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NANO Mercury Power Plant (Non Conventional /Renewable)

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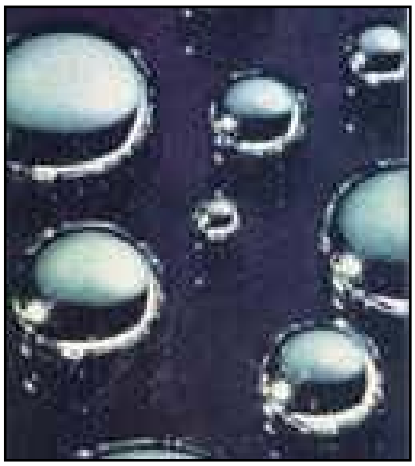
Abstract **-** Power plant is used to production of electricity by so many types of technology. Like Hydro power plant, Thermal power plant, Nuclear power plant, Gas turbine power plant, combined cycle power plant, solar power plant, Wind power plant, Tidal power plant, Diesel generator, petrol generator, this all are power plant run by fuel and generate electricity. I am introducing new type and technology power plant.

I. LIQUID MERCURY



MERCURY:

It's the only common metal which is liquid at ordinary temperatures. Mercury is sometimes called quicksilver. It is a heavy, silvery-white liquid metal. It is a rather poor conductor of heat if compared with other metals but it is a fair conductor of electricity. It alloys easily with many metals, such as gold, silver, and tin. These alloys are called amalgams. The most important mercury salts are mercuric chloride $HgCl_2$ (corrosive sublimate - a violent poison), mercuric chloride Hg_2Cl_2 (calomel, still used in medicine occasionally), mercury fulminate (Hg (ONC) $_2$, a detonator used in explosives) and mercuric supplied (Has, vermillion, a high-grade paint pigment).

APPLICATIONS:

Mercury metal has many uses. Because of its high density it is used in barometers and manometers. It is extensively used in thermometers, thanks to its high rate of thermal expansion that is fairly constant over a wide temperature range. Its ease in amalgamating with gold is used in the recovery of gold from its ores.Industry uses mercury metal as a liquid electrode in the manufacture of chlorine and sodium hydroxide by electrolysis of brine. Mercury is still used in some electrical gear, such as switches and rectifiers, which need to be reliable, and for industrial catalysis. Much less mercury is now used in consumer batteries and fluorescent lighting, but it has not been entirely eliminated. Mercury compounds have many uses. Calomel (mercurial chloride, Hg_2Cl_2) is used as a standard in electrochemical measurements and in medicine as a purgative. Mercuric chloride (corrosive sublimate, $HgCl_2$) is used as an insecticide, in rat poison, and as a disinfectant. Mercuric oxide is used in

skin ointments. Mercuric sulphate is used as a catalyst in organic chemistry. Vermilion, a red pigment, is mercuric sulphide; another crystalline form of the sulphide (also used as a pigment) is black. Mercury fulminate, $Hg(CNO)_2$, is used as a detonator.

ENVIRONMENTAL EFFECTS OF MERCURY:

Mercury from soils can accumulate in mushrooms. Acidic surface waters can contain significant amounts of mercury. When the pH values are between five and seven, the mercury concentrations in the water will increase due to mobilization of mercury in the ground. Once mercury has reached surface waters or soils microorganisms can convert it to methyl mercury, a substance that can be absorbed quickly by most organisms and is known to cause nerve damage. Fish are organisms that absorb great amounts of methyl mercury from surface waters every day. As a consequence, methyl mercury can accumulate in fish and in the food chains that they are part of. The effects that mercury has on animals are kidneys damage, stomach disruption, damage to intestines, reproductive failure and DNA alteration.

HEALTH EFFECTS OF MERCURY:

Metallic mercury is used in a variety of household products, such as barometers, thermometers and fluorescent light bulbs. The mercury in these devices is trapped and usually does not cause any health problems. However, when a thermometer will break a significantly high exposure to mercury through breathing will occur for a short period of time while it vaporizes. This can cause harmful effects, such as nerve, brain and kidney damage, lung irritation, eye irritation, skin rashes, vomiting and diarrhea. Mercury has a number of effects on humans, that can all of them be simplified into the following main effects:

- Disruption of the nervous system
- Damage to brain functions
- DNA damage and chromosomal damage
- Allergic reactions, resulting in skin rashes, tiredness and headaches
- Negative reproductive effects, such as sperm damage, birth defects and miscarriages Damaged brain functions can cause degradation of learning abilities, personality changes, tremors, vision changes, deafness, muscle in coordination and memory loss. Chromosomal damage is known to cause mongolism.

MERCURY IN THE ENVIRONMENT:

Mercury occur uncombined in nature to a limited extent. It rarely occurs free in nature and is found mainly in cinnabar ore (HgS) in Spain, Russia, Italy, China and Slovenia. World production of mercury is around 8.000 tons per year. Mineable reserves are around 600.000 tones. Mercury is a compound that can be found naturally in the environment. It can be found in metal form, as mercury salts or as organic mercury compounds. Mercury enters the environment as a result of normal breakdown of minerals in rocks and soil through exposure to wind and water. Release of mercury from natural sources has remained fairly the same over the years. Still mercury concentrations in the environment are increasing; this is ascribed to human activity. Most of the mercury released from human activities is released into air, through fossil fuel combustion, mining, smelting and solid waste combustion. Some forms of human activity release mercury directly into soil or water, for instance the application of agricultural fertilizers and industrial wastewater disposal. All mercury that is released in the environment will eventually end up in soils or surface waters. Mercury is not naturally found in foodstuffs, but it may turn up in food as it can be spread within food chains by smaller organisms that are consumed by humans, for instance through fish. Mercury concentrations in fish usually greatly exceed the concentrations in the water they live in. Cattle breeding products can also contain eminent quantities of mercury. Mercury is not commonly found in plant products, but it can enter human bodies through vegetables and other crops, when sprays that contain mercury are applied in agriculture.

PROPERTIES, USES, AND OCCURRENCE:

Mercury was known in Egypt and also probably in the East as early as 1500 BCE. The name mercury originated in 6th-century alchemy, in which the symbol of the planet was used to represent the metal; the chemical symbol Hg derives from the Latin ***HYDRARGYRUM***, "liquid silver." Although its toxicity was recognized at an early date, its main application was for medical purposes. Mercury is the only elemental metal that is liquid at room temperature. (Cesium melts at about 28.5 °C [83 °F], gallium at about 30 °C [86 °F], and rubidium at about 39 °C [102 °F].) Mercury is silvery white, slowly tarnishes in moist air, and freezes into a soft solid like tin or lead at −38.87 °C (−37.97 °F). It boils at 356.9 °C (674 °F).It alloys with copper, tin, and zinc to form amalgams, or liquid alloys. An amalgam with silver is used as a filling in dentistry. Mercury does not wet glass or cling to it, and this property, coupled with its rapid and uniform volume

expansion throughout its liquid range, makes it useful in thermometers. Barometers and manometers utilize its high Density and low vapor pressure. Gold and silver dissolveReadily in mercury and in the past this property was used in the extraction of these metals from their ores. The Mercury from soils can accumulate in mushrooms.

Acidic surface waters can contain significant amounts of mercury. When the pH values are between five and seven, the mercury concentrations in the water will increase due to mobilization of mercury in the ground. Once mercury has reached surface waters or soils microorganisms can convert it to methyl mercury, a substance that can be absorbed quickly by most organisms and is known to cause nerve damage. Fish are organisms that absorb great amounts of methyl mercury from surface waters every day. As a consequence, methyl mercury can accumulate in fish and in the food chains that they are part of. The effects that mercury has on animals are kidneys damage, stomach disruption, and damage to intestines, reproductive failure and DNA alteration. Goodelectrical conductivity of mercury makes it exceptionally useful in sealed electrical switches and relays. An electrical discharge through mercury vapor contained in a fused silica tube or bulb produces a bluish glow rich in ultraviolet light, a phenomenon exploited in ultraviolet, fluorescent, and high-pressure mercury-vapor lamps. Mercury's high thermal neutron-capture cross section (360 barns) and good thermal conductivity make it applicable as a shield and coolant in nuclear reactors. Much mercury is utilized in the preparation of pharmaceuticals and agricultural and industrial fungicides. The use of mercury in the manufacture of chlorine and caustic soda (sodium hydroxide) by electrolysis of brine depends upon the fact that mercury employed as the negative pole, or cathode, dissolves the sodium liberated to form a liquid amalgam. An interesting application, though not of great commercial significance, is the use of mercury vapor instead of steam in some electrical generating plants, the higher boiling point of mercury providing greater efficiency in the cycle. Mercury occurs in Earth's crust on the average of adserver.adtechus.com/addyn/3.0/5308.1/1371312/0/170 /ADTECH;target=_blank;grp=628;key=false;kvqsegs= D;kvtopicid=375837;kvchannel=SCIENCE;misc=13136 77448147"></script> 0.08 gram (0.003 ounce) per ton of rock. The principal ore is the red sulfide, cinnabar. Native mercury occurs in isolated drops and occasionally in larger fluid masses, usually with cinnabar, near volcanoes or hot springs. Over two-thirds of the world supply of mercury comes from China, with most of the remainder coming from Kyrgyzstan and Peru (where it is a by-product of gold mining). Cinnabar is mined in shaft or open-pit operations and refined by flotation. Most of the methods of extraction of mercury rely on the volatility of the metal and the fact that cinnabar is readily decomposed by air or by lime to yield the free metal. Because of the toxicity of mercury and the threat of rigid pollution control, attention is being directed toward safer methods of extracting mercury. These generally rely on the fact that cinnabar is readily soluble in solutions of sodium hypochlorite or sulfide, from which the mercury can be recovered by precipitation with zinc or aluminum or by electrolysis. (For treatment of the commercial production of mercury *See*mercury processing; for mineralogical properties, *see*native element [table].)Extremely rare natural alloys of Mercury have also been found: Mitchell and sybarite (with silver), portrait (with palladium), and gold amalgam. Mercury is extracted from cinnabar by roasting it in air, followed by condensation of the mercury vapor. Mercury mixture of seven stable isotopes: ^{196}Hg (0.15 percent), ^{198}Hg (9.97 percent), ^{199}Hg (16.87 percent), ^{200}Hg (23.10 percent), ^{201}Hg (13.18 percent), ^{202}Hg (29.86 percent), and ^{204}Hg (6.87 percent). As a wavelength standard and for other precise work, isotopic ally pure mercury consisting of only mercury-198 is prepared by neutron bombardment of natural gold, go197.

Mercury has recently been used in the Newtonian constant of gravitation, G, in the equation $F = GmM/r^2$. Henry Cavendish (1731-1810) used a torsion balance for the first determination of this constant, and published his results in 1798. A measurement in 1995 was discordant with previous ones, and in addition to this, a possible systematic error in using torsion fibers put the whole subject in doubt. This stoked up interest in new measurements.

The recent measurement of G using mercury was made in Zürich, and instead of a torsion balance a commercial beam balance intended for the accurate comparison of masses in standards laboratories was used. The principle of the measurement was the same as used by Cavendish, in which large field masses were moved to opposite sides of the test masses. Here, the field masses are two cylindrical tanks of mercury, each weighing M = 7000 kg. The test masses are m = 1.1 kg slugs of copper or tantalum. Different materials are used because it is nice to verify that the gravitational force depends only on mass, not on the substance. In one configuration, the field masses are between the test masses, and in the other they are just on the other side of each test mass, as shown in the figure. The force exerted on a single test mass by the whole 14000 kg of mercury in the first configuration was about 0.2 mg, or 0.2 dyne, from the average of the difference in weight of the two test masses with the field masses in the two different positions. If it is assumed that the field mass attracts as if its mass were concentrated at its center, 75 cm from

the test mass, then a simple calculation gives G = 7.2 x 10^{-8} $cm^3/g\text{-}s^2$. The precise value from this experiment was (6.67407 ± 0.00022) x 10^{-8} $cm^3/g\text{-}s^2$. Combining this with the observed acceleration of gravity at the earth's surface, 980.665 cm/s^2, you should be able to find the mass of the earth in grams.

Mercury was used for the field masses not only because it is dense, but because the liquid state made its mass distribution very uniform. We can estimate that the tanks required 405 flasks of mercury, or $115,560 worth at the 1989 price**.** Now current price is 200 $ per flask in year of 2011. A curious technical use of mercury was in the production of frozen mercury patterns for making molds for casting. The patterns could be made in steel dies, and easily assembled by fusing them together to make complicatedforms. The completed pattern was then coated with a mold material, and when the mold had been formed, the mercury was warmed and ran out. It was a kind of lost-wax process using mercury instead of wax.It is said that the first emperor of China, Qin Shihuangdi, was buried in 210 BCE in a bronze coffin floating on mercury. Unusual concentrations of mercury have been found in the area. Caliph Abd-er-Rahman III of Cordoba (ruled 912-961) was reported to have maintained a large mercury bath in a porphyry basin. By disturbing the surface, he reflected sunbeams to the amazement and temporary blindness of his guests.

PRINCIPAL COMPOUNDS:

The compounds of mercury are either of +1 or +2 oxidation state. Mercury (II) or mercuric compounds predominate. Mercury does not combine with oxygen to produce mercury (II) oxide, HgO, at a useful rate until heated to the range of 300 to 350 °C (572 to 662 °F). At temperatures of about 400 °C (752 °F) and above, the reaction reverses with the compound decomposing into its elements. Antoine-Laurent Lavoisier and Joseph Priestley used this reaction in their study of oxygen. There is relatively few mercury (I) or mercurial compounds. The mercury (I) ion, Hg_2^{2+}, is diatomic and stable. Mercury (I) chloride, Hg_2Cl_2 (commonly known as calomel)., isprobably<scriptsrc= "http://adserver. adtechus.com/addyn/3.0/5308.1/1388656/0/170/ADTECH;target=_blank;grp=628;key=false;kvqsegs=D;kvtopicid=375837;misc=1313677460339"></script> the most important univalent compound. It is used in antiseptic salves. Mercury (II) chloride, $HgCl_2$ (also called bi chloride of mercury or corrosive sublimate), is perhaps the commonest bivalent compound. Although extremely toxic, this odorless, colorless substance has a wide variety of applications. In agriculture it is used as a fungicide; in medicine it is sometimes employed as a topical antiseptic in concentrations of one part per 2,000 parts of water; and in the chemical industry it serves as a catalyst in the manufacture of vinyl chloride and as a starting material in the production of other mercury compounds. Mercury (II) oxide, HgO, provides elemental mercury for the preparation of various organic mercury compounds and certain inorganic mercury salts. This red or yellow crystalline solid is also used as an electrode (mixed with graphite) in zinc-mercuric oxide electric cells and in mercury batteries. Mercury (II) sulfide, HgS, is a black or red crystalline solid used chiefly as a pigment in paints, rubber, and plastics.

WORKING MODEL OF 100 WATTS:

NANO MERCURY POWER PLANT:

Working principal and operation.Which is run by mercury metal, it is non-destroyable metal only transfer the form one form to another form. Having specific gravity is 13.5 gram /C.C (13500kg/meter cube. This mercury get activate and fully charge by the activation charging machine by using electron proton motor initially. Once its start and generate electricity the cycle complete by the stroke /30 second ,60 second, 120 second as per designed of the power plant. As per power FORMULA is PhQgkd/1000. Where is P-power in watt,h-head of discharge height in meter,Q- quantity of discharge liter/ Second(LPS), g-Gravity 9.81constant, K-efficiency in 80%(0.8), d-Density inkg/ meter cube

Working Model: 1000 watts(1 Kilo watt)

NANO MERCURY POWER PLANT:

(Non-conventional&Renewable)

COMPONENTS: RCC Structure of civil work, S S&MS steel Fabricated, Mercury metal, Copper, Rubber, Oil, D.C Motor, A.C Alternator, Gearbox, Tungsten Electrode, electronic controlvalve.Battery12volts, 120AH rechargeable. L.A Type, E.C. Valve Switches, Connector, Rectifier.Pressure gauge.

INTRODUTION:

This power plant run on charge and activated Mercury by A.C. /D.C. Electrical power in rotating stroke of 30 second, and multiple thereof for one time charging. Ones time it will charge then machine generates Electrical power in A.C. designed.

DESCRIPTION:

PROTO TYPE WORKING MODEL

Capacity: 100 Watts, 14 Volts, 7.5 Amp.

Size: 400mm x 200mm x 1600mm

ACTUAL WORKING MODEL

Capacity: 1000 watts (1 kilowatt),

Component: 220 volts, 4.5 Amp.500 rpm, Single phase Alternator, D.C. Motor 300 watts, 150 rpm, 12 volts E.C. Valve, Pressure gauge.

WORKING PRINCIPAL AND PROVEN FORMULA

As per power formula given as bellow.

P= h x Q x g x k x d/1000

Where is P= Power in watt, h= Head of the discharge in meter, Q= Quantity of discharge in litter /second, g= Gravity of the earth 9.81 constant, k= Efficiency 80% (0.8), d= Density kg/meter cube (Gram/C.C).

The power is define by above formula

P=100x0.095x9.81x0.8x13500/1000= 1006watts. Power generates. Here Mercury density is 13600kg/metercube.30 second =1 stroke there for 0.095LPSx30=2.85Litters/stroke.

Mercury need as per 2.85 Litter/stroke multiply with Density of Mercury. 2.85/1000x13600=38.76kg. (34.5kg=1 Flask). The plant size is 80cmx20cmx75cm.

Bottom plate size is 80cmx 20cm x15cm Hollow box type, thickness is 10mm plate.

Charging chamber size is 15cm x 20cm.

Pipe diameter 11cmx30cm =2nos. 11cmx 20cm =1, all flange fittings type.

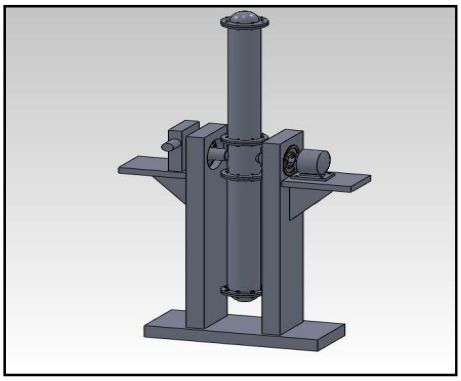
DC Motor 300 watts 12volts is use to charge the mercury before every stroke. DC Motor runs on storage battery of 12 volts /120AH. And use to start the mercury power plant.

The power generation cycle as per above formula 1006 watts/hr. As 30 seconds one stroke Total 120 strokes in a one hour. There for power generates one stroke as per Pt=Ratting Power stroke Time /3600.

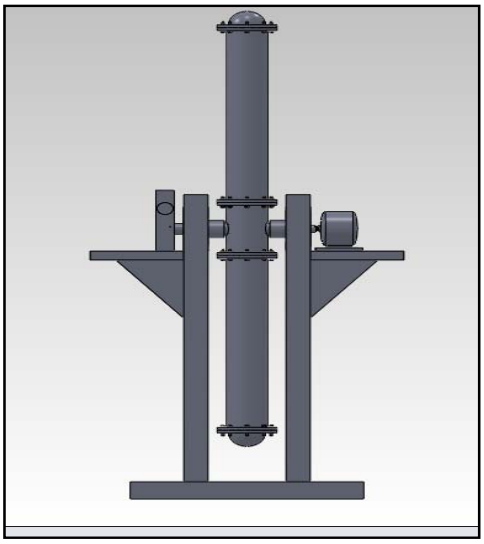
(1006X30/3600= 8.384watts/ stroke. Total power generate=120x8.384=1005.99watts.

Power Consumed by Mercury charging Motor in every stroke for 15second/stroke. There for Pc=Rating watts x Time/ 3600. (300x15/3600= 1.25watts/ stroke) 120x1.25=150 watts. Net power generate (NPG) = Total Power Generate (TPG) – Total consumed power (TCP). NPG=TPG –TCP is NPG= 1006 – 150 = 856 watts. PF is 0.8(80%). There for NPG x PF= NPGPF(856 x 0.8 =684.8.

WORKING MODEL OF 100 WATTS:

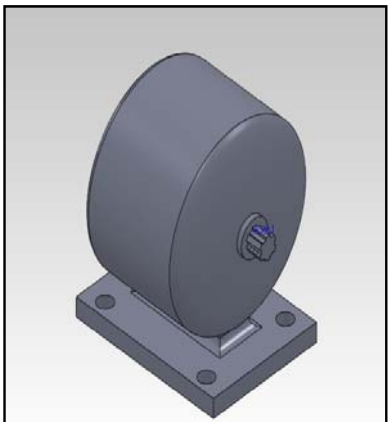


ASSEMBLY OF NANO MERCURY POWER PLANT



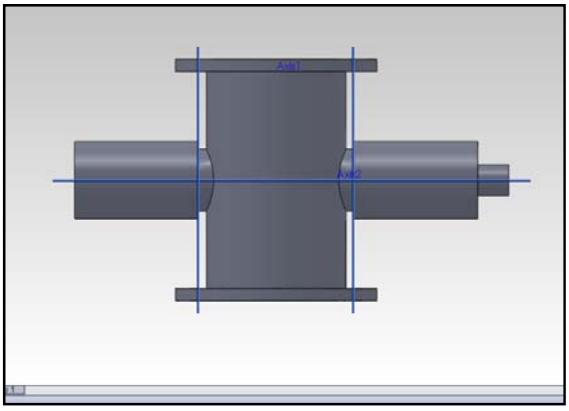
FRONT VIEW

A coin density 7.6g/cc floats in mercury due to the combination of the buoyant force and surface tension.

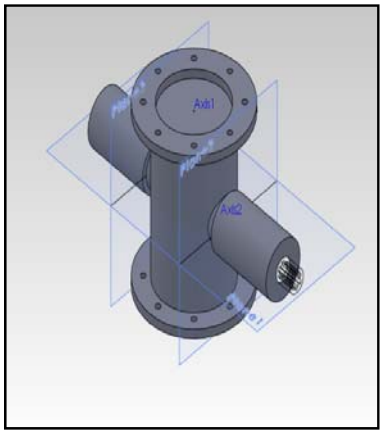


DC MOTOR 12 VOLTS 300 WATTS

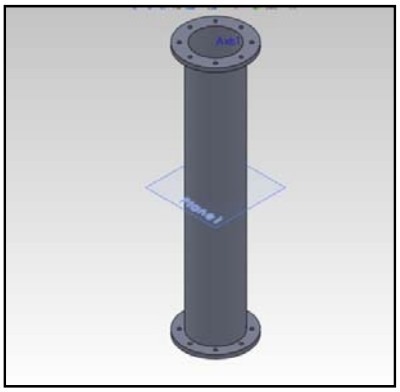
RELEASES IN THE ENVIRONMENT



Front View of Mercury Chargeing Chamber



SIDE VIEW MERCURY CHARGEING CHAMBER



MERCURY STORAGE CHAMBER

Fuel : Not required, only one time investment of15 $/watt 15000 $/ Kilowatts.ThePlant life Cycle is 40 years, but consider only 20 years. It has no running cost. The unit cost define as per formula U.C= Total plant cost/total time period in Hours. Therefore U.C.=15000/20x12x30x24= 15000/172000 = $ 0.087 USD/Unit cost. But Mercury is non-destroyable and other parts also have long life cycle Very low maintenance.

As per power equitation Mercury needs for 1 Megawatts. Flask (Mercury) FQ= P x 1000/hgkd x stroke period (Time in second) x d / 34.5 = Flask.Therefore Flask (M) = 1000000 x 1000/ 100 x 9.81 x 0.8 x 13500 x 60 x 13.6 / 34.5 = 444 Flask required. The current market price is 200 $ USD per Flask. So the cost of the

Mercury is 200 $ USD x 444 Flask = 88800 $ USD per Megawatts. (Only Mercury cost)

APPLICATION : Compact Commercial Captive power Generation Plant for production of Electricity.Used as fuel less Generator/Power plant for House, College, School, Transportation Vehicle, Space Shuttle, Train, Ship, Air craft, Satellite, Submarine, Army, Navy, ETC……

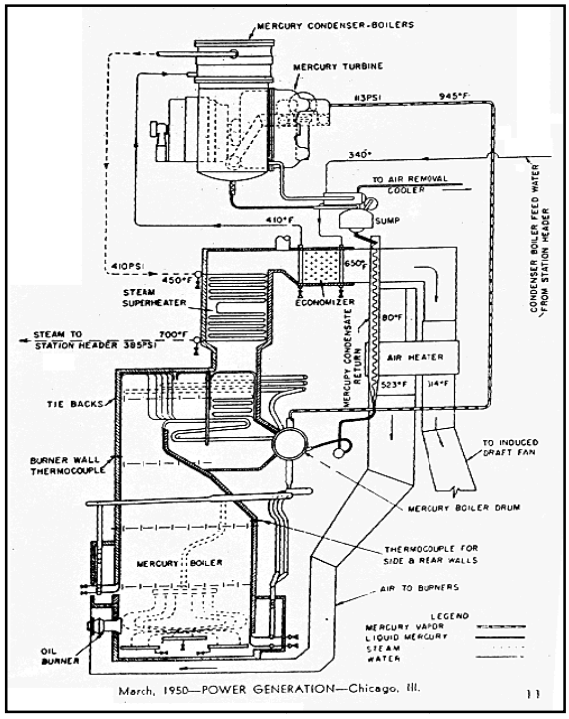
SPECIALITY OF THE POWER PLANT:

1) Dose not required fuel to generate electricity. (Fuel less)
2) Dose not creates any sound. (sound less)
3) Dose not generates any pollution. (Pollution less)
4) Dose not required any man power to operate the plant.
5) Very low maintenance servicing on required.
6) Plant size can be making 3kw onwards for Independent used as captive power plant.

7) Ideal for commercial power plant business and can be making 0.5MW to 10000MW.

8) This power plant never leakage mercury in the atmosphere.

9) This power plant work in normal temperature and pressure.

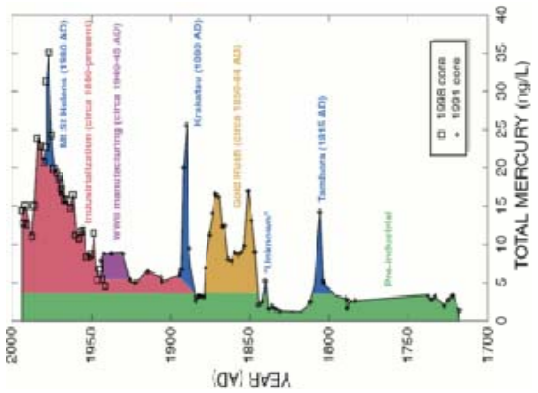


MERCURY STEAM THERMAL POWER PLANT COAL FIRED

Mercury and most of its compounds are extremely toxic and are generally handled with care; in cases of spills involving mercury (such as from certain thermometers or fluorescent light bulbs) specific cleaning procedures are used to avoid toxic exposure.[87] Essentially, it is recommended to physically merge smaller droplets on hard surfaces, combining them into a single larger pool for easier removal by using an eyedropper, or by pushing it into a disposable container which must then be dealt with according to local regulations. Vacuum cleaners and brooms should not be used because they cause greater dispersal of the mercury. Afterwards, sulfur powder, zinc powder, or some other element that readily forms an amalgam (alloy) with mercury (e.g. finely-divided Cu or Bi) at ordinary temperatures is sprinkled over the area and subsequently collected and properly disposed of. Cleaning porous surfaces and clothing is not effective at removing all traces of mercury and it is therefore advised to discard these kinds of items should they be exposed to a mercury spill.

Mercury can be inhaled and absorbed through the skin and mucous membranes, so containers of mercury are securely sealed to avoid spills and evaporation. Heating of mercury, or compounds of mercury that may decompose when heated, is always carried out with adequate ventilation in order to avoid exposure to mercury vapor. The most toxic forms of mercury are its organic compounds, such as dimethylmercury and methylmercury. However, inorganic compounds, such as cinnabar are also highly toxic by ingestion or inhalation of the dust.[88] Mercury can cause both chronic and acute poisoning.

RELEASES IN THE ENVIRONMENT



Amount of atmospheric mercury deposited at Wyoming's Upper Fremont Glacier over the last 270 years Preindustrial deposition rates of mercury from the atmosphere may be about 4 ng/(1 L of ice deposit). Although that can be considered a natural level of exposure, regional or global sources have significant effects. Volcanic eruptions can increase the atmospheric source by 4–6 times.[35]

Natural sources, such as volcanoes, are responsible for approximately half of atmospheric mercury

emissions. The human-generated half can be divided into the following estimated percentages:[36][37][38]

65% from stationary combustion,of which coal-fired power plants are the largest aggregate source (40% of U.S. mercuryemissions in 1999). This includes power plants fueled with gas where the mercury has not been removed. Emissions from coal combustion are between one and two orders of magnitude higher than emissions from oil combustion, depending on the country.[36]

11% from goldproduction. The three largest point sources for mercury emissions in the U.S. are the three largest gold mines. Hydro geochemical release of mercury from gold-mine tailings has been accounted as a significant source of atmospheric mercury in eastern Canada.[39]

6.8% from non-ferrous metal production, typically smelters. 6.4% from cement production.

3.0% from waste disposal, including municipal and hazardous waste, crematoria, and sewage sludge incineration. This is a significant underestimate due to limited information, and is likely to be off by a factor of two to five.

3.0% from caustic soda production.

1.4% from pig iron and steel production.

1.1% from mercury production, mainly for batteries.

2.0% from other sources.

The above percentages are estimates of the global human-caused mercury emissions in 2000, excluding biomass burning, an important source in some regions.[36]

Current atmospheric mercury contamination in outdoor urban air is (0.01–0.02 $\mu g/m^3$) indoor concentrations are significantly elevated over outdoor concentrations, in the range 0.0065–0.523 $\mu g/m^3$ (average 0.069 $\mu g/m^3$).[40]

Mercury also enters into the environment through the improper disposal (e.g., land filling, incineration) of certain products. Products containing mercury include: auto parts, batteries, fluorescent bulbs, medical products, thermometers, and thermostats.[41] Due to health concerns (see below), toxics use reduction efforts are cutting back or eliminating mercury in such products. For example, most thermometers now use pigmented alcohol instead of mercury. Mercury thermometers are still occasionally used in the medical field because they are more accurate than alcohol thermometers, though both are being replaced by electronic thermometers. Mercury thermometers are still widely used for certain scientific applications because of their greater accuracy and working range.

The United States Clean Air Act, passed in 1990, put mercury on a list of toxic pollutants that need to be controlled to the greatest possible extent. Thus, industries that release high concentrations of mercury into the environment agreed to install maximum achievable control technologies (MACT). In March 2005 EPA rule [42] added power plants to the list of sources that should be controlled and a national cap and trade rule was issued. States were given until November 2006 to impose stricter controls, and several States are doing so. The rule was being subjected to legal challenges from several States in 2005 and decision was made in 2008. The Clean Air Mercury Rule was struck down by a Federal Appeals Court on February 8, 2008. The rule was deemed not sufficient to protect the health of persons living near coal-fired power plants. The court opinion cited the negative impact on human health from coal fired power plants' mercury emissions documented in the EPA Study Report to Congress of 1998.[43]

Historically, one of the largest releases was from the Colex plant, a lithium-isotope separation plant at Oak Ridge. The plant operated in the 1950s and 1960s. Records are incomplete and unclear, but government commissions have estimated that some two million pounds of mercury are unaccounted for.[44]One of the worst industrial disasters in history was caused by the dumping of mercury compounds into McNamara Bay, Japan. The Chisso Corporation, a fertilizer and later petrochemical company, was found responsible for polluting the bay from 1932–1968. It is estimated that over 3,000 people suffered various deformities, severe mercury poisoning symptoms or death from what became known as McNamara disease.[45]

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