

**REMOVE IMPEDIMENT TO UTILIZATION OF LANDFILL GAS TO PRODUCE**

**100's OF MEGAWATTS OF RENEWABLE ELECTRIC POWER**

**AND**

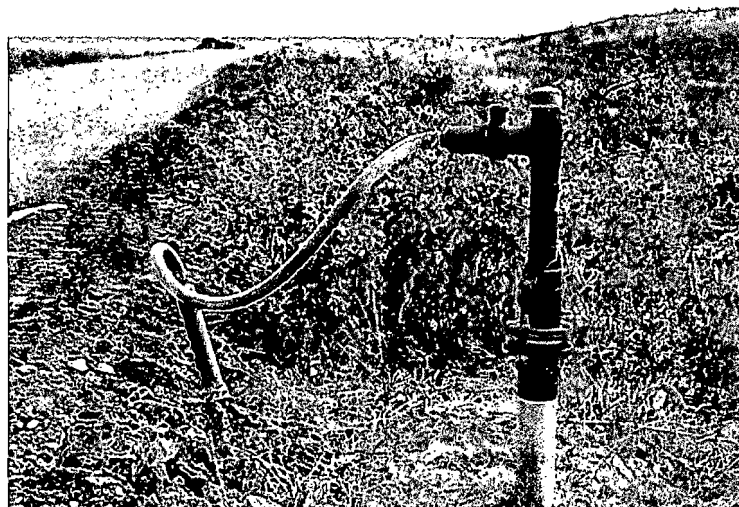
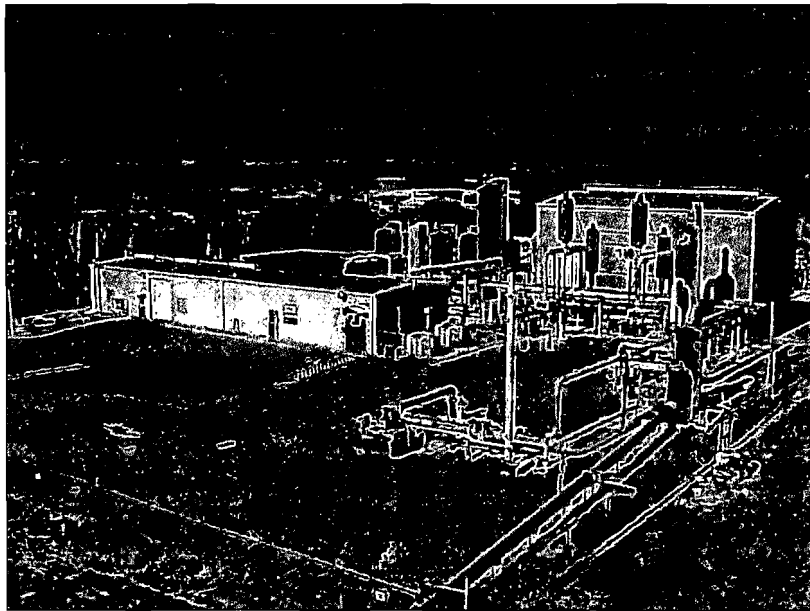
**LOW CARBON FUELS FOR TRANSPORTATION**

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- ❖ **Allow utilization of large renewable natural gas resource in California for generation of renewable electric power and use in low carbon transportation fuel by amending Health & Safety Code §§ 25420 & 25421 to apply only to Class I hazardous waste landfills**
  - Issue – vinyl chloride in landfill gas-derived pipeline quality gas introduced into gas pipeline
  - Vinyl Chloride is a carcinogen
  - Benzene and Toluene are also carcinogens that are in natural gas delivered throughout California
  - Vinyl Chloride also present in digester gas – which has no prohibition for delivery into California gas pipeline
- ❖ **Opportunity – availability of renewable natural gas for production of 100's of megawatts of renewable electric power and availability of renewable natural gas for use as low carbon fuel**
  - Example: Cambrian Energy and Clean Energy (largest supplier of alternative fuel, such as CNG and LNG, to transportation industry in U.S.) teamed with Shell Energy North America (US) to produce and deliver into California renewable natural gas derived from largest landfill in Texas for use by California utility to produce approximately 50 MW of renewable electric power for 15 years.
    - Resource life = more than 70 years
  - California is most populous state in U.S. and more people means more municipal solid waste, which means more landfill gas
    - Currently an underutilized renewable resource with large quantities of usable landfill gas being flared
- ❖ **Why isn't landfill gas being used to create electric power at landfills?**
  - It is, but restrictive regulations on air emissions limit amount of electric power generation that can be installed and operated
  - Example: Lopez Canyon Landfill – had 25 MW of available landfill gas resource, but could only site 6 MW of electric power generation

- Example: Otay Landfill in San Diego county has 7.4 MW of electric power generation, but 3,500,000 standard cubic feet of gas per day that is being flared because additional generation cannot be sited due to air emission constraints.
  - Nearly 10.5 MW of landfill gas fuel is being flared and wasted

#### ❖ **Bad Facts = Bad Law**

- 1988 law was proposed by then Senator Tom Hayden out of circumstances at a Class I hazardous waste landfill in Southern California – Operating Industries, Inc. Landfill
  - Landfill had only partial collection system installed to collect landfill gas
  - Landfill accepted large quantities of chemicals, including chlorinated solvents used for degreasing
- Operating Industries, Inc. Landfill became a Superfund Site
- Microbial action on chlorinated solvents produces vinyl chloride
- Large quantities of chlorinated solvents legally accepted in Class I hazardous waste landfills, and thus larger quantities of vinyl chloride
- Chlorinated solvents are not accepted at Class II and other permitted landfills in California, although very small quantities are present from aerosol cans
- Extensive study of creation of vinyl chloride in landfills prepared by Battelle Northwest Laboratories for California Air Resources Board in 1987, the following conclusions of which were ignored in adoption of H&S Code §§ 25420 & 25421:
  - Large quantities of vinyl chloride produced and present in gas that escapes Class I hazardous waste landfills due to legally accepted chlorinated solvents
  - Very small quantities of vinyl chloride produced and present in gas that escapes Class II and other landfills
  - PVC (used in construction and certain piping) does not result in creation of vinyl chlorides in landfills
- H&S Code §§ 25420 & 25421 applies to all landfills even though both the Battelle Northwest Laboratories report and the Operating Industries, Inc. facts indicate that significant levels of vinyl chloride in gas are created only at Class I hazardous waste landfills
- H&S Code §§ 25420 & 25421 require gas processed from LFG to be tested twice monthly by outside laboratory and impose \$2,500 per day fine on both producer of gas and gas pipeline company if vinyl chloride levels exceeded
  - Result – each California gas pipeline company tariff states that the pipeline company will not accept gas produced from landfills

#### ❖ **Wrong Phenomenon Regulated by H&S Code §§ 25420 & 25421 as to vinyl chlorides – Fuel Gas vs. Escaped Gas**

- All studies cited in adoption of California law and concerns about Operating Industries, Inc. Landfill pertain to vinyl chlorides present in landfill gas from Hazardous Waste landfills that is not collected and escapes into the atmosphere and to which people living around such Hazardous Waste landfills may be exposed as a health hazard

- Studies cite Operating Industries, Inc. Landfill and BKK Landfill, both of which are Class I hazardous waste landfills
- California law operates to restrict landfill gas that has been collected and will be used as a fuel when introduced into a gas pipeline rather than pertaining to landfill gas that may contain vinyl chlorides that escapes into the atmosphere
  - Existing federal and state regulations pertaining to landfill gas emissions regulate mandated collection of landfill gas and permissible levels of emissions
- ❖ **Vinyl Chloride in LFG is Diluted in Pipeline and Destroyed When Used as Fuel -- same as Benzene in Natural Gas**
  - Vinyl Chloride in LFG is diluted when blended with large quantities of natural gas in natural gas pipeline
  - Vinyl Chloride is destroyed more completely than is methane (the largest component in natural gas) when burned or combusted
  - There is less reason to restrict use of vinyl chloride in LFG in a pipeline than there is the presence of benzene, a more toxic carcinogen, that is present in natural gas in same gas pipeline
- ❖ **How Will Ability to Introduce LFG Into and Transport LFG through natural gas pipelines increase California's renewable electric power production and the use of low carbon fuels?**
  - Excess LFG available from California landfills can be processed completely by gas processing technology that has a very low emission profile into pipeline-quality renewable natural gas.
    - Can be permitted, constructed and operated in SCAQMD jurisdiction
  - LFG-derived renewable natural gas can be transported to existing large generating capacity electric power generation plants already operating in California to displace fossil-fuel natural gas and produce renewable electric power kilowatt hours that will qualify under California's Renewable Portfolio Standard.
    - Use of such LFG-derived renewable natural gas will eliminate full emissions from such quantity of LFG that otherwise would have been flared
  - Such LFG-derived renewable natural gas when used exclusively or blended with natural gas for use as a transportation fuel has high value in meeting proposed low carbon fuel standard being considered by California Air Resources Board for California
- ❖ **Does Any State Other than California have a law that restricts or prohibits pipeline quality landfill gas?**
  - NO – only normal gas pipeline specifications apply
- ❖ **Does California allow out-of-state renewable natural gas derived from LFG to be transported into California for use in production of renewable electric power?**
  - YES

- See California Energy Commission Renewables Portfolio Standard Eligibility Guidebook, (Third Edition)
  - Specifically allows and outlines qualifying procedure for use of out-of-state renewable natural gas derived from LFG to produced renewable electric power when transported to and used to produce kilowatt hours in California
- Not prohibited by California law, which only pertains to in-state landfill gas resources that will interconnect with a California gas pipeline company
- ❖ **Will Out-of State Renewable Natural Gas derived from LFG resources help California meet its Ambitious Renewable Portfolio Standard Goals?**
  - Only to a limited extent
  - Some pipeline constraints getting gas into California
  - Adoption of Federal Renewable Portfolio Standard will create high demand for retaining in-state renewable gas resources in other states
- ❖ **Are there landfills in or near my District in Southern California that could benefit from the recommended change to California law?**
  - Yes
    - Lopez Canyon Landfill
    - Sunshine Canyon Landfill
    - Bradley East & West Landfill
    - Puente Hills Landfill
    - Scholl Canyon Landfill
    - Otay Landfill
  - Other large landfills throughout California will also benefit
- ❖ **What Changes to H&S Code §§ 25420 & 25421 are recommended to achieve increased utilization of LFG to produce renewable electric power and for use as low carbon fuel in California?**
  - Amend H&S Code §§ 25420 & 25421 so that such provisions apply only to Class I hazardous waste landfills in California
  - Suggested amendments to such statutes are included in a Memorandum that will accompany this Outline