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| **Environmental Enlightenment #179**By Ami Adini - Reissued April 27, 2016

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| This is a SHORT, LIGHT and SIMPLE newsletter. Its purpose is to rekindle in the initiated terminology they have once learned, and enlighten the uninitiated on terms they may have heard but never known the meaning of. |
| **Petroleum Hydrocarbon Compounds; Series 3***Cyclic*has to do with circular or ring-like arrangement.http://amiadini.com/NewsletterArchive/160427-NL179/envEnl-179_clip_image002_revised.jpgA *cyclic chemical compound* is one that its molecules are structured from rings of atoms.The water molecule is not cyclic.  It has a linear arrangement where two hydrogen atoms hold hands with one oxygen atom, like this:http://amiadini.com/NewsletterArchive/160427-NL179/envEnl-179_clip_image004.jpgThe sulfur dioxide molecule is another example of linear arrangement where two oxygens are holding hands with one sulfurhttp://amiadini.com/NewsletterArchive/160427-NL179/envEnl-179_clip_image006_revised.jpgIn the organic universe of compounds, in the subset class of hydrocarbon compounds, we have the group of petroleum hydrocarbon compounds. There we find a cross-like molecular arrangement of the very basic compound of methane.http://amiadini.com/NewsletterArchive/160427-NL179/envEnl-179_clip_image008_revised.jpg     http://amiadini.com/NewsletterArchive/160427-NL179/envEnl-179_clip_image010_revised.jpg     http://amiadini.com/NewsletterArchive/160427-NL179/envEnl-179_clip_image012_revised.jpgWe climb up the ladder of complexity to the caterpillar-like molecule of *heptane*;http://amiadini.com/NewsletterArchive/160427-NL179/envEnl-179_clip_image014_revised.jpg       http://amiadini.com/NewsletterArchive/160427-NL179/envEnl-179_clip_image016_revised.jpgand proceed from there to the royal-like multi-name line, like the one below.http://amiadini.com/NewsletterArchive/160427-NL179/envEnl-179_clip_image018_revised.jpgAs we get more complex; and petroleum with its over 500 different molecules can get quite interesting; we enter the ring-like fellowship of the *cyclic compounds*.http://amiadini.com/NewsletterArchive/160427-NL179/envEnl-179_clip_image020_revised.jpgThe simplest ring of the petroleum gang is *benzene; s*ix carbons dancing holding hands and hydrogen toddlers holding to each of the dancers.http://amiadini.com/NewsletterArchive/160427-NL179/envEnl-179_clip_image022_revised.jpg   The rings evolve to intricate bonds; like the case of *ethylbenzene* where the *ethyl*kitty is springing out of the benzene ring.http://amiadini.com/NewsletterArchive/160427-NL179/envEnl-179_clip_image026_revised.jpg    http://amiadini.com/NewsletterArchive/160427-NL179/envEnl-179_clip_image028_revised.jpgIn the universe of organic compounds, a *cyclic compound* is one in which a series of carbon atoms are connected together to form a loop or ring. Benzene is a well known example.*Hetero* means *other* or *different*.  A *heterocyclic compound* would be the case where atoms other than carbon enter into the ring; the molecule is built of a ring of atoms of more than one kind.The ring-like molecule diagrammed below is *heterocyclic*; nitrogen entered into the carbon ring.http://amiadini.com/NewsletterArchive/160427-NL179/envEnl-179_clip_image030_revised.jpgA *heteroatom* is an atom other than carbon in the ring of a heterocyclic compound.  In the above ring, the nitrogen is designated that status; the nitrogen is a *heteroatom.*Petroleum and petroleum products are very complex mixtures that contain primarily hydrocarbons (compounds containing molecules of carbon and hydrogen atoms), heteroatom compounds (compounds containing molecules of carbon and hydrogen atoms with heteroatoms such as sulfur, nitrogen, or oxygen), and relatively small concentrations of metallic constituents.http://amiadini.com/NewsletterArchive/160427-NL179/envEnl-179_clip_image032_revised.jpgThe complexity of petroleum and petroleum products increases with carbon number. The heavier the material, the larger the number of possible combinations of atoms.Acknowledgment: The Association for Environmental Health and Sciences; <http://www.aehs.com/publications/catalog/contents/tph.htm> |
| You can find past issues of our "Environmental Enlightenment" at [amiadini.com](http://www.amiadini.com/)Wealth of information about environmental site assessments in the real estate transactions and issues concerning assessment and cleanup of contamination in the subsurface soil and groundwater. |

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| Call me if you have any questions. There are **no obligations.**Ami Adini Environmental Services, Inc.Environmental Consultants & General Engineering ContractorsCalifornia Lic. #1009513 A B HAZ ASB**818-824-8102**; **mail@amiadini.com**[www.amiadini.com](http://amiadini.com/)Ami Adini is a veteran environmental practitioner with over 40 years of experience. He carries a Bachelor of Science degree (B.Sc.) in Mechanical Engineering including academic credits in Nuclear and Chemical Engineering and postgraduate education in these fields. His career includes design and construction of nuclear plant facilities, chemical processing plants and hazardous wastewater treatment systems. He is a former California Registered Environmental Assessor Levels I & II in the 1988-2012 registry that certified environmental professionals in the assessment and remediation of environmentally impacted land, and a Registered Environmental Professional (REP) since 1989 with the National Registry of Environmental Professionals (NREP). He is a California Business & Professions Code Qualifying Responsible Managing Officer (RMO) in the General Engineering Contractor classification with Hazardous Substance Removal and Asbestos certifications, and president of AMI ADINI ENVIRONMENTAL SERVICES, INC. (AAES), a general engineering contractor and consulting firm specializing in environmental site assessments, rehabilitation of contaminated sites and removal of environmental risks from real-estate transactions. (Contact Ami for a complete resume.) **AAES provides practical solutions to environmental concerns using the highest standards of ethics and integrity while providing its clients with maximum return on their investments.** |

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