

Good Chemical Engineering Practice always expands Clean water Quality Management Area trend.

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ABSTRACT

Process Maximization data generated from Good Chemical Engineering Practice of the small sampling areas always state the expansion of Clean Water Quality Management Area Trends of the specific Geographical location. The whole program will be carried out in two phase. Protection human and aquatic ecosystem health in India involves understanding what is in the water, how is to be there, and how it might affect users of that water. Through scientific research, we are able to understand more and more about how human activity and how natural occurrences affect water quality and ecosystems. For instance, when scientist, study of waste water discharged from a manufacturing plant, they can see if a pollution prevention program at that plant is working. By using minnows in a laboratory, they can test how certain chemicals or mixtures of substances may affect fish populations. This research is done in a variety of ways and with many different partners from research facilities all over India. Governments, universities, and SME-businesses and industries run these facilities. Scientists share their research results with each other and the public. Scientists study everything's to do with water, not just what is in the water itself. Of course, they measure oxygen and chemicals and study microorganisms and fish. For instance, when scientist, study of waste water discharged from a manufacturing plant, they can see if a pollution prevention program at that plant is working to water reuse and recycling proper set up of water treatment plant, waste water treatment etc. Vast of water source area need not any such treatment. But now a day the important of water is increasing at a greater pace with the fast growing industries, thus is increasing the contamination of water sources. Where water quality index WQI (Degree of pollution Rating) = $\frac{[\sum QIW1]}{[\sum W1]}$. Where W1= assigned waste weight parameters= No of parameters utilized for computation of WQI. Approximately 750 samples per year need to be taken covering the following field parameters collection. That must determine Gro

und water Management Area Trends. Which should be permissible on the oversight (solid and Hazardous Waste Split Sampling).

As health and environmental issue is matter of concern both essential characteristics(parameters),eg: odour, turbidity, P^H value, Total hardness, Iron, chlorides, and diserable characteristics (parameters) eg:colour,total dissolve solides, Ca, Mg, Cu, Mn, SO₄⁻,NO₃⁻,F⁻, Zn, Alkalinity, Conductivity, Inorganic Phosphorous etc. all need to be tested carefully in proper analytical ways under schduled time and lab infrastructure. With theses all parameters the following pesticides need to be analysed to check the water sample for drinking purpose. The pesticides to be analysed :Aldrin and dieldrin, Alpha-BHC, Beta-BHC, Gama-BHC(Lindon), Endosulfan-I&II, Endosulfan sulfate, Endrin and Endirin aldehyde, Hepta chloro and Hepta chloro epoxide, Total DDT(4,4-DDT,4,4-DDD,4,4-DDE). To get fruit full result the working area should not be too much far i.e. at about within 10 to 15 K.M. from the laboratory *The matter is not only of health benefit but as well as socio-economic benefit of the concern area. Not only good habit as well as scientific practices by using high The various invention which are patent will come into market after 10 years , overcoming legislative boundary. Chemical analysis of water parameters may be drawn in various ways. Scientists and Engineers could be encouraged in this respect. Mechanical designs may be modified in various ways should be collective under a trademark and patent quality is highly encouraged.*

Use of renewable resources in the mechanical device design id highly well come in the water related problem. Apart from that conservation of bio-diversity by using some concept of water pollution management.

Key words: Good practice, WQI, Parameters, Patent techniques.

Introduction:

An increasing world population exerts a continually growing demand on usable fresh water resources. For a sustainable development of these water resources under economic and social constraints, the education of highly qualified water resources engineers with a global perspective and the ability for international scientific cooperation is of utmost importance. To facilitate the education the Department of Chemical Engineering at the University of Calcutta is operating a research Program in the field of "Sustainability Science of Water" The program aims the research through classes and workshops taught by faculty, and mandatory participation in seminars. Several interests have already shown in this field by publication and presentation of the matter in National and International level seminars and workshops. Actually it is to be established in the research topics more practically and theoretically that the *Process Maximization data generated from Good Chemical Engineering Practice of the small sampling areas always state the expansion of Clean Water Quality Management Area Trends of the specific Geographical location*

Program Guideline of the projected research:

The whole program will be carried out in two phase. In the initial phase, it is required to anticipate in classes at the doctoral level as specified in an individually designed study plan. The courses are intended to directly aid in the preparation for the dissertation research. Most classes in a regular curriculum based is to be supplemented through workshops and short courses taught by faculty from university. Aside from the classes, there will mainly focus on the preparation of a detailed research progress report and projected time line. In the second phase the research will primarily focus on the dissertation research and the preparation of a doctoral thesis. The thesis research may be undertaken at any of the participating institutes of the Department of Civil and Environmental Engineering Sciences. In addition the research will continue to participate in the doctoral seminar, which will take place twice a year. The

project may be carried out maximum within two years of duration for a particular segment of work and it may cost upto 10 lac for personel expenditure with the departmental infrastructure. Personal expenditure is from own source of income.

Research Scenario:

Protection human and aquatic ecosystem health in India involves understanding what is in the water, how is to be there, and how it might affect users of that water. Through scientific research, we are able to understand more and more about how human activity and how natural occurrences affect water quality and ecosystems. For instance, when scientist, study of waste water discharged from a manufacturing plant, they can see if a pollution prevention program at that plant is working. By using minnows in a laboratory, they can test how certain chemicals or mixtures of substances may affect fish populations. This research is done in a variety of ways and with many different partners from research facilities all over India. Governments, universities, and SME-businesses and industries run these facilities. Scientists share their research results with each other and the public. Scientists study everything to do with water, not just what is in the water itself. Of course, they measure oxygen and chemicals and study microorganisms and fish. For instance, when scientist, study of waste water discharged from a manufacturing plant, they can see if a pollution prevention program at that plant is working. By using minnows in a laboratory, they can test how certain chemicals or mixtures of substances may affect fish populations. This research is done in a variety of ways and with many different partners from research facilities all over sectors run these facilities. Scientists share their research results with each other and the public. But they also look at the amphibians or invertebrates/insects and other wildlife that live in or near the water and see how healthy they are. They also study plants. This is an ecosystem approach – one that looks at the health of all the living things that depend on the water, and just at what is in a single glass of water. Scientists are able to analyze chemicals in the water and in many cases trace them back to their sources. They also try to understand more about how bacteria act. And of course, scientists do some major detective work to find out the sources of

substances that seem to have no explanation for being there. Although many water research centers have already information about the work available on-line, based from the results of scientific studies. The Ministry of Environment (MOE), Pollution Control Board (PCB) recognizes the daily importance of science in making good environmental decisions. To sustain the clean water trend Department Of Chemical Engineering, The University Of Calcutta will organize a series of workshops on water quality, each of which will be co-hosted by the several Government and Non Government Organization and policy holders. Short term course from IIT-Kharagpur has given an Intellectual Property based idea which is important to guide a MSME for their guideline to overcome the legislative problems to establish themselves as good water concern.

Water Quality Impact: These research work side by side workshops provides a forum in which leading scientists present the latest information on issues such as water quality impacts from agricultural practices, ground water quality and water quality issues that relate to WQI tables given below.

To water reuse and recycling proper set up of water treatment plant, waste water treatment etc. Vast of water source area need not any such treatment. But now a day the important of water is increasing at a greater pace with the fast growing industries, thus is increasing the contamination of water sources. The major sources of water pollution are industries including tanneries, paper and pulp,

pharmaceutical, chemical, dyeing, petrochemical, petroleum, electroplating, agricultural industries etc. The waste water from industries percolates down and contaminates the natural ground water in both domestic and industrial sector in order to make water available to every sector it has to be treated before use. These workshops have drawn together many Indian key people in the areas of water research, knowledge development, policy development, and program delivery. The objective is to share information and provide opportunities for policy makers to give input to the scientific community. Some time some specific techniques must be imposed in order to get maximum benefit. As per example carcinogen 4-CP (Chlorophenol) is found in the water bodies near to effluents of pesticides, iron, steel, photographic pharmaceutical, pulp-paper, leather industries etc. Generally removed by using mixture (Fe₂O₃) + MnO₂. But using some H₂O₂ (1GM/L) will lead to 80% more vigorous agitation in the oxidation process. Although the vexing problem i.e. disposal which affects the water quality should only be solved by zero waste concept only. It is important to remember that the WCI alone should not be used to make hasty decisions to clean up water a water body. For instance should an impairment to the water quality of system be noticed, this is an indication that further investigation is needed into the potential problem area where water quality index WQI (Degree of pollution Rating) = $\frac{[\sum Q1W1]}{[\sum W1]}$. Where W1 = assigned waste weight parameters = No of parameters utilized for computation of WQI.

Excellent	Good	Bad	Very Bad	<u>Toxic</u>
90-100	70-90	<u>50-70</u>	25-50	<u>0-25</u>

WQI range

Overall water Quality Index determined by Q value

Test Results for	Row Data Column A	Row Data Column B	Weight Factor Column C	Total Column D
1.D.O.	60% Saturated.	58	0.17	9.86
2.Facial Coliform	20 colonies /10 ml.	62	0.17	9.92
3. P ^H	8 units	85	0.11	9.35
4.B.O.D.	6 mg/L	51	0.11	5.61
5.Temperature	0 °C	92	0.11	0.12
6.Total P[hosphate	4mg/L	51	0.10	7.00
7.Nitrates	0.8mg/L	58	0.08	5.80
Test Results for	Row Data Column A	Row Data Column B	Weight Factor Column C	Total Column D

8. Turbidity	3/set, (110/gm	76	0.07	6.08
9. Total solids	709 mg/L	20	0.07	1.40

Overall Water Quality Index

65.14

Q value 62 fical coliformcountof 20 colonies per 100 ml water.

So is the water excellent ,good medium or bad or very bad can be determined?

Sampling Techniques:

- Flow, depth of water is matter of concern for sampling Approximately 750 samples per year need to be taken covering the following field parameters collection:--

Alkalinity,BOD,COD,specificConductances,DO,D
O%Sat.,E.Colie,FaecalOviform,Ammonia,Nitrates,
Nitrites,TKN, PH, Dissolved Ortho Phosphate,total
Phosphate, total solids, Temp, TOC,
Turbidity>Total & Dissolved metals, Volatile and
semi volatile compounds, pesticides, herbicides.
Groud water contamination.

Ideas of Parameters in brief

- (1) Turbidity, a measure of light transmitting properties of water, is another test used to indicate the quality of waste discharge and natural water with respect to colloidal and residual suspended matter. TSS, Mg/s (total suspended solids)
 .Electric conductivity (EC) of a water is measure by conductometer.
- (2) $P^H = -ve \text{ Log}[H^+]$, of aqueous solution is measured P^H meter, and various papers and indicator that changes colour a definite solution.
- (3) Cl^- is constituents of concern in waste water, as it can impact the final re use applications of treated waste water. It comes mainly from leaching of Cl^- contents rocks/soils, may removed by various inorganic analytical methods.
- (4) Alkalinity is determined by treating against a strong acid. The result is expressed in terms of required mg/L $CaCO_3$ /
- (5) BOD test measurement of the DO used by microorganisms in the initial oxygen demand is done BOD bottle
- (6) A filter is used to separate TSS /TDS
- (7) Orthophosphate is determined directly by adding a substance such as ammonium molybdate
- (8) Sulphate is reduced to sulphide in sludge digestors
- (9) actual quantities of gases present in the solution is governed by Henry's law
- (10) Sensory method is often used to measure the odour
- (11) metals are removed by acid extraction, digestion, or membrane separation
- (12) bacterial indicators are used in pour and spread plate method / membrane separation techniques to detect and free bacteria
- (13) It should be kept in mind that a sampling area nearly pure water contain the following data to compare with the sampling areas:

Water Quality Parameters	BOD	TSS	Total N	Total P	PH	Cations: Ca^{+2}, Mg^{+2}, Na^+
Concentration Mg/L	39	160	4.4	5.5	7.7	37,46,410

Water Quality Parameters	Anions: HCO_3^-, SO_4^{2-}, Cl^-	Electrical Conductivity d s/m	TDS	Boron	Alkalinity	Hardness (Total $CaCO_3$)
Concentration Mg/L	295,66,526.	2.4	1536	1.2	242	281

In the time of determination of the water quality parameters we should be careful on the general water quality parameters of ground water, waste water, and normal water parameters given in the following chart:

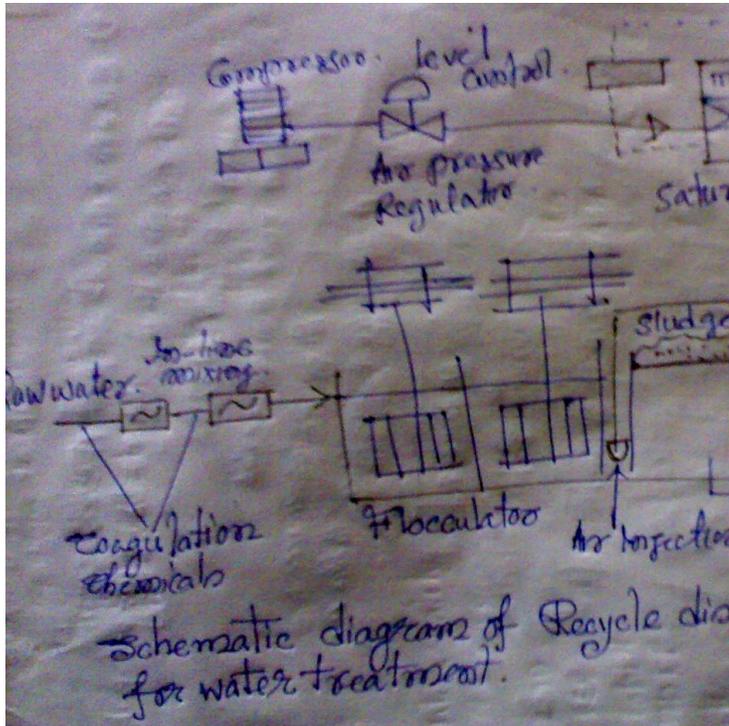
Constituents	Normal water	Ground water	Waste water
EC(ds/m)	0.11	1.25	0.69
p ^H	7.1	7.7	8.6
Ca ⁺²	10	100	24.0
Mg ⁺²	5	33	12.8
Na ⁺	6	92	80
K ⁺	1.5	3.9	13.8
SAR	0.4	2.0	3.3
HCO ₃ ⁻	42	190	236

SO4-2	7.3	110	----
Cl-	2.2	5.9	14
NO3-	0.08	1.4	0.43
TDS	72	800	44.2

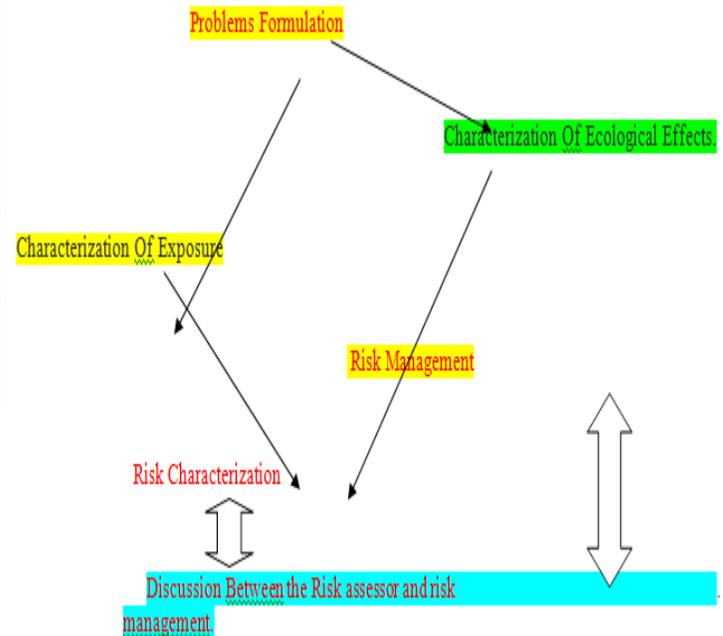
As health and environmental issue is matter of concern both essential characteristics(parameters) eg: odour, turbidity, P^H value, Total hardness, Iron, chlorides, and diserable characteristics (parameters) eg: colour, total dissolve solides, Ca, Mg, Cu, Mn, SO₄⁻, NO₃⁻, F⁻, Zn, Alkalinity, Conductivity, Inorganic Phosphorous etc. all need to be tested carefully in proper analytical ways under schduled time and lab infrastructure. With theses all parameters the following pesticides need to be analysed to check the water sample for drinking purpose. The pesticides to be analysed : Aldrin and dieldrin, Alpha-BHC, Beta-BHC, Gama-BHC(Lindon), Endosulfan-I&II, Endosulfan sulfate, Endrin and Endirin aldehyde, Hepta chloro and Hepta chloro epoxide, Total DDT(4,4-DDT, 4,4-DDD, 4,4-DDE).

If the pesticides found in the sampling location have concentration within the permeasible limit can be suitable for drinking purpose. That must determine Ground water Management Area Trends. Which should be permissible on the over sight (solid and Hazardous Waste Split Sampling). Naturally water quality trend will be of two types Ground water and hazardous Waste split sampling.) Naturally water quality trend will be of two types Ground water and surface water. Ground water pollution due to floride is nowadays emerginmg as a global issue considering its magnitude and spatial distribution throughout the world. In India itself 65 to 70 milion people are affected with fluorosis, a fluoride related crippling disease. In calcutta moderate high level of fluoride, even 15 times greater (4.5ppm) than the permissible limit by WHO [F-ve] (drinking water) < 1mg/litre of water. The people here suffering from mainly dental and skeletal flurosis. A detail survey and through monitoring of the water quality index together with deflurosis. A detail survey and through monitoring of the water quality index together with deflurodiation techniques is highly recommended to overcome the sufferings. The soil sampling by petrologic studies also proves fluoride concentration high.

NO	Community	Bare well No	date
1	X	10	dd/mm
2	Y	100	-
3	Z	1000	-
4	Q	01	--
5	A	001	---



of such studies. Various models may be dealt with with to give a synoptic view of the water pollution, surface and ground water source of contamination. So lower geographical regions (wetland, agricultural fields) have been given more preference the detection of Pb,As,Sb. There are several risk factors fo water Reuse. Risk Assessment For Water Reuse:



Sampling areas monitoring (Remote sensing and GIS is on technique) :

To get fruit full result the the working area should not be too much far i.e. at about within 10 to 15 K.M. from th laboratory, because of handling problems. Different locations of salt Lake have been taken as a zone of working area. Razabazr is another working location. Remote sensing may be used as susitable and cost effective tool to locate certain sub component of the environmental areas studies, especially those which are relevant in terms of metho, content and scale, such as land cover and land use, water quality , land forms drainage conduits and networks and surface profile disturbances. School Of Oceanography,, Jadavpur University, Department Of Science and Techonology, West Bengsl Government has such facility. Water quality monitoring through image processing requires vivid and intensive analysis of satelite data along with constant monitoring of the trend of change of various parameters also from a part

Conclusion:

The matter is not only of health benefit but as well as socio-economic benefit of the concern area. Not only good habit as well as scientific practices by using high technological latest devices to get maximum out put in a long term basis at about 5 years of continous educational development for well being to set up a good water quality area trend. Municipality, pancheat, corporation have their own scheme for establishing new pump station tank set up, deep tubelling according to Mouza wise need. But in W.B. substrub consciousness of water quality management is realy less due to small no of testing Laboratories. So establishment of such laboratories according to need is a very good idea. Government also take initiative

with the MSME, MNC to increase their business quite scientifically to get water in a packed form rather than open form for all community at a moderate rate. Invention of various tools, techniques, analytical methods for chemical analysis of water quality is highly welcome. The various inventions which are patentable will come into market after 10 years, overcoming legislative boundaries. Chemical analysis of water parameters may be drawn in various ways. Scientists and Engineers could be encouraged in this respect. Mechanical designs may be modified in various ways should be modified in various ways should be collective under a trademark and patent quality is highly encouraged. Use of renewable resources in the mechanical device design will highly well come in the water-related problem. Apart from that conservation of bio-diversity by using some concept of water pollution management. Sometime may be very much effective. Just for example usage of less plastic in the vicinity of water bodies may prevent life of fishes. It is found in research the idea of ecological park, Bio-village, green to evergreen revolution concept in water bodies may be used in some ways for the establishment of Eco-friendly water bodies should contain some minimum basic distinct features with the wetland as declared by Ramsar site criteria. Architectural idea may be incorporated to establish such park. It is highly beneficial for people's entertainment as well as business beneficial.

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