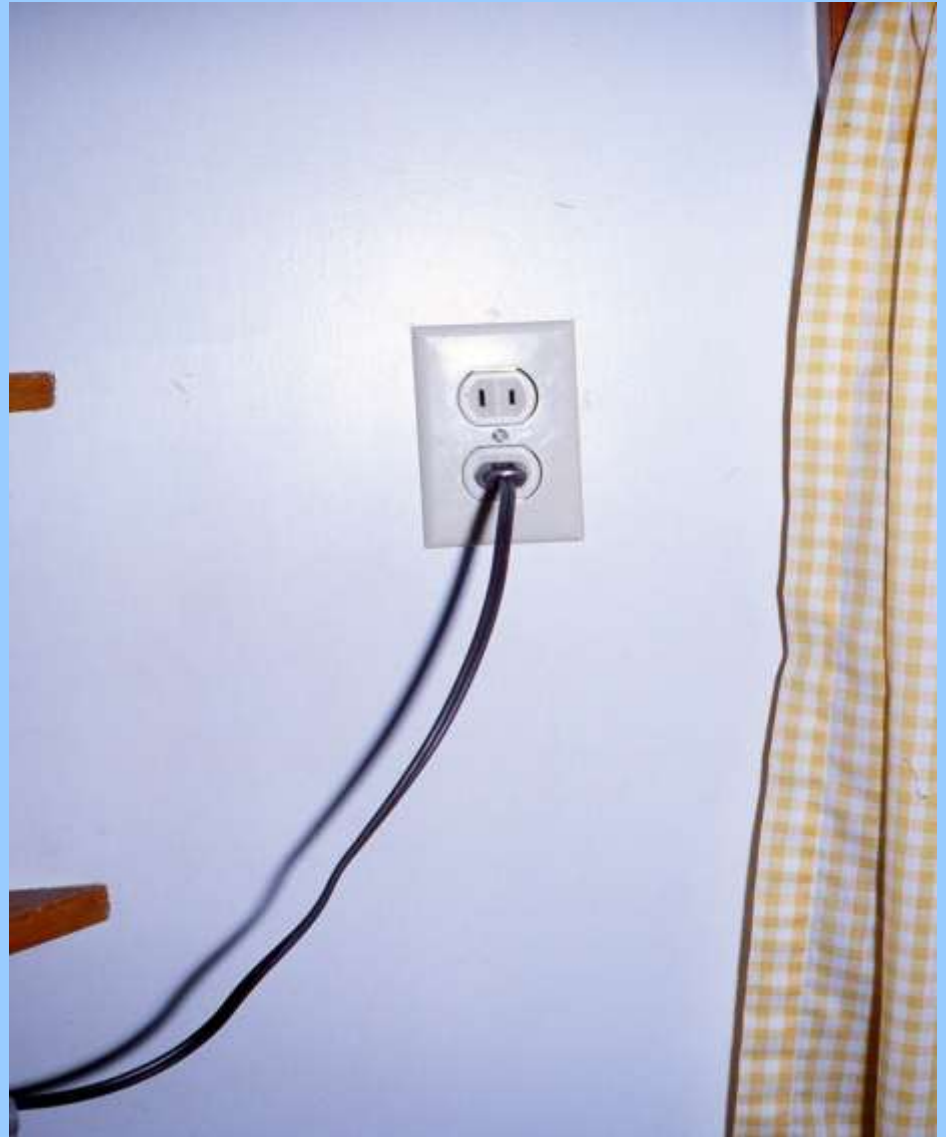
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Let's start on a Monday morning.

**Six o'clock Monday morning.
Time to get up.**



Electricity to run the
clock comes through
Copper Wires.



Copper comes from a **Copper Mine**.
Copper Sulfide minerals have to be concentrated to
separate them from worthless **Minerals**.



The ore is hauled In large **Haul Trucks**.
Some are 24ft high and 30ft wide with tires 14 ft tall!!!



Mining Engineering Students on Field Trip



The copper ore is crushed and then ground to a fine powder in **Ball Mills**.



The fine ore goes to banks of **Flotation Cells**
in the Copper **Concentrator**,



**and the Copper Sulfide Minerals are
collected on bubbles.**



The **Concentrate** is dried and the **Sulfur** is burned off in a furnace.



Molten copper is cast into **Anodes which are refined to make Copper Rods.**



**The Copper Rods are heated and extruded
to make Copper Coils,**



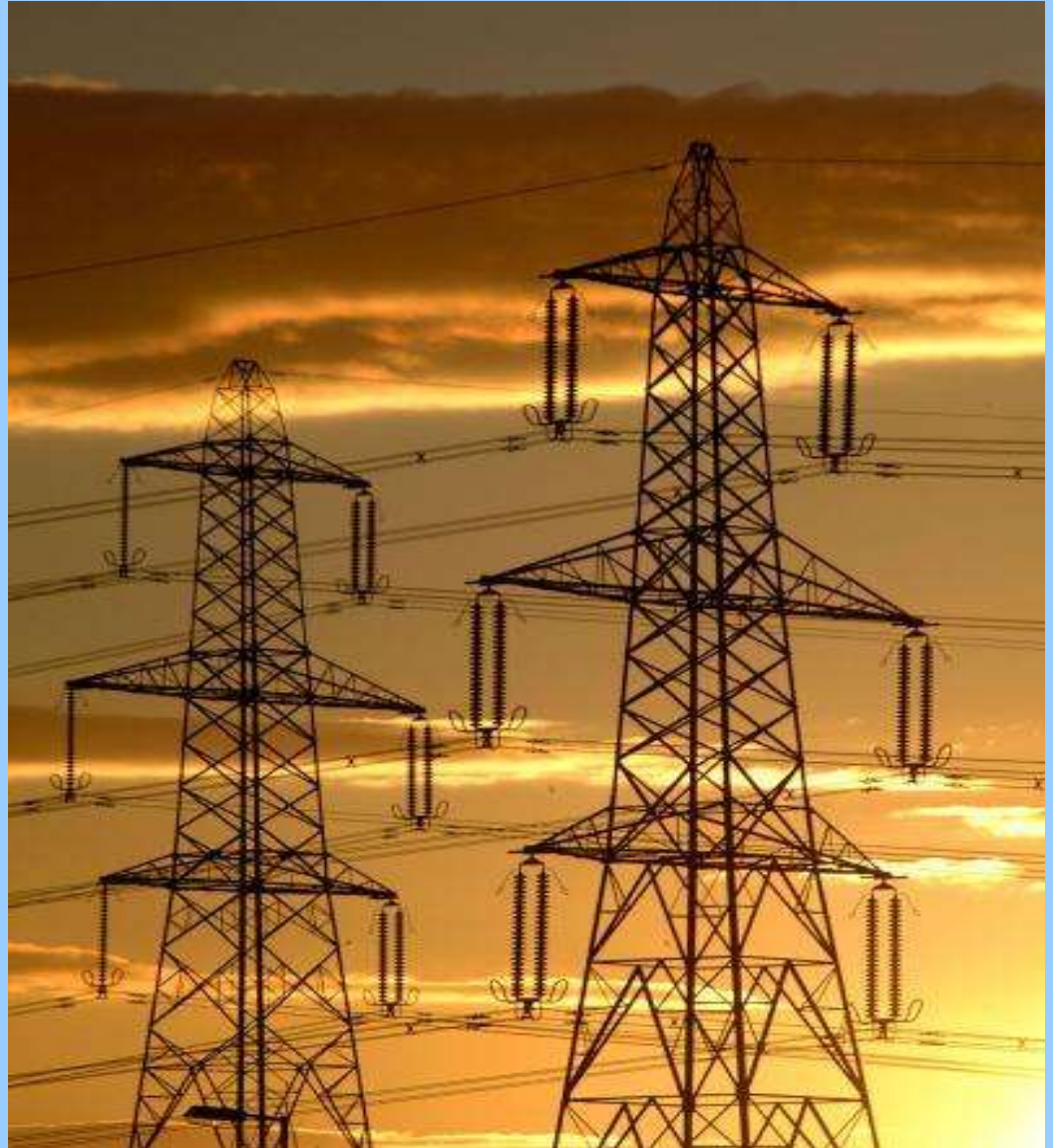
and wire is made from the Copper Coils.



**It takes a lot of
work to get from
the Minerals
in the rocks
in the Copper Mine
to the Copper wire
bringing electricity
to the clock.**



**The electricity
comes through
power lines,**



from a Coal fired **Power Plant** made out of
Concrete and Steel.
Over 40% of all electricity used in USA comes
from Coal Fired Power Plants.



The **Coal** might come from a distant
Open Pit Coal Mine,



delivered by long **Unit Trains.**



The Coal is burnt in boilers to generate steam which drives the generators to make electricity.



Power distribution requires a lot of
Structural Steel,



which comes in many different shapes and sizes.



To make Steel we need **Iron Ore**.
Here it comes from a Minnesota **Taconite** Mine.



The ore goes to a Taconite **Pellet Plant**,



and is made into **Taconite Pellets**,



**which are delivered by train to
Lake Superior docks,**



and transported by ship to
Lower Lakes **Steel Mills**,



where they are
fed into a
Blast Furnace
With **Coke** (made
from coal) and
Limestone to
make liquid iron.



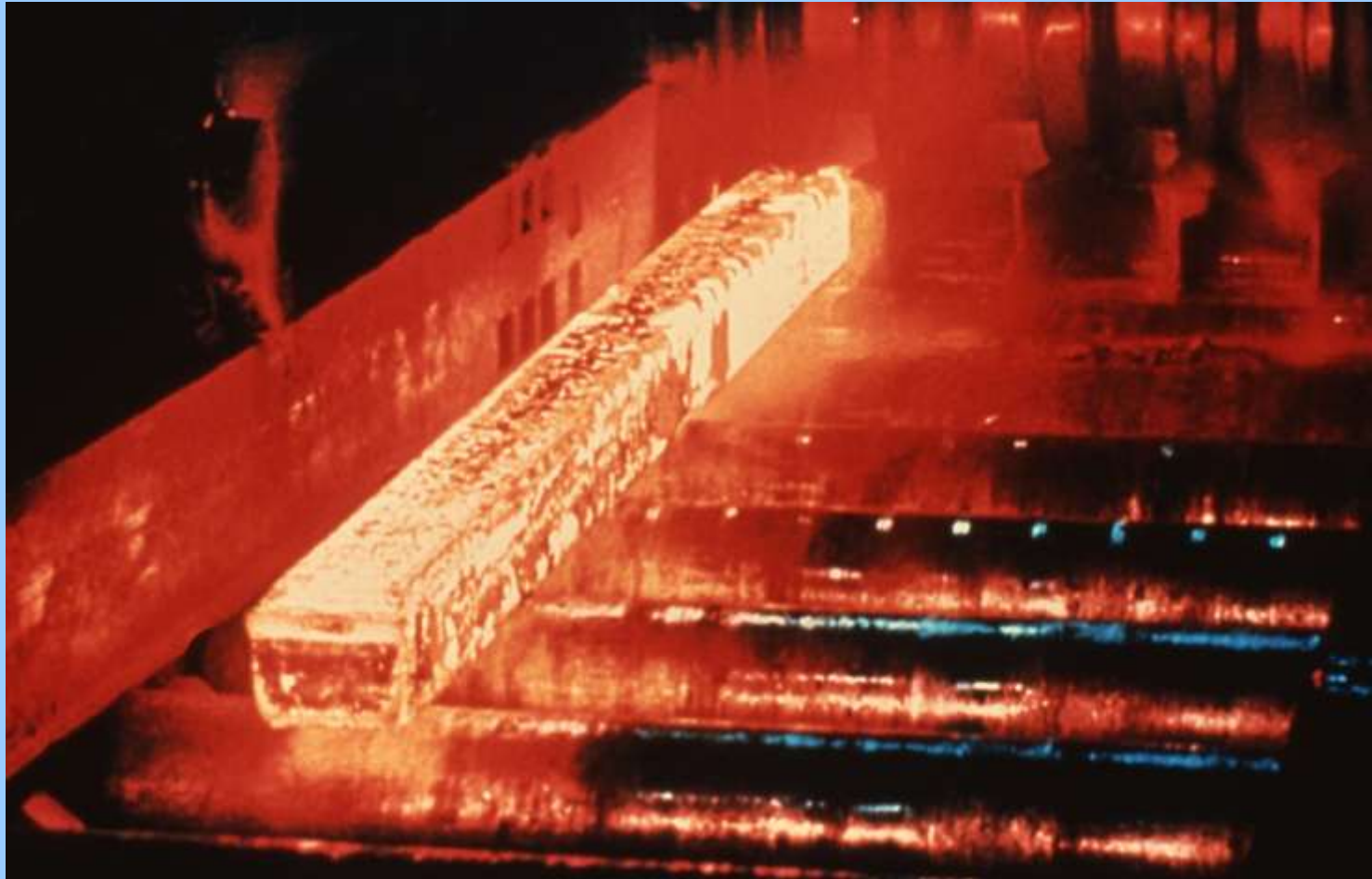
**Molten iron is tapped from the
Blast Furnace,**



and poured
into a **Basic
Oxygen Furnace**
to make Steel.



Large steel sections are made from ingots
in large **Integrated Steel Mills**,



while small shapes like **Rebar** are often made from **Scrap Iron** in **Mini Mills**.



What about **Concrete**?
All roads and buildings need Concrete.



Concrete is made with **Sand** from **Sand Pits**,



and **Gravel** or Crushed Rock **Aggregates**,



from a **Rock Quarry,**



and **Cement.**



Cement is made at a **Cement Plant** in a high temperature **Cement Kiln**,



from Limestone and other minerals,



with the Limestone mined in a
Limestone Quarry.



It's 6:05.
Time to get up and go to the bathroom.



**We use the toilet, clean our teeth
and take a shower.**



Where does the water come from?
It comes into the house through
Copper Pipes,



after purification in the local
Water Treatment Plant,



which receives large volumes of water
through **Steel Pipes**,



or large **Concrete Conduits**,



from a River or a
Reservoir behind a Concrete **Dam**.



Aerial photo of Lake Mead Reservoir and Hoover Dam showing Steelwork construction for a Highway Bridge



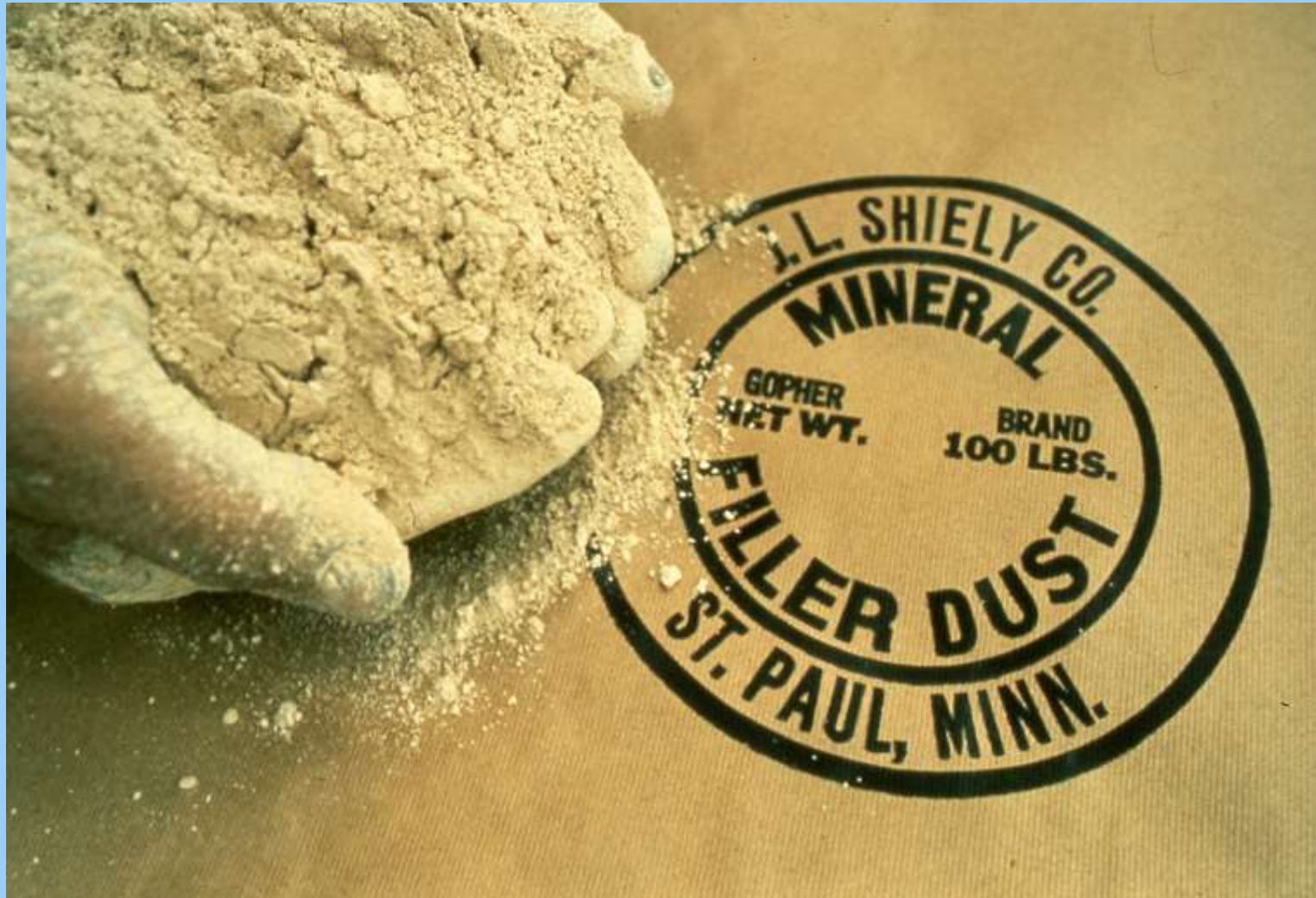
Turbines generate electricity inside the Hoover Dam.
About 7% of all US electric power is **Hydropower**



Where does the toilet come from?
The toilet is a **Ceramic** product,



and all Ceramic products are made from **Clay**,



mined from a **Clay Pit.**



When we flush,
the waste water
leaves the house
in **Cast Iron** Pipes,



and goes through
large Concrete
Sewer Pipes,



to a **Waste Water Treatment Plant,**



**and now it's 6:15.
Time for breakfast.**



**Our food is stored
in Refrigerators
made with Steel,
Copper, Aluminum,
Plastics and Paints.**



**But before breakfast
be sure to get
your **Vitamins
and Minerals.****

**They're essential
for good health.**



**Let's have a donut.
Finally something that's not mineral.**



But the donut comes from the bakery,



and the bakery needs **Flour**,



which comes
from a **Flour Mill**
made of Steel
and Concrete.

The water tower
and Mill sign are
Steel

The Stone Bridge
is made of
Natural Rock



**The grain is transported
by train on steel rails,**



and is harvested by large
Combine Harvesters.



All plants need mineral **Fertilizers**.
Nitrogen (N) is provided by **Liquid Ammonia**,
Urea or **Ammonium Salts**.



Phosphorus (P) comes from a
Phosphate Mine,



and **Potassium** (K) from a **Potash** Mine,



where the **Underground Mine** tunnels
can extend for many miles.



**Agricultural machinery is needed
to till the ground.**



Without modern machinery
we go back to **Horse Power**,



**and without Minerals: no donuts, no television,
no cities, no modern civilization.**



That's the first half hour of the week and look at all the Mines and Minerals we've had to rely on.



So: Are Minerals Important?

You Betcha

**Absolutely everything
we depend on
is either made from minerals
or relies on minerals for its
production and distribution**

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“Importance of Mining”

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RED WORD LIST

COPPER COPPER MINE COPPER SULFIDE MINERALS HAUL TRUCKS
BALL MILLS FLOTATION CELLS CONCENTRATOR CONCENTRATE
SULFUR ANODES POWER PLANT COAL OPEN PIT UNIT TRAINS
STRUCTURAL STEEL IRON ORE TACONITE PELLET PLANT
TACONITE PELLETS STEEL MILLS BLAST FURNACE COKE LIMESTONE
BASIC OXYGEN FURNACE INTEGRATED STEEL MILLS SCRAP IRON REBAR
MINI MILLS CONCRETE SAND SAND PITS GRAVEL AGGREGATES
ROCK QUARRY CEMENT CEMENT PLANT CEMENT KILN
LIMESTONE QUARRY COPPER PIPES WATER TREATMENT PLANT
STEEL PIPES CONCRETE CONDUITS RESERVOIR DAM TURBINE
HYDROPOWER CERAMIC CLAY CLAY PIT CAST IRON SEWER PIPES
WASTE WATER TREATMENT PLANT VITAMINS AND MINERALS FLOUR
FLOUR MILLS COMBINE HARVESTERS FERTILIZERS NITROGEN
LIQUID AMMONIA UREA AMMONIUM SALTS PHOSPHORUS
PHOSPHATE MINE POTASSIUM POTASH UNDERGROUND MINE
HORSE POWER