DEPARTMENT OF ENVIRONMENTAL QUALITY

NORTHWEST REGION

1010 N.E. COUCH STREET • PORTLAND, OREGON • 97232 • (503) 238-8471

TOM McCALL
GOVERNOR

KESSLER R. CANNON
Director

E. J. WEATHERSBEE
Region Administrator

August 21, 1974

Columbia Region Association
of Governments
6400 S. W. Canyon Court
Portland, Oregon 97221

Attention: Mr. John Hankee

Re: WQC - Johnson Creek

Gentlemen:

As per our telephone conversation of August 19, 1974, enclosed you will find the two water quality surveys for the Johnson Creek Basin that includes samples besides just the bacteriological data.

If we can be of any further assistance, please feel free to contact this office.

Sincerely,

KESSLER R. CANNON
Director

Robert E. Gilbert

Robert E. Gilbert
District Manager
Northwest Region

REG/kz
Enclosures

WATER QUALITY

ELEV OK

LRP - [illegible] Weather Clear & Sunny Major Basin

Month August Date Received 8/22/73

Year 1973 Date Reported 9/14/73

BOT / TOP	HPI	Basin	Field	C	IBM NUMBER	River Mile	Date	Time	pH	Temp.	DO		%Sat.	BOD	PBI	Field Cond.	MPN/100 ml T.C.	MPN/100 ml F.C.
514 / 420	439	514	6 CR	2	2250006	02	08 21 73	0940	73	155	10.7	9.1		16			1300	460
A30 / 472	42	----	6 CR	2	1250006	10		0950	73	150	10.1	8.5		16			2300	2300
525 / 477	868	589	2 CR	2	2250061 0	05		1000	73	150	10.2	9.2		10			230	60
542 / 877	109	----	4 CR	2	1250006	12		0955	75	150	10.6	9.8		08			2300	600
202 / 666	711	53	4 CR	2	2250006	28		1015	73	140	10.8	9.3		15			6200	600
618 / 522	322	----	2 CR	2	1250006	33		1055	68	140	8.8	7.9		09			24000	6200
R427 / 113	680	----	1 CR	2	1250006	48		1045	74	165	7.4	2.1		53			24000	2300
R10 / 129	530	----	½ CR	2	1250006	57		1105	75	200	7.7	0.0		≥77			6200	<450
A71 / 100	758	W420	½ CR	2	2250006	63		1115	66	270	4.5	0.8		37			6200	2300
325 / 394	884	----	½ CR	2	1250006	70		1130	73	180	7.9	1.1		68			<450	<450
486 / 665	2	----	½ CR	2	1250006	79		1140	73	160	7.7	6.1		16			2300	2300
57 / 394	917	----	½ CR	2	1250006	92		1145	73	170	7.3	4.7		26			2300	<450

...ENVIRONMENTAL QUALITY — STREAM SURVEY DATA SHEET

Survey ... Johnson Creek page 2 — ELEV OK

Month _____ Date Received 8/22/73

Year _____ Date Reported 9/4/73

... Lop - Dno Weather _____ Major Basin _____

Station	BOD / BPI	Basic	Flow	C	IBM NUMBER	River Mile	Date	Time	pH	Temp.	DO	%Sat	BOD	PBI	Field Cond.	MPN/100 ml T.C.	MPN/100 ml F.C.
...lly Cr. ... ...ster Rd.	247 / 353 / 915	W823	50PM	2 1	2 2 5 0 0 6 2 0	1 0		1155	78	160	10.3	10.0	03			< 4 5 0	< 4 5
...mond Trib. to ...ly Cr. ...ckey Rd.	106 / 632 / 544	----	16PM	2 1	2 2 5 0 0 6 2 0 1 0	0 1		1205	< 60	170	8.8	0.1	≥ 87			< 4 5 0	< 4 5
...nson Cr. ... E. Berea	19 / 336 / 741	I-1	½ cfs	2 2	2 2 5 0 0 6	1 1 9		1215	72	165	6.9	4.6	23			< 4 5 0	< 4 5
...nson Cr. ... Main St. (Crosby)	7 / 352 / 769	----	½ cfs	2 1	2 2 5 0 0 6	1 4 0		1225	76	200	14.9	8.8	61			6 2 0 e	< 4 5
...nson Cr. ... ...gner Rd.	R50 / 153 / 293	1065	150PM	2 2	2 2 5 0 0 6	1 5 0		1320	73	180	9.1	6.6	25			6 0 e	< 4 5
...nson Cr. ... ...gan Rd.	220 / 407 / 823	----	46PM	2 1	2 2 5 0 0 6	1 5 6		1330	72	160	7.2	4.2	30			< 4 5 e	< 4 5
TK. Johnson Cr 2.62nd	~~127~~ / 223 / ~~577~~	----	<1CFS	2 1	2 2 5 0 0 6 8 0	1 2											
...ed Trib. to TK. John... Cr	/ /	----	Dry	2 1	2 2 5 0 0 6 8 0 1 0	0 1											

REMARKS: _____

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...ENVIRONMENTAL QUALITY — LABORATORY BASIC DATA SHEET

...Creek — DATE COLLECTED: — DATE REPORTED: 9/4/73

Station	Bottle Number	pH Units	Color Units	Turbidity JTU's	Total Solids mg/l	Susp. Solids mg/l	Alkalinity mg/l as $CaCO_3$	Hardness mg/l as $CaCO_3$	Sulfate $SO_4^=$ mg/l	Ammonia Nitrogen NH_3-N mg/l	Nitrate Nitrogen NO_3-N mg/l	Soluble Ortho Phosphate mg/l as PO_4	Chloride Cl^- mg/l	Sodium Na mg/l	Potassium K mg/l	Ejectable-hitrogen E-N mg/l	Total Phosphorus mg/l as PO_4	Lab Cond.
...ch	S-14	7.7	0	4	241	5.5	58	~~74~~ 105 / ~~39~~ 34.0	~~45.3~~ 17.4	<0.01	4.8	0.22	~~29.8~~ 30.4	9.5	3.7	0.2	0.2	358
...ch	S-89	7.6	0	5	195	13.0	54	81.9 / 74.1	16.4	0.03	5.5	0.19	16.7	6.8	3.0	0.5	0.2	258
...ch	S-3	7.7	0	4	172	4.5	60	81.5 / ~~81.9~~	16.0	<0.01	6.4	0.24	9.2	8.6	3.8	0.4	0.2	275
...ch	W420	sample not found																
...ch	I-1	7.5	25	12	178	21.0	82	~~72.6~~	2.5	0.03	0.22	0.11	10.1	9.5	2.5	0.4	0.2	216
...Rd.	1065	7.7	20	7	116	10.5	71	52.6	1.5	0.25	0.16	0.14	2.6	8.9	2.2	0.3	0.1	168
...y creek at ...ster Road	W823	7.7	5	5	132	15.0	59	53.5	3.9	0.01	0.62	0.16	5.3	7.2	1.3	0.2	0.2	170

NAME: Johnson Creek page 1
DATE COLLECTED: 8/21/73
COLLECTED BY: LDP & DWO

DEPARTMENT OF ENVIRONMENTAL QUALITY

MPN COMPARISONS

	DEQ Membrane Filter		DEQ Multiple Tube		OSHD Multiple Tube	
	Total	Fecal	Total	Fecal	Total	Fecal
Johnson Cr. @ mouth					1,300	460
Johnson Cr. @ Ochoco Ave.					2,300	2,300
Crystal Springs Cr. @ mouth					230	60
Johnson Cr. @ Johnson Park					2,300	600
Johnson Cr. @ S.E. 45th					6,200	600
Johnson Cr. @ Stanley Ave.					24,000	6,200
Johnson Cr. @ Luther Rd.					24,000	2,300
Johnson Cr. @ S.E. 92nd Ave.					6,200	<450
Johnson Cr. @ S.E. 100th					6,200	2,300
Johnson Cr. @ S.E. 110th					<450	<450
Johnson Cr. @ S.E. 122nd Ave.					2,300	2,300
Johnson Cr. @ Foster Rd.					2,300	<450
Kelly Cr. @ Foster Rd.					<450	<450
Unnamed Trib. to Kelly Cr. @ Richey Rd.					<450	<450

NAME: Johnson Creek page 2
DATE COLLECTED: 8/21/73
COLLECTED BY: LDP & DWO

DEPARTMENT OF ENVIRONMENTAL QUALITY

MPN COMPARISONS

	DEQ Membrane Filter		DEQ Multiple Tube		OSHD Multiple Tube	
	Total	Fecal	Total	Fecal	Total	Fecal
Johnson Cr. @ S.E. 190th					<450	<450
Johnson Cr. @ S. Main St. (Gresham)					6,200	<450
Johnson Cr. @ Regner Rd.					600	<450
Johnson Cr. @ Hogan Rd.					<450	<450

WQC 6-2-43 Johnson Creek TO REG & ~~LDP~~ PDX

OREGON STATE SANITARY AUTHORITY — STREAM SURVEY DATA SHEET

Sample Run: Johnson Creek Date 4-17-73 District PORT. Date Received (Lab.) 4/17/73

Collected by: REG, LDP, DWO Weather: Overcast Copy Sent _____ Date Reported 5-17-73

DESCRIPTION and COMMENTS	STATION NUMBER	Sample Time	SAMPLE BOTTLE NUMBER DO	BOD	PBI	MPN	Basic Data	Other Flow cfs	FIELD DATA pH	Temp °C	LABORATORY ANALYSIS Orig. DO	Final DO	BOD	PBI	Cond.	MPN FC	Other 7 c
NEAR MOUTH	1	0920	201	353		568	S 12	15cfs	7.7	11	10.7	7.5	3.2			24000	2,3
@ Chaco Ave	2	0932	A 54	137		608		15cfs	7.7	11	10.8	8.3	2.5			13000	2,3
@ Johnson Park	3	0948	68	665		721		10 cfs	8.3	11	10.8	7.9	2.9			24,000	60
@ 75TH S.E.	4	1000	181	315		655	W 37	9 cfs	7.3	11	10.6	7.8	2.8			6200	230
@ Stanley Ave	5	1010	229	379		188		9 cfs	7.1	11	10.4	8.1	2.3			24000	60
@ Luther Road ~~Ave~~	6	1020	144	401		781		9 cfs	7.3	11	10.3	7.5	2.8			70,000	2,3
@ SE 92nd	7	1035	327	642		434		9 cfs	7.3	11	10.4	7.4	3.0			24000	2,3
@ SE 100TH	8	1045	180	236		857	993	8 cfs	7.3	10	10.3	7.9	2.4			70,000	1,3
@ SE 110TH	9	1130	B 55	281		695		7 cfs	7.3	10	10.9	8.1	2.8			24,000	2,3
@ SE 122nd	10	1135	25	115		740		7 cfs	7.3	10	11.3	9.2	2.1			24,000	24,0
@ Foster Road	11	1140	B 95	663		496		7 cfs	7.1	10	11.0	9.0	2.0			70,000	2,3
@ SE 130TH	12	1155	160	161		645	968	6 cfs	7.1	10	11.0	9.0	2.0			70,000	2,3

Rev. WPC-27 (5/63)

OREGON STATE SANITARY AUTHORITY — STREAM SURVEY DATA SHEET

Sample Run: Johnson Creek Date 4-17-73 District _____ Date Received (Lab.) 4/17/73

Collected by: LDP, REG, DWO Weather: Overcast Copy Sent _____ Date Reported 5-17-73

DESCRIPTION and COMMENTS	STATION NUMBER	Sample Time	SAMPLE BOTTLE NUMBER DO	BOD	PBI	MPN	Basic Data	Other	FIELD DATA pH	Temp °C	LABORATORY ANALYSIS Orig. DO	Final DO	BOD	PBI	Cond.	MPN	Other T C
@ Main Ave	13	1203	384	761		777		5 cfs	7.1	10	11.6	10.1	1.5			24,000 ~~70,000~~	2,300
@ Regner R.	14	1210	139	184		603	W 413	5 cfs	7.3	10	11.5	10.2	1.3			24,000	2,300
@ Hogan Rd	15	1220	54	634		614		4 cfs	6.9	10	11.7	10.1	1.6			24,000	2,300
Crystal Spring	16	0945	278	309		688	S 21	5 cfs	7.3	11	10.9	9.9	1.0			600	600
North Fork of Johnson Creek @ Powell Valley Rd	17	1345	A 01	400		868		30 gpm	6.7	10	10.4	8.9	1.5			>70,000	70,000
North Fork of Johnson Creek @ 282nd	18	1350	202	714		183		300 gpm		10	10.4	8.4	2.0			240,000	<4,500
~~Pleasant Valley Kelly Creek above STP~~ ~~STP~~	~~19~~	~~1420~~	~~457~~	89		631		0.25 cfs	6.9	10.5	9.4	8.2	1.2			1,300	<450
Trib of Kelly Creek above Pl. Valley STP																	
~~Kelly~~ Creek below Pl. Valley STP	20	1435	A 26	320		479		1.5 cfs	6.8	9	10.1	8.0	2.1			70,000	2,300

Rev. WPC-27 (5/63)

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY — LABORATORY ANALYSIS DATA SHEET

SURVEY: Johnson Creek — DATE COLLECTED: 4-17-73 — DATE REPORTED: 5-10-73

STATION	Bottle Number	pH Units	Color Units	Turbidity JTU's	Total Solids mg/l	Susp. Solids mg/l	Alkalinity mg/l as $CaCO_3$	Hardness mg/l as $CaCO_3$	Sulfate $SO_4^=$ mg/l	Ammonia Nitrogen NH_3-N mg/l	Nitrate Nitrogen NO_3-N mg/l	Soluble Ortho Phosphate mg/l as PO_4	Chloride Cl^- mg/l	Sodium Na mg/l	Potassium K mg/l	Kjeldahl-Nitrogen K-N mg/l	Total Phosphorus mg/l as PO_4	Lab Cond
r Mouth	S-12	8.9	7	23	~~514~~ 209	12.5	~~51~~ 0.6	51.3	6.2	0.12	3.15	0.20	13.2	14.0	2.8	0.4	0.3	218
45th S.E.	W37	6.8	10	33	~~146~~ 159	43.0	24 ~~2.4~~	27 ~~30.0~~	3.0	0.10	1.22	<0.01	3.6	4.5	2.0	0.3	0.2	95
SE [redacted]oth	993	7.1	15	48	~~144~~ 125	~~25.5~~ 62.0	~~2.3~~ 25	28.8	4.1	0.12	1.13	0.03	3.6	~~4.0~~ 3.0	2.0	0.3	0.2	97
SE 190th	968	6.8	25	27	~~32.3~~	~~17.5~~ 25.5	~~1.8~~ 18	~~22.5~~ 19.9	2.3	0.12	1.20	0.05	4.1	~~3.5~~ 3.0	2.0	0.3	0.2	78
Rogue R.	W413	6.7	20	15	~~37.1~~	~~5.5~~ 17.5	~~1.4~~ 14	18.0	1.6	0.08	1.41	0.03	3.1	~~3.5~~ 2.0	2.0	0.4	0.1	66
Crystal Spring	S-21	7.5	5	2.5	~~48.3~~	~~5.5~~	~~5.3~~ 53	~~84.4~~ 80.4	14.6	0.10	5.22	0.23	7.7	~~5.5~~ 5.0	4.0	0.2	0.2	237
				-														

COMMENTS: ✓

COST BREAKDOWN BY PROGRAM ELEMENT (Water Quality Management)

PROGRAM ELEMENT	CRAG[1]	MSD[2]	CORPS[3]	OTHER[4]
I. Project Initiation	$ 9,800	$		$
II. Physical Characteristics	10,500			
III. Population and Economic Growth	11,800			
IV. Land Use Inventory	34,000			
V. Land Use Projections	35,400			
VI. Inventory Existing Facilities	25,700	7,500		
VII. Existing Waste Sources	16,000			
VIII. Waste Projections	8,300			
IX. Water Quality Data Gathering	8,300			30,000
X. Urban Runoff & Combined Sewer Data Gathering				80,000
XI. Inventory Non-Structural Controls	3,400	7,400		
XII. Inventory Water Quality Management Institutions	3,400	7,400		
XIII. Financial Capability	3,200	7,600		
XIV. Develop Alternatives for Wastewater Control to meet 1983 Requirements of PL 92-500	10,000			50,000
XV. Develop Alternatives for Wastewater Control to Meet 1985 Requirements of PL 92-500	30,000		415,000[5]	
XVI. Develop Alternatives for the Control of Urban Stormwater Runoff	6		6	
XVII. Develop Alternatives for the Control of Sanitary and Combined Sewer Overflows	15,000			120,000
XVIII. Develop Alternatives for the Control of Residual Wastes	5,000		75,000[5]	
XIX. Develop Alternatives for the Control of Non-Point Sources	6,000		36,000[5]	50,000
XX. Evaluate and Compare Alternatives, Select Water Quality Management Plan	20,000			35,000
XXI. Environmental Impact Assessment				30,000
XXII. Develop Regulatory Alternatives	1,700	5,100		60,000
XXIII. Develop Institutional Alternatives	1,700	5,100		20,000
XXIV. Develop Financial Alternatives	1,700	5,100		70,000
XXV. Develop Alternatives for a Continuous Planning Process	1,700	5,100		20,000
XXVI. Evaluate and Compare Alternatives, Select Implementation Arrangements	4,200	12,200		15,000
XXVII. Public Involvement Program	15,700			30,000
XXVIII. Study Management	80,000			
XXIX. Preparation of Reports				30,000
	$362,500	$62,500	$526,000	$640,000

[1]Work performed by CRAG Staff (EPA Funds).
[2]Work performed by MSD with contract from CRAG (EPA Funds).
[3]Work performed by Corps related to Water Quality Management (urban studies program).
[4]Work performed by outside consultants (EPA Funds).
[5]Cost includes data collection and analysis, development of alternatives, evaluation of impacts, development of implementation arrangements, public involvement and study management.
[6]Cost included in program element XV.

cc Chuck, Tony
208 Chuck

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region X - 1200 Sixth Ave., Seattle, WA 98101

SUBJECT: Section 208 Designation for the Portland Area and the Columbia Region Association of Governments in Oregon

DATE: OCT 4 1974

FROM: Clifford V. Smith, Jr.
Regional Administrator, Region X

RECEIVED
OCT - 7 1974
COLUMBIA REGION ASS'N. OF GOVERNMENTS

TO: James L. Agee, Assistant Administrator
for Water and Hazardous Materials (WH-556)

We recommend approval of Governor McCall's designation of the Portland Area (including Washington and portions of Multnomah and Clackamus Counties) and the Columbia Region Association of Governments as the planning area and agency for areawide waste treatment management under Section 208 of the Federal Water Pollution Control Act Amendments of 1972.

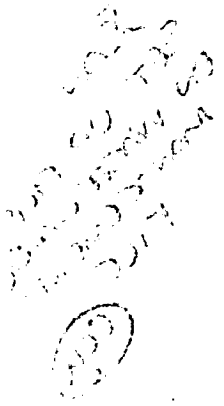
The information submitted with this designation demonstrates the existence of a substantial water quality control problem in the area. All of the major receiving waters available for waste discharge from the area have been classified by the Department of Environmental Quality as water quality limiting due to specific water quality problems or the need to preserve existing high quality waters. Waste load allocations and advanced waste treatment levels for municipal and industrial dischargers, established by the Department of Environmental Quality in their preliminary 303(e) basin plan for the Willamette River, constitute severe external constraints upon the area that must be met by 1983. An extensive combined sewerage and urban storm runoff problem also exists.

There is assurance that the affected units of local government will join together in the 208 planning process to develop a coordinated areawide waste treatment management plan, and that the planning agency contains the capability of having the plan implemented.

We recommend a planning cost of $1,065,000 for the development of an initial areawide waste treatment management plan over a period of two years. This cost estimate is in accord with the average values in EPA's guide for determining potential 208 grant amounts.

Enclosed are two copies of supporting information, dated August 1974, submitted by the Columbia Region Association of Governments. This information upgrades information of a similar nature supplied by the Oregon Department of Environmental Quality and the Columbia Region Association of Governments on March 12, 1974 (a copy of the March 12 material was sent to Mark Pisano of your staff on March 22). Except for Attachment E of the March 12 submittal (Attachment E summarizes public participation during the designation process), all supporting material pertinent to the designation is included in the August package. For convenience,

EPA Form 1320-6 (Rev. 6-72)



we are enclosing a copy of Attachment E. We are also enclosing our evaluation of the designation based on our review of the supporting information. In addition, we are enclosing copies of Governor McCall's March 12, 1974 letter designating the subject area and agency and his September 13, 1974 amendment to the designation.

If we can be of assistance as your office reviews this material, please contact us.

Enclosures

cc: Governor Tom McCall
Oregon Department of Environmental Quality
Columbia Region Association of Governments
Director, Oregon Operations Office, w/encl.

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION X
1200 SIXTH AVENUE
SEATTLE, WASHINGTON 98101

DEC 3 1974

REPLY TO ATTN OF: M/S 441

Honorable Tom McCall
Governor of Oregon
State Capitol
Salem, Oregon 97310

Dear Governor McCall:

The Administrator of the Environmental Protection Agency has approved the Oregon designations submitted pursuant to Section 208 of the Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500). The Administrator's approval letters are enclosed. This approval covers the areas and agencies designated in your letter dated March 12, 1974 and amended on September 13, 1974. Specifically, the areas and agencies involved are:

Portland Area	- Columbia Region Association of Governments
Salem Area	- Mid-Willamette Valley Council of Governments
Eugene-Springfield Area	- Lane Council of Governments

We feel that 208 planning in these areas will be a key element in implementing PL 92-500 and a significant step toward solving the water quality problems in the Willamette River Basin.

In response to your designation of the Department of Environmental Quality as our contact on 208 matters, we will be working closely with that office to assure that the 208 program is closely tailored to State needs and will complement other State programs. With the assistance of the Department of Environmental Quality, we will be meeting with the designated 208 agencies in the near future to assist them in developing an application for a planning grant and in formulating a planning process.

We appreciate your interest and assistance in initiating the Section 208 planning program.

Sincerely,

Clifford V. Smith, Jr., Ph.D., P.E.
Regional Administrator

Enclosures

cc: (w/encls)
Kessler R. Cannon, DEQ
W. J. Kvarsten, MWVCOG
Larry Rice, CRAG
Robert W. Chave, LCOG
John Vlastelicia, Oregon Opns. Ofc.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

NOV 18 1974

OFFICE OF THE
ADMINISTRATOR

Dear Governor McCall:

I am pleased to inform you that I have approved your designation of the Portland area as an areawide waste treatment planning area and the Columbia Region Association of Governments as the planning agency for that area in accordance with Section 208(a) of the Federal Water Pollution Control Act Amendments of 1972.

This designation represents an excellent opportunity to collectively solve the complex water quality control problems of the Portland area.

I assure you that the Environmental Protection Agency will continue to provide all possible assistance to the Columbia Region Association of Governments in carrying out its duties under the designation.

Sincerely yours,

Russell E. Train
Administrator

Honorable Tom McCall
Governor of Oregon
Salem, Oregon 97310

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

NOV 18 1974

OFFICE OF THE
ADMINISTRATOR

Dear Governor McCall:

I am pleased to inform you that I have approved your designation of the Eugene-Springfield area as an areawide waste treatment planning area and the Lane Council of Governments as the planning agency for that area in accordance with Section 208(a) of the Federal Water Pollution Control Act Amendments of 1972.

This designation represents an excellent opportunity to collectively solve the complex water quality control problems of the Eugene-Springfield area.

I assure you that the Environmental Protection Agency will continue to provide all possible assistance to the Lane Council of Governments in carrying out its duties under the designation.

Sincerely yours,

Russell E. Train
Administrator

Honorable Tom McCall
Governor of Oregon
Salem, Oregon 97310

10/D. 2

COLUMBIA REGION ASSOCIATION of GOVERNMENTS

527 S. W. HALL STREET
PORTLAND, OREGON 97201

(503) 221-1646

FILE WATER QUALITY

M E M O R A N D U M

January 2, 1975

To: Community Development Technical Advisory Committee

Subject: Item VI C #1, Agenda, January 8, 1975: Presentation of Program and Application for EPA Funds for Waste Water Management Study

Enclosed for your information and study is the staff report prepared in connection with the above agenda item.

This material will be discussed at the Community Development Technical Advisory Committee meeting at 1:30, January 8, 1975.

TL/mhm
enclosures

PRELIMINARY WORKPLAN

I. DATA COLLECTION AND ANALYSIS

TASK I - GOALS AND OBJECTIVES

1. Meet with local government agencies to determine specific water quality management problems and management needs.
2. Obtain from state and federal agencies a statement of their objectives for the water quality management program.
3. Through meetings with the Technical Advisory Committee and the Citizens Advisory Committee develop water quality management goals and objectives to year 2000, consistent with local government needs and state and federal goals and objectives.
4. For project initiation, assume the following goals for water quality management:
   a. Meet in-stream water quality standards enacted by the Oregon Department of Environmental Quality.
   b. Meet the 1983 Water Quality Goal of PL 92-500 - water quality which provides for fish propagation and water quality which provides for water contact recreation.
   c. Local government standards.

TASK II - REVIEW 303e BASIN PLAN

1. Evaluate preliminary 303e in-stream quality standards, load allocations, treatment requirements, stream classifications.
2. Make recommendations to DEQ.
3. Obtain the major design criteria from DEQ necessary for project initiation:
   a. in-stream quality standards
   b. municipal and industrial treatment requirements
   c. municipal and industrial load allocations
   d. stream classifications

TASK III - INVENTORY OF PLANNING PROPOSALS

1. Inventory and evaluate pertinent regional and local water quality control planning completed or in progress throughout the Study Area. This task will generally consist of evaluating master plans completed by Portland, Clackamas County, Washington County, Multnomah County and the Columbia Region Association of Governments.

The specific planning proposals will be incorporated into the analysis of alternative water quality control strategies.

2. Inventory and evaluate drainage planning.
3. Inventory solid waste planning.
4. Inventory transportation planning.
5. Inventory air quality planning.

TASK IV - STUDY AREA PHYSICAL CHARACTERISTICS

1. Basin description - tabulate surface air, land, water, total acreages and map.
2. Describe and map Study Area topography; establish major and minor drainage basins.
3. Geology. Describe and map surface geology; include a composite map showing geological factors, high water tables, flood plains, soil characteristics and other factors which would: (a) inhibit septic operations, (b) describe drainage conditions. Also describe subsurface geologic conditions; including gravel resources.
4. Surface water. Describe hydrology of surface water: (a) low flow year of record (b) mean monthly flows, (c) 1 day in 10 year low flow, (d) 7 day in two year low flow, (e) flood flow characteriscics.
5. Groundwater. Inventory available information on groundwater movement, location and depth of groundwater aquifiers, ground water recharge areas, location and yield of wells.
6. Climate. Describe the Study Area climate and percipitation patterns. From rainfall records, tabulate and map precipitation intensity and spatial distribution and storm patterns by drainage basin.

TASK V - INVENTORY EXISTING LAND USE

1. Conduct land use inventory in accordance with the following classifications:
   a. residential - acreage in residential use at several densities
   b. commercial - acreage in shopping centers, strip commercial, central business districts
   c. industrial - acreage used for manufacturing, industrial non-manufacturing, wholesale trade.
   d. transportation - acreage related to transportation including roads, airports, railroads, parking lots.

e. recreational - public and private acreage devoted to recreational activities.

f. public - acreage owned by the public including military reservations, cemeteries, educational holdings, sanitary landfills, public utilities.

g. agricultural - acreage in agricultural land uses including irrigated crop land, dryland farming, grazing and dairy lands, feedlots and poultry farms.

2. Tabulate existing land uses by drainage basin.

3. Map existing land uses by drainage basin.

TASK VI - POPULATION AND ECONOMIC GROWTH

1. Population. Assume a maximum population equal to the Study Area Design population of 2,000,000 at year 2000. Develop at minimum projection based on analysis prepared by the CRAG staff. The minimum and maximum projections provide a population range.

2. Economic growth. Analyze "water using" activities, particularly "wet process" industries. Based on the analysis, project growth of these activities to year 2000. The economic growth projections are to be consistent with CRAG's Focused Growth plan and maximum design population of 2,000,000.

TASK VII - LAND USE PROJECTION

1. Utilize the CRAG Focused Growth Plan to establish the four basic land use categories and their distribution:

   a. urban services area
   b. rural residential
   c. agricultural
   d. conservation

   Project and distribute these four basic land use categories for 1985, and 2000. The projection and distribution should be based on existing land use patterns, the population and economic growth analysis, and the CRAG Focused Growth Plan.

2. Extend the four basic land use categories and break projected land use patterns down to the following classifications:

   a. residential - acreage in residential use at several densities.

   b. commercial - acreage in shopping centers, strip commercial,

business districts

c. industrial - acreage used for manufacturing, industrial non-manufacturing, wholesale trade.

d. transportation - acreage related to transportation including roads, airports, railroads, parking lots.

e. recreational - public and private acreage devoted to recreational activities

f. public - acreage owned by the public including military reservations, cemeteries, educational holdings, sanitary landfills, public utilities

g. agricultural - acreage in agricultural land uses including irrigated crop land, dryland farming, grazing and dairy lands, feedlots and poultry farms.

3. Tabulate the above classifications by drainage basin for 1985 and 2000. Map the above classifications.

4. Spatially distribute the existing and projected population and economic activities by drainage basin for 1985 and 2000.

TASK VIII - WATER USE

1. Conduct a general analysis of water use by drainage basin (data to be used to help determine wastewater flows and to help in identifying critical stream segments). Some possible categories of use are as follows:

   a. drinking water
   b. water recreation
   c. agricultural
   d. industrial

2. Conduct a general analysis of water rights and assess the impact on water quality.

3. Project water use for 1985 and 2000.

TASK IX - INVENTORY EXISTING FACILITIES

1. Sanitary and Combined Sewage Systems

   a. Inventory and map sewer service areas and jurisdictional boundaries of agencies providing sewer service. Provide additional descriptive information as needed.

   b. Conduct an inventory to determine size, type, physical condition and location of sanitary and combined interceptors

and lift stations.

c. Describe overflow history of sanitary and combined sewers; including frequency and an estimate of overflow quantity. Determine points of discharge.

d. Provide maps of present system showing interceptor and outfall sanitary sewers, principle combined sewers, pump stations, overflows and bypasses for sanitary and combined sewers.

2. Treatment Facilities (municipal):

a. Map location, outfall line and receiving stream.

b. Inventory treatment facilities and provide at least the following information:

1. NPDES permit design
2. design flow
3. type of treatment
4. assessment of performance
5. influent and effluent characteristics
6. industrial pretreatment requirements

3. Treatment Facilities (industrial):

a. Map location, outfall line and receiving stream.

b. Inventory industrial treatment facilities and provide the following information:

1. NPDES permit information
2. design flow
3. type of treatment
4. assessment of performance
5. influent and effluent characteristics

4. Storm Water:

a. Inventory and map drainage service areas, jurisdictional boundaries of agencies providing storm water runoff control and boundaries of municipalities.

b. Inventory and map storm drainage facilities in the study area. Indicate size, type, physical condition, capacity, location of discharge points.

5. Septic Tanks:

a. Inventory individual waste treatment systems (septic tanks) that are in existence within individual sewer service areas and outside service areas but within the Study Area.

b. Define unsewered areas which have existing sewerage needs (i.e. areas having failing septic tanks).

6. Residual Wastes:
   a. Inventory and map residual wastes disposal areas.
   b. Describe residual waste disposal practices.
7. Solid Wastes - provide descriptive information on current solid waste disposal facilities, practices and plans.

TASK X - EXISTING WASTE SOURCES

1. Determine Existing Waste Sources - inventory and map significant point and nonpoint discharges with each discharge keyed to river-mile or other specific descriptions. Possible identifiable point and nonpoint discharges include the following:
   a. municipal wastes (including industrial components)
   b. industrial wastes
   c. individual sanitary discharges
   d. combined sewer overflows
   e. sanitary sewer overflows
   f. urban storm water runoff
   g. drainage from solid waste disposal
   h. thermal power and cooling water discharges
   i. recreation wastes
   j. log dumping, rafting and storage
   k. streambank erosion
   l. irrigation return flow
   m. animal feedlot wastes
   n. runoff from agricultural operations
   o. runoff from construction practices
   p. spills
   q. wastes from vessels and marinas
   r. dredging and dredging spoils.
2. Waste Characteristics - identify, to the extent practicable, the waste characteristics of the significant waste sources. Some possible waste characteristics include the following:
   a. BOD
   b. COD
   c. color
   d. turbidity

e. solids
f. toxic substances
g. metal ions
h. fluids
i. dissolved substances
j. temperature
k. ph
l. chlorides
m. nutrients

3. Determine Raw Waste Produced - the raw waste is that waste produced by each source prior to treatment. The waste produced shall be given by flow (mgd) and pounds of waste wherever possible.
   a. raw waste during the dry weather period.
   b. raw waste produced under wet weather conditions.
4. Determine the level of treatment presently employed to control the waste sources:
   a. point source waste should include influent characteristics, types and level of treatment, and effluent characteristics and quantity.
   b. currently employed practices used to eliminate or reduce the entry of non-point sources into water bodies should be enumerated.
5. Determine final waste load after current treatment and controls from each waste source. Estimates of quantity of individual pollutants should be estimated during dry weather and wet weather conditions. Estimates to be broken down by receiving stream.

TASK XI - FUTURE WASTE LOADS

1. Utilize data developed regarding population and economic growth, changes in land use and increases in water use to develop projections of future waste quantities.
2. Projections to be made for 1985 and 2000. Estimates of future waste production will be made for dry weather, wet weather and storm conditions. Estimates to be broken down by drainage basin.

TASK XII - DEFINE EXISTING WATER QUALITY

1. Describe existing DEQ stream standards by stream segment on a stream by stream basis.
2. Describe EPA and DEQ proposed changes, if any, in stream standards.
   a. to meet 1983 goals of PL 92-500
   b. to meet long range goals and objectives
3. Describe existing surface water quality on a stream by stream basis based upon accumulated physical chemical and biological water quality data.
4. Parameters monitored to include the following when practicable:
   a. BOD
   b. COD
   c. color
   d. turbidity
   e. solids (suspended, volatile, total)
   f. toxic substances
   g. metal ions
   h. fluids
   i. dissolved substances
   j. temperature
   k. ph
   l. chlorides
   m. nutrients
5. Water quality data prepared for historical period of record under various flow conditions. Mean, maximum and minimum values to be presented.
6. Evaluate and relate existing water quality to beneficial uses and instream water quality standards. Determine water quality deficiencies and problems on a stream segment basis; prioritize problem areas.

TASK XIII - WATER QUALITY AND QUANTITY MODELING

1. Develop mathematical model of water quality and quantity. Model to be developed which can be operable in each significant drainage basin throughout the Study Area.
2. Utilizing model, relate current wasteloads to water quality under dry weather, and wet weather conditions.

3. Utilizing model relate future wasteloads to water quality and determine:
   a. probable impact on water quality
   b. probable water quality deficiencies in major streams
4. Model runoff characteristics for significant drainage basins with existing and land use configuration. Estimate runoff characteristics for 1985 and year 2000.

TASK XIV - NON-STRUCTURAL CONTROLS

1. Land use - describe and analyze existing land use controls throughout the Study Area which may have an impact on water quality. These controls should be differentiated by municipality, county, CRAG Focused Growth Plan, state and federal. Land use controls to be evaluated include at least the following:
   a. zoning
   b. flood plain zoning and regulations
   c. subdivision development regulations
   d. buffer zones
2. Inventory and analyze other ordinances and regulations which may impact on water quality. Examples include:
   a. housing codes
   b. building codes
   c. construction permits
   d. hillside regulations
   e. grading regulations
   f. taxation policies
   g. public works policies
3. Determine present constraints on Study Area land use:
   a. political
   b. physical
   c. socio-economic
4. Inventory and analyze land management practices and regulations. Examples include:
   a. SCS regulations and recommendations for land management
   b. Oregon State Forest Practices Act
   c. U.S. Forest Service regulations

TASK XV - CONDUCT INSTITUTIONAL STUDY

1. Inventory the Study Area's institutional setting:
   a. areawide experience in water quality management
   b. area potential for areawide water quality management - the extent of regional cooperation
   c. emergence of regional agencies, e.g. MSD's role in solid waste management and implementation
2. Identify and describe the major management programs and policies of existing institutions with regard to water quality management.
3. Describe and analyze powers and legal authority of existing institutions to implement various aspects of the 208 Water Quality Management Plan.
4. Assess the extent to which the existing institutional arrangements (contractual and other intergovernmental arrangements) are adequate to perform the required 208 functions.

TASK XVI - AREAWIDE FINANCIAL CAPABILITY

1. Inventory and describe financial capabilities of those institutions engaged in water quality control. Data to include a minimum of the following:
   a. assessed valuation
   b. tax rates
   c. bonded indebtedness
   d. financial commitments to wastewater control and other related programs
   e. other indices of financial capability
   f. legal constraints on financial capability
2. Inventory and describe areawide sources of funding for water quality control:
   a. federal grants and loans
   b. state grants and loans
   c. taxes
   d. user charges
   e. general obligation and revenue bonds
3. Inventory and describe area's current outlays for water quality control (mainly to wastewater abatement). Data to include at least the following costs:
   a. debt costs

b. O&M costs
c. administrative costs
d. per capita costs
e. cost per million gallons of waste treated

II. DEVELOP TECHNICAL WATER QUALITY MANAGEMENT PLAN

TASK XVII - WATER QUALITY TECHNICAL NEEDS

This task assesses and specifies the water quality technical needs to the year 2000 based on the data developed in Tasks I - XVI. The alternative plans will be prepared to meet these needs. Some possible water quality needs are as follows:

1. Expanded service areas to eliminate individual waste treatment systems.
2. Higher treatment efficiencies beyond those proposed for 1983 in the DEQ 303e Basin Plans.
3. Different configuration of collection systems and treatment plants to maintain no discharge to specified stream segments either to eliminate discharges or to maintain non-degredation.
4. New methods to control and treat stormwater runoff and combined sewer overflows.
5. Methods to improve control and management of residual wastes.

TASK XVIII - DEVELOP TECHNICAL ALTERNATIVES

This task involves generating alternative structural and non-structural solutions which meet the water quality technical needs and study objectives to the year 2000. When practicable, short range and long range solutions will be specified. Following the development of several alternative solutions, each alternative will be evaluated for its effectiveness in solving the wastewater, stormwater runoff and non-point source problems. Consideration must be given to existing systems in-place, short-term water quality control plans already

committee and long-term regional and subregional plans. The alternatives to be developed include the following:

1. Individual waste treatment systems
   a. extension of sewer service areas
   b. density zoning
   c. regulations to control location, placement and operation
2. Combined and sanitary sewer overflows
   a. complete seperation of stormwater
   b. storage and treatment
   c. augmenting interceptors
3. Stormwater runoff and treatment
   a. storage and treatment
   b. off stream pipelines
   c. open conduits
   d. separate treatment systems
   e. modification of natural drainage courses
   f. density zoning and open spaces
4. Residual wastes
   a. land application
   b. transport out of region
   c. heat treating and incineration
5. Wastewater treatment
   a. regulation of discharge points
   b. treatment measures including advanced biological, physical-chemical land application as treatment
   c. new treatment facilities
   d. upgrading and modifying existing facilities
   e. source controls including pretreatment, process changes, temporary storage, flow reduction
6. Sewerage system
   a. new interceptors and pumping facilities
   b. expand, upgrade existing systems
   c. new service areas
7. Areawide non-structural controls
   a. land use controls including zoning, control of general urban design, regulations to control the location, modification and construction of facilities
   b. septic tank regulations

c. land management practices including control of irrigation return flows, measures to control land runoff and streambank erosion, regulations to control construction activities
d. alternative taxation measures and incentives for water quality control

8. Possibilities for achieving flow augmentation

TASK XIX - EVALUATE AND COMPARE ALTERNATIVES, SELECT WATER QUALITY MANAGEMENT PLAN

1. Evaluation and comparison is the process by which the various alternatives are refined and eliminated until one technical water quality management plan is selected for implementation. Each alternative is carefully evaluated and compared with other similar alternatives until ultimately the optimum technical solution for water quality management is selected. Suggested criteria for evaluation and comparison are as follows:
   a. costs - economic, social, environmental
   b. operational effectiveness
   c. institutional capability
   d. financial capability
   e. public accountability
2. Technical water quality management plan outputs will include the following:
   a. A process to control municipal wastewater (sanitary and combined sewage)
      1. service area boundaries with population and land use distribution over time
      2. interceptor sewers and lift stations
         a. location
         b. capacity
         c. land acquisition and construction costs
      3. wastewater treatment facilities
         a. location, receiving stream
         b. type of treatment and required treatment efficiencies (including load allocations)
         c. design flow (including industrial component)
         d. land acquisition, construction and O&M costs
      4. identification and prioritization of needed 201 facility

plans over the 5 year period following completion of the 208 planning.

5. pretreatment requirements for all industrial components of municipal wastewater.

b. A process to control wastewater from individual industrial treatment systems
   1. location, receiving streams
   2. type of treatment
   3. required effluents (including load allocations)

c. A process to control urban stormwater runoff
   1. Service area boundaries with population and land use distribution over time
   2. Conveyance, storage and treatment systems
      a. location
      b. capacity
      c. land acquisition, construction and O&M costs

d. A process to control the disposition of all residual wastes.
   1. Disposal facilities
      a. location
      b. design type and capacity
      c. land acquisition, construction and O&M costs

e. A process to control wastes from individual treatment systems (septic tanks)

f. A process to control agriculture and silviculture related non-point sources of pollution.

g. A process to control construction activity related sources of pollution

TASK XX - ENVIRONMENTAL IMPACT ASSESSMENT

An environmental assessment will be prepared to include the following considerations:

1. Probable impact of the plan on the economic and social environment and on the balance of the natural environment.
2. Any probable adverse environmental effects which cannot be avoided.
3. Any irreversible and irretrievable commitment of resources.
4. Indications of public objections to plans arising because of environmental issues.

III DEVELOPMENT IMPLEMENTATION ARRANGEMENTS

TASK XXI - IMPLEMENTATION NEEDS

This task assesses and specifies implementation needs to the year 2000. The implementation needs are primarily based on the technical water quality management plan, institutional capability, financial capability and the adequacy of existing areawide land use controls and other regulations to implement both the structural and non-structural aspects of the technical plan. Some possible implementation needs are as follows:

1. Increase legal authority to prevent future water quality deterioration.
2. Land use controls to facilitate the location and outfall lines, treatment facilities, interceptors, and conveyance facilities for urban stormwater runoff.
3. Specific regulations for implementing non-structural water quality control measures.
4. New legislation and/or improved contractural agreements to develop areawide institutional arrangements capable of implementing the technical plan.
5. Increased funding capabilities.

TASK XXII - DEVELOP IMPLEMENTATION ALTERNATIVES

This task develops alternatives for implementing the technical plan. These alternatives are grouped into four broad categories for ease of analysis: financial; institutional; regulatory; and continuous planning. The financial alternatives are primarily concerned with sources of funds, cost sharing and an implementation schedule. The institutional alternatives are concerned with the development of an areawide governmental mechanism for coordination and implementation of the various technical plan components. The regulatory category provides alternative regulations and land use controls. These regulatory elements will be used as a legal basis for implementation and, in particular, will be used as the non-structural solutions for water quality control. The last category develops alternatives for the continuous planning process.

1. Develop financial alternatives.
   a. Develop alternatives for prioritizing capital improvements to year 2000 and for prioritizing needed 201 facility plans. For each prioritization alternative, develop 5 year and 20 year construction schedules for all facilities enumerated in the technical water quality management plan. In addition, develop a 5 year prioritization schedule for needed facility plans.
   b. Develop alternative sources of funding of all water quality control costs. Costs to include the land acquisition costs, capital costs, O&M costs and administrative costs. Alternative sources of funds are to include:
      1. federal grants, loans and revenue sharing
      2. state grants and loans
      3. areawide revenue sources: taxation, revenue bonds, general obligation bonds, user charges.
   c. Develop alternatives for cost sharing of all water quality control costs. Cost-sharing must involve a determination of benefits received by jurisdiction and by category of user (industrial, residential, etc.). Cost sharing may involve a complex system of rates, user charges and taxes. The industrial control costs for major industries on municipal systems must be specific.
   d. Develop alternative areawide accounting systems for revenue raising and disbursement of funds to water quality control agencies. Accounting systems are restricted to areawide aspects of water quality control only.
2. Develop institutional alternatives
   a. Describe alternative jurisdictional authorities for various aspects of the technical plan. Jurisdictional authorities to include federal, state, areawide and local water quality agencies.
   b. Develop alternative areawide institutional arrangements.
      1. single areawide agency
      2. several single-purpose agencies for various components of the plan.
      3. local agencies with contractual agreements
      4. areawide coordinating agency and contractual arrangements

with local agencies

5. combinations of the above.

c. Develop alternatives for areawide management. Possibilities should include a regional accounting system and computerized data processing.

3. Develop alternative regulatory controls to enforce structural aspects of the plan and, in particular, the non-structural aspects of water quality control. Some of the alternatives to be considered include:

a. land use controls to spatially distribute population and economic activity

b. regulations to control construction practices

c. regulations to control farming and logging practices

d. regulations to specify the location, modification and construction of water quality control facilities

e. flood plain zoning and regulations

f. subdivision development regulations

g. regulations to establish industrial pre-treatment requirements.

h. regulations to control location and operation of individual waste dispersal systems

i. regulations governing cost sharing formulas

j. regulations to control implementation schedules on an areawide basis

4. Continuous planning process

a. alternatives for ongoing review, upgrading and modification of the technical water quality management plan and the implenentation arrangements

b. alternatives for monitoring the operation of water quality control facilities and programs

c. alternative institutional arrangements to carry on the continuous planning process

d. explore the development of computerized data bank on pertinent aspects of water quality management to insure plan updating.

TASK XXIII - EVALUATE AND COMPARE ALTERNATIVES, SELECT IMPLEMENTATION ARRANGEMENTS

1. Develop criteria for evaluating alternative implementation arrangements. Examples include:
   a. operational effectiveness
   b. political feasibility
   c. equitable distribution of capital and other costs
2. Evaluate and compare alternatives; select implementation plan. Plan outputs will include the following:
   a. Financial plan
      1. prioritize capital improvements
      2. funding sources
      3. cost-sharing on an areawide basis
      4. areawide accounting system
   b. Institutional plan
      1. jurisdictional authorities and service areas
      2. areawide governmental arrangements
   c. Regulatory program
   d. Continuous planning process
      1. review, upgrading and modification of the water quality management plan
      2. program monitoring
      3. process for analysis of local planning for conformance with the implementation plan.

TASK XXIV - DEVELOP PUBLIC INVOLVEMENT PROGRAM

1. Provide for areawide involvement through two principal outputs to the planning process.
   a. The Environmental Services Citizen Advisory Committee of the Columbia Region Association of Governments
   b. Public information exchange conducted by the Citizens Communication office of the Columbia Region Association of Governments
2. Prepare a detailed plan for public participation. Some possible information and participation techniques to be considered include the following:
   a. informal meetings and workshops
   b. public hearings

c. presentations to civic groups and schools
d. tabloids and brochures
e. slide shows, movies, radio and television programs
f. surveys and opinion polls
g. press conferences

TASK XXV - STUDY MANAGEMENT (CRAG)

1. Study Responsibility: The Columbia Region Association of Governments is responsible for general supervision of all aspects of the water quality management program.
2. Study Team: Sufficient in-house staff will be hired to:
   a. supervise and administer the program
   b. develop sufficient in-house expertise to administer the continuous planning process
3. Study Team Responsibility:
   a. Reports
      1. preparation of a final report
   b. Financial
      1. maintain accounting system for in-house work and outside contracts
      2. handle all disbursement requests
   c. Contracts
      1. select consultants for specific items of the program
      2. administer consultant contracts
   d. Coordination
      1. coordinate with the Environmental Services Citizens Advisory Committee
      2. coordinate with those planning activities closely related to the water quality management program
         a. solid waste planning
         b. transportation planning
         c. air quality planning
         d. administer the public involvement program
         e. coordinate with state and federal water quality planning agencies
      3. Work with the Community Development Technical Advisory Committee on all aspects of plan development

TASK XXVI - STUDY MANAGEMENT (DEQ)

TASK XXVII - FINAL REPORTS

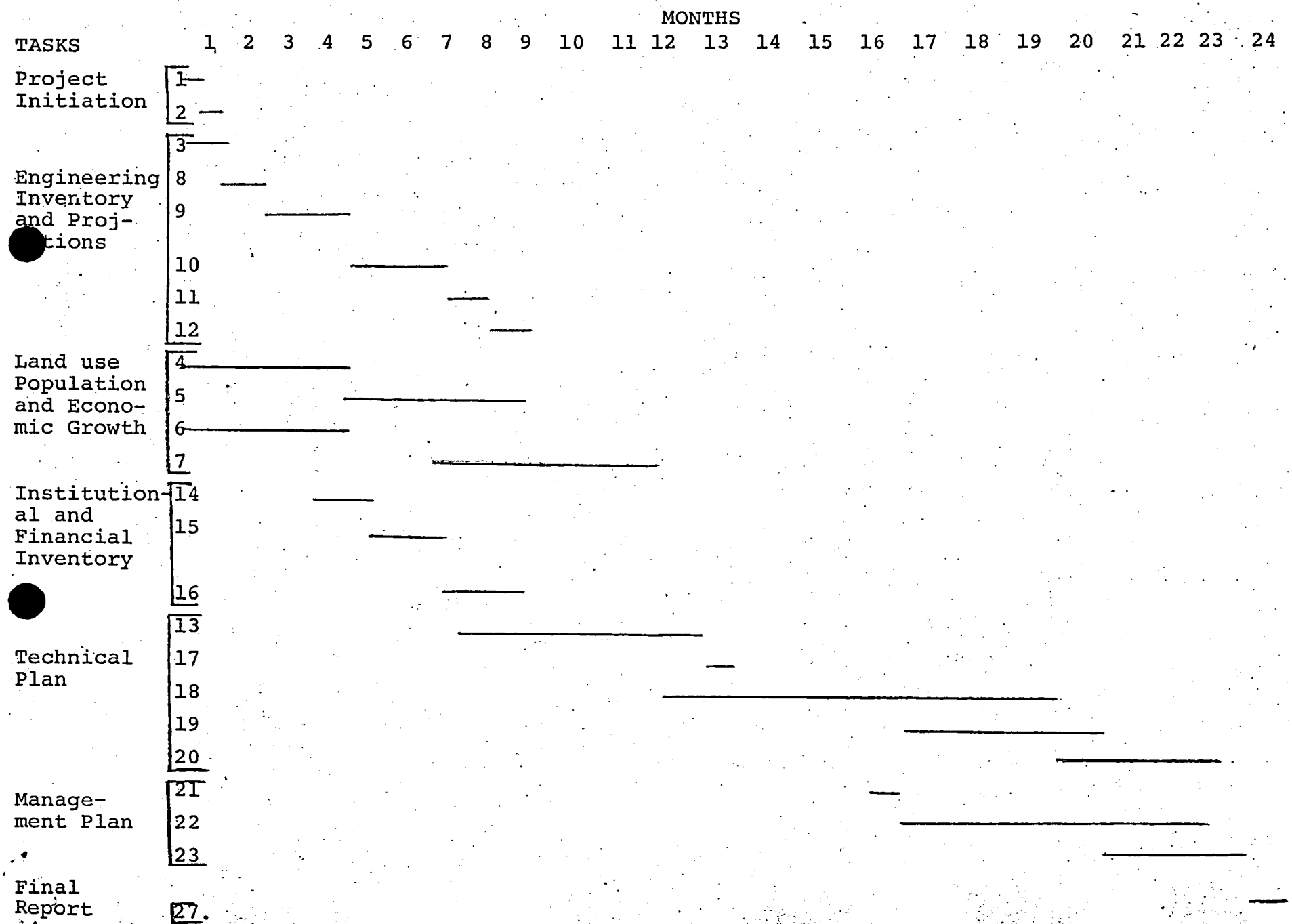
PRELIMINARY TASK/COST BREAKDOWN

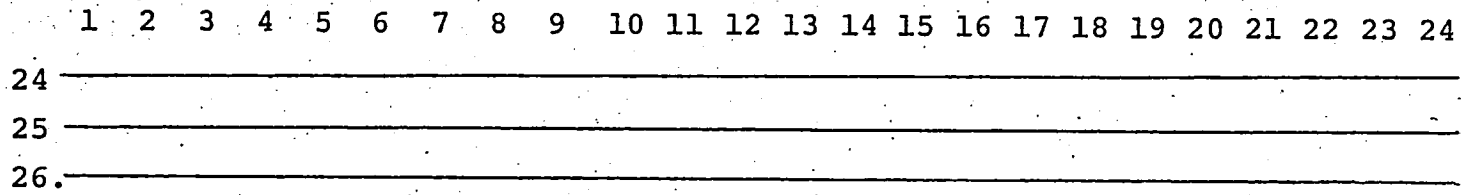
	TASK	COST ($)		
		CRAG(1)	CONSULTANT	TOTAL
I	Goals & Objectives	$ 1,500	$	$ 1,500
II	Review 303c Basin Plan	1,500		1,500
III	Inventory Planning Proposals	8,250		8,250
IV	Study Area Physical Characteristics	20,600		20,600
V	Inventory Existing Land Use	20,600		20,600
VI	Population & Economic Growth	10,300		10,300
VII	Land Use Projection	36,550		36,550
VIII	Water Use	4,100		4,100
IX	Inventory Existing Facilities	16,500		16,500
X	Existing Waste Sources	20,500		20,500
XI	Future Waste Loads	8,250		8,250
XII	Define Existing Water Quality	8,250		8,250
XIII	Water Quality & Quantity Modeling		50,000	50,000
XIV	Non-Structural Controls	8,100		8,100
XV	Conduct Institutional Study	8,100		8,100
XVI	Areawide Financial Capability	8,100		8,100
XVII	Water Quality Technical Needs	1,650	5,000	6,650
XVIII	Develop Technical Alternatives	50,000	350,000	400,000
XIX	Evaluate & Compare Alternatives, Select Water Quality Management Plan	25,000	25,000	50,000
XX	Environmental Impact Assessment		30,000	30,000
XXI	Implementation Needs	2,500	5,000	7,500
XXII	Develop Implementation Alternatives	39,000	120,000	159,000

	TASK	COST ($)		
		CRAG (1)	CONSULTANT	TOTAL
XXIII	Evaluate & Compare Alternatives, Select Implementation Arrangements	$ 15,000	$ 15,000	$ 30,000
XXIV	Public Involvement	15,650	30,000	45,650
XXV	Study Management (CRAG)	80,000		80,000
XXVI	Study Management (DEQ)		30,000	30,000
XXVII	Final Report		30,000	30,000
		$410,000	$690,000	$1,100,000

(1) Operating Overhead and Administrative Costs Included.

SCHEDULE OF MAJOR TASKS

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Study Management and Public Involvement
24
25
26

SUBJECT: Comments on CRAG'S Wastewater Management Study Plan

1. The outline prepared by CRAG is a very ambitious project for only 1.1 million dollars (This same program cost approximately 3.7 million for Seattle).

2. Probably the single most important concept that could come from this study would be determination of Water Quality goals that would be applicable to the study area. Once these goals have been set, the plans for Pollution Control and Abatement alternatives would be much easier to define.

3. The study plan has allocated $500,000 for developing technical alternatives for Water Quality Management and only $50,000 for developing the data base on which these alternatives will be developed. Water Quality Management Plans are abundant in the literature based on generalized assumptions for a particular region without specifically defining the problems associated with the study area. I would like to see more of the study spent on defining existing water quality problems, waste loads, and the environments capacity to assimulate these pollutants rather than spending most of the money on developing needless alternatives.

4. The combined sewer overflow problem has to be a major factor in defining the water quality problems for the Willamette River yet it consists of only a small portion of the total study. Portland will spend a good deal of time and money answering this problem and with assistance from CRAG it could be incorporated into the Water Quality Management Plan. This should be strongly emphasized at the Technical Advisory Committee Meeting on January 8, 1975.

5. As the program is presently set up, most of the study would be done by a consultant hired by CRAG. This isn't a very attractive situation because the consultant could do the study without conferring with Portland on our needs and objectives in Pollution Control and Abatement. This would give us very little control over a plan that will be adopted by local and state authorities and commits us to a plan we have no say in its development.

Meeting w/
N. Lindberg
Bauman
Neuhauser
ETC
1/8/75

D/S forwarded to Chuck Kemper

BOWER INDUSTRIES, INC.
CORPORATE OFFICES:
1601 WEST ORANGEWOOD AVENUE, P.O. BOX 1631
ORANGE, CALIFORNIA 92668 U.S.A.
PHONE (714) 633-8334 — CABLE "BOWERINDS"

January 29, 1975

Mr. Mel Gordon, County Commissioner
Multnomah County Courthouse
1021 SW Fourth Avenue
Portland, Oregon 97204

Dear Mr. Gordon:

As a member of the Environmental Advisory Committee, you are no doubt interested in the significant scientific developments which are coming about in the sewage and industrial wastewater treatment field.

The availability of DBC Plus Dried Bacteria Cultures and the related know how which we have developed in connection with their use now makes it possible to biologically remove grease and lodged solids from sewage treatment collection systems without mechanical effort. It has been demonstrated that the engineered application of DBC Plus Dried Bacteria Cultures will typically result in a significant improvement in the reduction of BOD and suspended solids on a through-the-plant evaluation; odors are typically eliminated and the need for chlorine and other expensive chemicals is proportionately reduced.

It is true that at least part of the function of the typical sewage treatment plant is to provide a place for bacterial activity to take place. This bacterial activity is vital to the utilization of volatile solids in the system and in most cases aids in the flocculation of settleable solids.

It is not always true that scientific breakthroughs in any field of endeavor have a cost reduction impact, but when it comes to DBC Plus Dried Bacteria Cultures, there are many areas for potential cost reduction which are, I am sure, of a vital concern to you, together with the opportunity for improving the quality of our wastewater streams.

If you have any specific questions about any of the work we are doing or the product line itself, I will be pleased to respond to you personally about it.

Yours sincerely,

Gerald C. Bower
President

GCB:saj
Encs.

COLUMBIA REGION ASSOCIATION OF GOVERNMENTS

Memorandum February 19, 1975

FILE NO. 10.D/2

To: Community Development Technical Advisory Committee

From: Staff, Public Facilities Section

Subject: MSD's role in 208 Water Quality Management Planning

This memo is in response to the CD-TAC request for an explanation of MSD's role in the water quality management program. Several reasons for utilizing MSD on a contractual basis are provided below.

The two general requirements of the 208 water quality management program include the development of a technical plan for water quality control on an areawide basis and the development of a management program for implementation on an areawide basis. The 208 guidelines state that the management program may be very flexible. The governmental arrangements may include a single implementing agency or several implementing agencies for each element of the technical water quality control plan.

With regard to the management program the staff strategy is to contract with private consultants. The utilization of outside consultants with considerable expertise should result in a well-conceived and unbiased program.

To help in the development of areawide management aspects of the program, one man will be required to work closely with both the consultants and the local governments, and will assist the consultants in the development and evaluation of management alternatives. The proposed contract with MSD specifies that MSD perform the above services.

It should be emphasized that the above strategy does not imply any special consideration for MSD as the areawide implementing agency. Consultants will have primary responsibility for the development of the program and the CRAG staff, working through the CD-TAC will have direct responsibilities for management of the entire program.

The primary reason for utilization of MSD's services is its recent experience in implementation planning. MSD, through solid waste management, has developed contracts, ordinances and regulations on an areawide basis. This expertise should prove useful in this program. Although MSD's involvement in the program as proposed is modest, it nevertheless allows certain advantages over contracting with a private firm for this work or adding another person to the CRAG staff.

The second reason for utilization of MSD's services, rather than an additional CRAG staff person, is simply that some aspects of the program may be implemented on an areawide basis by a single

agency. This pertains to the control of urban stormwater runoff and the control of other non-point sources of waste. MSD is the only agency which has the legislative authority to finance and implement areawide aspects of sewerage, drainage and non-point sources of waste. By utilizing MSD's services, the MSD Board can become familiar with both the technical and management aspects of the program. The MSD Board will then be in a position to implement such aspects of the program as might be recommended in the consultant reports.

TL:md

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RECEIVED
JUN 18 1975
METRO SERVICE DISTRICT

LAND USE RESEARCH INSTITUTE

June 17, 1975

Mr. Tom Lucas, Project Mgr.
Community Development Division
Columbia Region Association of Governments
527 S.W. Hall
Portland, Oregon 97201

Dear Mr. Lucas:

This is to confirm that the Land Use Research Institute is interested in offering it's services to CRAG during your two year, $1.11 million regional water quality management study.

As discussed in our recent phone conversation, we are particularly interested in the sewage sludge disposal aspects of the proposed study. The Institute is in a position to work directly with CRAG or with the Corps of Engineers who you indicated may assist in the waste water residual analysis phase of the work. It would be appreciated if you would send us information pertaining to the CRAG study that would assist us in the preparation of our proposal.

Incidently, the CRAG map you gave me was used to outline a regional sludge disposal plan under consideration by the Institute that would make it possible to recycle, for agricultural use, the total amount of sludge produced throughout the entire Portland Metropolitan area. I'd be glad to review it with you or the Community Development Committee at any time.

Cordially Yours,

George D. Ward

George D. Ward

GDW/jh
CC...Lyle E. Balderson (CRAG)
Terry Waldele (CRAG)
Chuck Kemper ~~(CRAG)~~ M S D
Institute

METROPOLITAN SERVICE DISTRICT
527 S.W. HALL, PORTLAND, OREGON 97201 222-3671

February 22, 1976

MEMORANDUM

TO: Terry Waldele
Tom Lucas

FROM: Chuck Kemper, MSD
John Hankee, MSD

SUBJECT: PLAN OF STUDY - PORTLAND/VANCOUVER METROPOLITAN AREA WATER RESOURCES STUDY, CORPS OF ENGINEERS (FEB., 1976) REVIEW

Generally, the subject report is not sufficiently detailed to determine the benefit of the Water Resources Study as an input to the MSD Drainage Management Program for the Johnson Creek Basin. The following is a summary of pertinent information extracted from the plan of study related to the MSD Program.

1. $500,000 has been budgeted for the Flood Plain Management portion of the Water Resources Study. A description of that portion of the study is attached. Also included is a cost breakdown.

2. Inputs for the Johnson Creek study may also come from the Wastewater Management, Water Related Recreation or Conservation of Fish and Wildlife Resources portions of the study.

3. The institutional study and public involvement program are important aspects of the plan development and it appears that a sufficient amount of money has been allocated to these tasks ($100,000). In particular the public involvement program will be very helpful in developing the kind of people-oriented plan that appears to be required.

4. The outline of tasks follows a standard format - inventory, analysis, alternative formulation, impact analysis and plan selection. It can only be assumed the Corps will be liberal in allowing the public to actually guide the direction of the program. It seems to be the intent.

5. The plan of study does not describe the inputs or outputs of data that will be available. Therefore, comments on the computer program etc. do not seem appropriate. Maybe personal contact with the Corp would be appropriate.

The concern of MSD is that the Corp will not develop the data base necessary to assist in the detailed Drainage Management Program within the Johnson Creek Basin and further planning would be required by MSD.

g. Flood plain management. The primary objective of this study element is to provide information which can be used by local governments to more effectively incorporate drainage and flood control considerations into their decisions on resources management in the Portland-Vancouver metropolitan area. To achieve that objective, generalized guidelines for drainage management throughout the urban area will be prepared. The guidelines will be based on data gathered from the U.S. Geological Survey's stream gaging of 16 small watersheds, and on detailed studies of specific drainage and flood control management measures in two or three medium-sized stream basins. Johnson Creek basin in Clackamas and Multnomah Counties, and Salmon Creek basin in Clark County tentatively have been selected for detailed study. A final selection of basins to be studied in detail will be made on the basis of more detailed problem identification activities to be undertaken early in the study. The detailed studies of individual basins will result in a range of alternative drainage management plans. The studies will consider both structural and nonstructural management measures, including storm-sewering, channel work, levees, detention storage, maintenance of flood plain land in open-space or other uses having low flood damage potential, and preservation of natural ponding and ground water recharge areas. A primary emphasis of the studies will be on finding nonstructural solutions which are publicly acceptable and implementable. The following work tasks will be accomplished:

(1) Inventory urban area drainage and flood problems.

(2) Review and analyze previously conducted flood plain delineation studies, local drainage and storm sewer plans, and other documents pertaining to existing drainage facilities.

(3) Analyze data from U.S. Geological Survey rainfall-runoff gaging, determine watershed runoff characteristics, calculate flow frequencies and volumes within watersheds, and map areal extent of various frequency flood events.

(4) Finalize selection of a limited number of watersheds for detailed study.

(5) Formulate alternative drainage management plans for the watersheds selected for detailed study.

(6) Determine and analyze social, economic and environmental impacts, and possible institutional arrangements.

(7) Prepare generalized guidelines for use by local governments in urban drainage management throughout the Portland-Vancouver metropolitan area

TABLE 8

PORTLAND METRO STUDY

TOTAL STUDY COSTS BY MAJOR WORK ITEM AND EFFORT COMPONENT

EFFORT COMPONENTS / WORK ITEMS	*Flood Control and Flood Plain Management	Wastewater Management	Water Supply Management	Navigation (Commercial & Recreational)	Water Related Recreation	Conservation of Fish and Wildlife Resources	TOTAL FOR EFFORT COMPONENT
1. Preparation of a Plan of Study	24	23	17	5	4	2	75
2. Plan Formulation and Evaluation							
a. Problem Identification	40	190	60	7	5	5	307
b. Formulation of Alternatives	175	90	80	25	25	20	415
c. Impact Assessment & Evaluation	100	60	60	15	10	13	258
d. Public Involvement and Institutional Studies	100	52	105	20	17	5	299
3. Study Documentation and Report Preparation	35	40	20	13	5	3	116
4. Study Management	26	25	18	5	4	2	80
TOTAL FOR WORK ITEM	500	480	360	90	70	50	1,550

NOTE: All table entries are in Thousands of Dollars ($\$10^3$)

METROPOLITAN SERVICE DISTRICT
1220 S.W. MORRISON, ROOM 300, PORTLAND, OREGON 97205
(503) 222-3671

file

JUNE 27, 1977

TO: MSD BOARD OF DIRECTORS

FROM: CHARLES C. KEMPER, DIRECTOR
SOLID WASTE DIVISION

SUBJECT: WATER QUALITY MANAGEMENT AGENCIES

THE ATTACHED IS A COPY OF A DRAFT REPORT BY BARTLE-WELLS ON THE SELECTION OF MANAGEMENT AGENCIES FOR WATER QUALITY SERVICES. YOU MAY FIND THIS INTERESTING.

CCK/JW

ENCL.

CC: MSD STAFF

Edwin A. Wells
Preliminary Author's Draft
June 8, 1977

PRACTICAL CONSIDERATIONS IN THE SELECTION OF WATER QUALITY MANAGEMENT AGENCIES

1. SHORTCOMINGS OF THE TYPICAL APPROACH

Most reports dealing with the selection of a management agency for water quality control usually begin by a studious review of the existing statutes and other possible management forms. And, of course, an inventory of existing agencies and their powers, services, and statistics is brought together. From this information, the authors usually conclude that an appropriate new management agency can be selected to resolve the regional water quality problems. Such background information is vital but, unfortunately, the subject matter is exceedingly complex and the number of acceptable or workable alternatives is too great to enable selection of a management agency without other perceptive considerations.

The Portland area is not unique with its many public agencies and the interrelationships of their powers and territories. Proposed management alternatives in multiple agency situations are typically explained in generalized terms relative to powers of existing agencies. And the management alternatives are typically conceptualized in physical terms. Thus an agency alternative would have such-and-such representation from existing agencies and would cover such-and-such an area depending upon the location of treatment plants at point A or point B. But it only rarely works out. The selection process rarely produces an acceptable solution without looking very carefully at the strategies involved in changing forms of government. And who really wants change?

Edwin A. Wells
Preliminary Author's Draft
June 8, 1977

PRACTICAL CONSIDERATIONS IN THE SELECTION OF WATER QUALITY MANAGEMENT AGENCIES

1. SHORTCOMINGS OF THE TYPICAL APPROACH
2. AMBIGUITIES AND REDUNDANCIES
3. WHO WANTS NEW MANAGEMENT AGENCIES?
4. WEST COAST METROPOLITAN AREA SOLUTIONS
5. TERRITORIAL IMPERATIVES OF CITIES AND DISTRICTS
6. INDIVIDUALS IN THE DECISION PROCESS
7. MANAGEMENT ARRANGEMENT DEPENDENCIES
8. COST EFFECTIVENESS MYTH
9. EASE OF IMPLEMENTATION CRITERIA
10. WASHINGTON COUNTY USA
11. OREGON REACTIONS

The difficulties in selection and implementation of new management forms breaks down into people problems. What can be "sold" to the current leadership is extremely important. Their support, or at least comprehension, is necessary. A great deal of consideration needs to be given on how to motivate the existing leadership or, in the absence of ability to motivate, how to impose solutions.

2. AMBIGUITIES AND REDUNDANCIES

There is a certain hopelessness about attempting to restructure the existing agencies in the Portland area for the single purpose of water quality management. This involves the difficult task of stratifying the power structure, planning, rule making, and operation of existing agencies so that they carefully complement one another in only one area of their mutual interrelationships. Existing agencies become very specialized in their own minds. Each agency plans, raises its money, makes rules, and operates to achieve its own assumed goals. So each agency involved in a discussion of restructuring of governmental organizations already has its own conceptualized version of its responsibilities to the exclusion of the need for change. Unless there is some imminent threat most agencies have heard what they want to hear about their own functions and have not understood the problem that has generated the effort to restructure governmental control for purposes of water quality management. And they will want to remain unrestricted in other areas.

A further element of hopelessness is involved in the 208 planning process. PL 92-500 requires that local agencies develop a system of con-

sistent coordinated effort for water quality management. This involves the three basic local levels of government: cities, special districts, counties, and perhaps a regional agency or two created around local government. They in turn are expected to be able to cope with the mess of interrelated agencies superimposed upon the local management effort by state and federal agencies. The bureaucratic pyramid involved with the water quality problem at the state and federal levels is awesome to the point where local agencies may well wonder if the effort is worthwhile. Local agencies while being told to put their own house in order must be somewhat intimidated by the myriad of agencies and requirements at higher levels of government and which their new government form, whatever it may be, must cope.

And finally there is buzzword ambiguity developing in the general terms being used: institutional, management, regulatory planning.

3. WHO WANTS NEW MANAGEMENT AGENCIES?

PL 92-500 is usually identified as the reason for the necessity of development of new local management agencies. Obviously, if Congress, with the state's help, provides funding for water quality facilities, then any requirement they wish can be imposed as one of the conditions for the receipt of funds. The language of the law is almost simplistic in that it admonishes local jurisdictions to establish a system of governmental controls to protect water quality.

Typically, each of the higher levels of government, in turn, wants to deal with the agency that can react rapidly to its demands. A county government dealing with nine small districts and cities evidences frustration because of the fragmentation of operation and responsibility, even though each may be doing an adequate job within its separate territory. If the nine agencies in turn rent an office, appoint a manager, set up a telephone and secretary, send a delegate to regular meetings, they have suddenly created a form of regional government that can respond to the needs of higher levels of government. While elements of responsibility may not have changed, the combined area of the nine sewering agencies suddenly has accomplished a regional form of representation able to deal with higher levels of government. They're now regionalized.

What is missing within the framework of existing agencies and their representatives is any understanding of where they collectively have fallen short. While each agency may be doing an excellent job within the framework of its own powers and territory, there is a clear evidence of shortsidedness in terms of their separate ability or even collective ability to plan for long range urban growth and improved water quality standards within the total area which they influence. Cities and districts are typically disinterested in planning or providing for areas outside their boundaries. Their concerns have been reactive to specific requests for expansion. Or they have been reactive to typical requests for upgrading of water quality control facilities. And they seldom generate enlightened leadership.

Very plainly, PL 92-500 evidences the environmental concerns, in the face of an expanding population, in virtually every major metropolitan area. The management agency has to have more, much more, than any coalition of existing agencies to accomplish long range water quality needs. A primary requirement for a new management agency is to be able to assume the responsibility for control of new developing areas as they relate to water quality control problems. It must be able to anticipate the problems and raise the funds necessary to prevent degradation of water quality. And its control must extend beyond the collective boundaries of existing agencies to cover the regional area which will be influenced by growth within and from existing development.

4. WEST COAST METROPOLITAN AREA SOLUTIONS

Most of the major urban areas in the western United States have developed some form of water quality management agency over the last 25 years. New contract agencies operate on behalf of member agencies in the Los Angeles basin and in the Orange County basin. A local agency providing sewage treatment for neighboring agencies under contract is used by the City of San Diego for its area and by the East Bay Municipal Utility District (a water agency) serving the eastern side of the San Francisco Bay. The Seattle Metro, special legislative form, set up an agency to operate on behalf of member agencies in the Seattle area.

In recent years many smaller versions of interagency created management forms have been developed for smaller metropolitan areas. Two major cities, San Francisco and Portland, already extremely large in area and

complexity of the territory served, have not become involved in creating new management agencies.

Only two major regional areas have created a new governmental form to solve water quality management problems. They are Ventura County, California, and Washington County, Oregon. The Ventura County Sanitation District covers the entire county and has representation by each sanitary district and city within its boundaries. Existing agencies, through smaller collective efforts, have generally continued to solve their own sewage treatment problems and have not acted to develop a countywide operating organization. They have developed a strong coalition of governmental levels for long range planning.

Washington County, on the other hand, presents a unique example of the formation of a new government agency form which clearly can and has assumed responsibility for water quality control facilities to serve an area larger than the collective areas of existing cities and districts. This agency also obtained authorization of $36 million of bond funds to provide local financing for such facilities. Representation of existing agencies was accomplished indirectly through an advisory commission. Some of the other unique characteristics are discussed briefly in the sections which follow.

Even with the creation and expansion of existing forms of regional sewerage agencies, most of these agencies consider their primary responsibility is building and development of water quality control facilities.

Only under the 208 process has the potential of the larger job of controlling nonpoint source degradation as well as control of those community functions which are reflected in water quality control begun to touch metropolitan sewering agencies. Nowhere has it been suggested that existing metropolitan sewering agencies, no matter how extensive, take on the long range problems of control of the development which will result in future water quality control problems. The role of the major metropolitan sewering agencies still seems to be one of reactive to events triggered by other levels of government within their area.

5. TERRITORIAL IMPERATIVES OF CITIES AND DISTRICTS

Cities, districts, and counties that provide services through special districts governed by the counties constitute the principal melange of existing agencies within urban metropolitan areas. The immediate assumption is that their sewerage functions--collection, treatment, and disposal--can be rearranged sufficiently to satisfy EPA that, in fact, there is a local ability to assume responsibility for water quality control standards. Unfortunately, districts largely are created to avoid city jurisdiction. Once property has been developed and provided sewerage under a district form of government, there is usually no advantage for the property owner to become incorporated as part of a nearby city. Counties that assist in the development of sewerage systems to serve unincorporated lands through special districts or state agencies that permit septic tank development in the path of urban growth, are acting to prevent centralization of water quality management in the broad sense.

Concerns expressed by responsible leaders of districts and cities engaged in sewerage are that they must have representation on any policy-making levels in order to protect their agency's area and its vested rights from unjustly imposed policies and costs in the name of water quality control. They express a fear of entrapment, unnecessary taxes, and interference with local affairs.

Fundamental to the operation of cities are their rights to determine the type of development within its boundaries. The land use planning aspects and the creation of noncity vs. city areas within the metropolitan area, constitute two of the most difficult aspects of providing for long range water quality management.

6. INDIVIDUALS IN THE DECISION PROCESS

The individuals involved in the decision process are largely unaware and unacceptive of the target imposed by the long range planning process. Members of governing board, management staff, and the professionals--engineers, attorneys, and accountants--work for and support the existing forms of government. Their frame of reference is the existing level of services provided by their particular agency. They have accepted the roles of their agency and are typically not alert to the areas of responsibility to which their agencies could or should expand. They would, mostly, rather accept the status quo than to reorder their agency to provide a long range water quality control solution.

Each of these individuals also has in some form a vested interest in his current position. The manager of a small sanitary district would much rather remain the manager of the sanitary district than to become a staff member "in charge of training" in a much larger organization. Each individual prefers the prerequisites that come with the current level of service rather than to face the unknown that a change in function of the existing agency would engender.

Fundamental to the position of existing individuals is their pride in identification with the progress or services provided by the agency. And for which, incidentally, recognition is sadly lacking because usually they have done a good job. A proposed change of function through reorganization invariably results in retreat to provincialism and identification of the historical adversary as a reason for not doing something differently. Why not recognize the sense of accomplishment with due credit?

In Washington County, regardless of the quality of effort provided by cities and sanitary districts, the electorate overwhelmingly supported the creation of a new level of government superimposed on existing jurisdictions. Under the act in effect at that time, existing sanitary district government was merged out of existence in one day and combined with the staff of a new agency. Cities, while they remained as a form of government, had to change some of their methods of operation and take direction from the new agency. But the new agency was carefully structured to complement their needs and not to compete with them.

7. MANAGEMENT ARRANGEMENT DEPENDENCIES

Frequently alternative management arrangements are explained and illustrated by the way in which they relate to the physical facilities needed most immediately. Thus alternative management arrangements tend to be thought as dependent upon the selection of sewage treatment plant sites. The reverse is probably more pertinent. The most satisfactory management arrangement is probably one in which the siting of the sewage treatment plant can be determined by an agency with no political preferences.

Washington County USA, for example, has been particularly flexible in its ability to select the best solution to treatment plant siting. The Seattle Metro has done well in this function as being able to gradually reduce the number of treatment plants over a long span of years.

Simplification of the physical solutions, such as EV5, lead to the apparently logical demand for alternative management arrangements to fit each of the solutions. Clearly, the most acceptable management arrangement would be one which can implement whichever solution is the most feasible from the other aspects of water quality control. If the management agency had overall budgetary control, a commonality of approach and could command all of the resources within the area related to water quality, it would be in the best position to determine siting of sewage treatment plants. In other words, selection of the management agency certainly can come well ahead of selection of the siting of sewage treatment plants.

8. COST EFFECTIVENESS MYTH

Typically it's presumed that the management agency can be selected on the basis of cost effectiveness. While sewage treatment plant alternatives may lend themselves to such analysis, e.g. present worth analysis and economies of scale, etc., management agencies don't lend themselves to straightforward economic comparisons. If in the end, comparison is on the basis of cost to the user, relatively small agencies or groups of relatively small agencies will cost less than a large new management agency. The new management agency will invariably develop additional administrative levels not needed in small agencies. While the same work force may be operating the system, the smaller agency is benefitted by the lack of administrative and management overhead costs. The volunteers who run small sewerage agency districts and cities are usually reasonably effective but very low cost substitutes for the bureaucratic form of organization necessary to run a very large water quality control organization.

The management agency selection, therefore, has to be directed toward selection of the agency which can accomplish the long range goals, not just simply to put existing services under central management.

9. EASE OF IMPLEMENTATION CRITERIA

Measurement of the acceptability of management agencies by the ease of implementation is counterproductive. The status quo is the easiest to implement. The selection depends upon identifying the changes in powers and services available as choices to existing agencies. No

change is the most acceptable. The choices of management agency should involve describing and identifying the changes in jobs, personal responsibilities, and training requirements available to the existing individuals in the work force and on the board of directors, and in providing professional services.

In the end the adoption of a management agency form clearly able to accomplish long range goals of the 208 planning process is going to involve substantial personal changes for the individuals presently in the field and will develop a considerable curtailment of powers and services of existing agencies. The salability of "the nonsolution," e.g. the easiest course of action, will not provide the area with an effective long range solution to management of water quality.

10. WASHINGTON COUNTY USA

The use of a county service district to create the Washington County USA was carefully planned to minimize some of the objections discussed earlier. Some of the pertinent points are summarized below:

a. Based on an adopted general land use plan, USA includes undeveloped land in the urbanizing area lying outside cities. Agricultural lands were excluded.

b. It is governed by county commissioners, who also are able to plan for and control land development in unincorporated areas lying outside former sanitary districts.

c. The commissioners agreed with cities to require annexation of lands outside city (and former sanitary districts) if capable

of being served by city. This is referred to as a non-competition agreement.

d. The formation agreement gives each city some choice in level of service it will provide in exchange for share of revenues.

e. Cities and sanitary district areas receive compensation for the relative value existing facilities turned over to the USA.

f. Cities and sanitary district areas share new development connection charge revenues collected from their areas with the sewerage agency.

g. Both cities and sanitary districts have some opportunity through formation of a sewer commission to influence policy and to protect interests of existing agencies.

h. Through the financial plan the sewerage agency is able to draw upon revenues generated from developed areas to plan for and control pollution throughout the urbanizing area.

11. OREGON REACTIONS

Events in Oregon show that neither the legislature nor the voters are going to wait for direction from the representatives of local government.

a. Washington County USA election - while not the main issue, we can draw from the results:

- o Voters created a sewer agency knowing the sanitary districts would be merged out of existence. Voters outside cities still approved consolidation of operations. No one shed a tear for all the hard work of sanitary district managements and boards.

- o City councils approved USA and inside voters approved USA even though cities would lose substantial sewering powers.

b. Elections to disband CRAG and MSD have failed, even though heavily supported by vested interests opposed to land development restrictions.

c. Legislature modified the County Service District Act to provide for merging small districts out of existence if they have the same purpose.

d. Legislation has given boundary commissions unique power to reorganize special districts.

e. Legislature has reformed CRAG from a weak council of government (COG) to an agency with statutory powers.

f. Legislation created LCDC to review and to insure there would be areawide planning.

g. Legislature is considering merger of CRAG and MSD.

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SCIENTIFIC

BREAKTHROUGH
IN SEWAGE AND INDUSTRIAL
WASTE WATER TREATMENT
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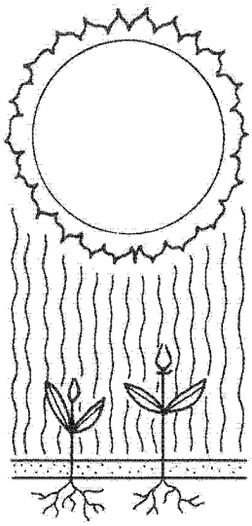
WHY USE DBCplus DRIED BACTERIA CULTURES IN MODERN WASTEWATER TREATMENT FACILITIES?



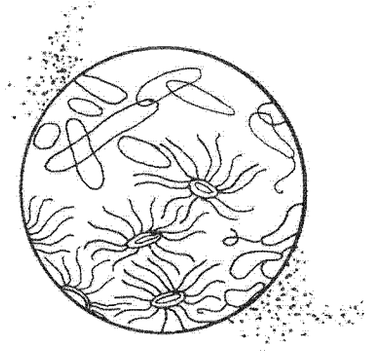
THE BASIC CONCEPT.

When the spark of life first flickered, in the beginning of the world, a marvelous formula for the perpetuation of the species went in motion. Included in this master plan was the process of photosynthesis, by which grasses, herbs and other plants are able to capture the energy of the sun to produce a product which we call chlorophyll.

This substance is vital to the existence of all organic life, not only to the plants themselves, but to the animals, birds and men who depend upon the reliability of this production process for food.

In nature's wise plan, a procedure was also set in order for the renewal of the earth, and the perpetuation of this life process, through what we call the Carbon and Nitrogen Cycles of Life. When organic matter "dies" bacterial waste reduction begins to take place.

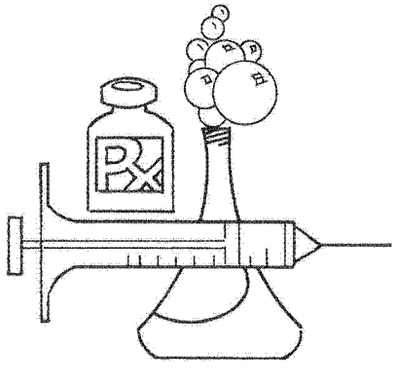
The modern wastewater treatment facility is intended to accomplish maximum bacterial waste reduction in the smallest amount of space and time.



DBCplus DRIED BACTERIA CULTURES IN MODERN WASTEWATER TREATMENT FACILITIES.

DBCplus is a compound of specially selected dried bacteria cultures together with biological synergists and nutrients. This forms a product that not only improves upon the action of the naturally occurring bacteria in sewage, but also goes far beyond the capability of these organisms to digest grease, carbohydrates and proteins which are otherwise frequently difficult to break down.

The bacteria used in DBCplus are harmless saprophytes and are friendly to living things. Used as directed, they will not damage pipes, equipment, or harm people, birds, other animals or plant life.



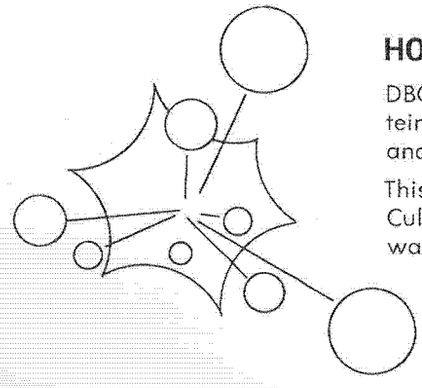
WHY ADD BACTERIA?*

This is a good question because there are so many bacteria in sewage that one might think it foolish to add any more. However, the facts indicate that this is not necessarily the case.

Our modern life style often spells trouble to the sewage treatment superintendent. With the advent of the garbage disposal unit, huge amounts of kitchen waste began to enter the sewer; and along with it came trouble. This garbage does not have the benefit of passing through the human digestive system to pick up the necessary bacteria to carry it along through the digestion phase in an ordinary way.

Antibiotics, which are relatively new in the history of the world, also discourage and reduce the effectiveness of natural bacteria. While valuable in treating various human ills, these antibiotics also destroy beneficial bacteria in the human digestive system. This reduces the effectiveness of the total sewage system more than people realize.

Then, consider the millions of pounds of detergents, hair oils, face creams, industrial wastes and other pollutants which are common to 20th century life. You can see why it is that the natural bacteria alone are often incapable of handling the vast amount of waste that flows through today's sewers.



HOW DO DBCplus DRIED BACTERIA CULTURES HELP?

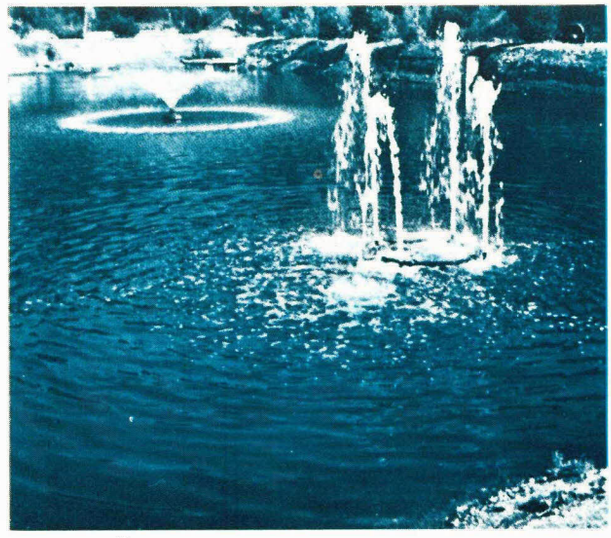
DBCplus Dried Bacteria Cultures have the ability to speed up the digestion of proteins, carbohydrates and fats both in sewer lines and treatment plants in accordance with modern needs.

This is why we consider the successful development of DBCplus Dried Bacteria Cultures to be the single most significant scientific breakthrough in sewage and wastewater treatment since Imhoff!

*Please see pages 2039-2054, JOURNAL WPCF, December 1967

THESE PHOTOGRAPHS CLEARLY DEMONSTRATE THE EFFECTIVENESS OF USING DBC PLUS DRIED BACTERIA CULTURES IN THE TREATMENT OF SEWERAGE LAGOONS.

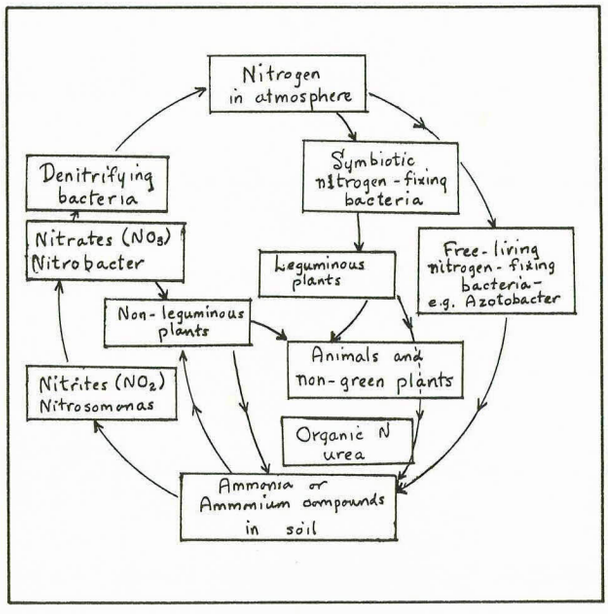
Lagoon shown is at Top-O-Topanga, California. A heavy growth of algae and floating sewage have made aeration impossible. Odors coming from this lagoon were very offensive.



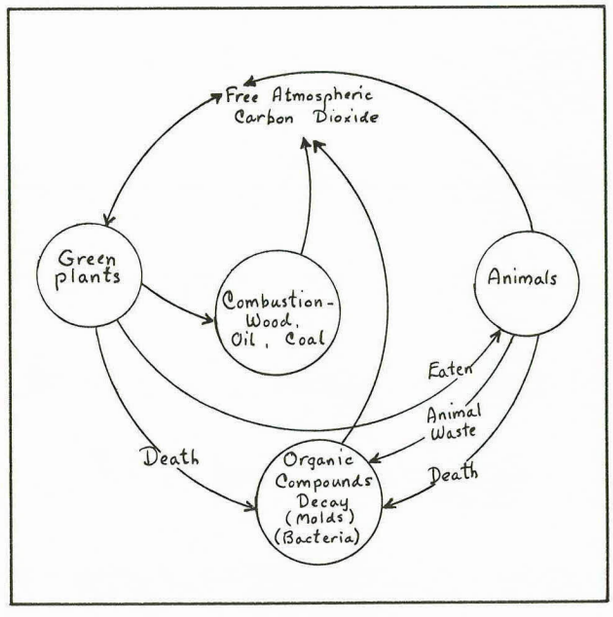
After 3 months treatment with DBC Plus dried bacteria cultures, the lake was clear, attractive and free of odors. Aeration equipment now works perfectly.

DBCplus

DRIED BACTERIA CULTURES SPEED CARBON AND NITROGEN CYCLES!



THE NITROGEN CYCLE



THE CARBON CYCLE

BOWER INDUSTRIES, INC.
CULTURED CHEMICALS DIVISION

1601 West Orangewood Ave., Orange, California 92668
Area Code (714) 633-8334

BACTERIA

Their Role In The Sewage Treatment Process

BACTERIA – THEIR ROLE IN THE SEWAGE TREATMENT PROCESS

By Gerald C. Bower, President, Bower Industries, Inc.

AS PRESENTED TO THE CHESAPEAKE WATER POLLUTION CONTROL ASSOCIATION AND THE WATER AND WASTE OPERATORS ASSOCIATION OF MARYLAND, DELAWARE AND DISTRICT OF COLUMBIA

JOINT ANNUAL MEETING
JUNE 7-9, 1972
OCEAN CITY, MARYLAND

Today, I want to discuss with you one area of sewage treatment that is not generally well understood or often discussed. I am talking about bacterial decomposition processes.

With very few exceptions, all formal sewage treatment involves facilities that are intended to take advantage of this sometimes incompletely understood natural process.

Bacteria may be aerobic, anaerobic or facultative. Aerobic bacteria require oxygen for life support whereas anaerobes can sustain life without air. Facultative bacteria have the capability of living either in air or in the absence of it. For our purposes, we are interested in helping the aerobic bacteria and controlling or discouraging the anaerobes.

In the typical sewage treatment plant, air is added to improve the functioning of aerobic bacteria and to assist them in maintaining superiority over the anaerobes. Agitation, settling, pH and other controllables are carefully considered and employed as a means of maximizing the potential of bacterial reduction of organics in the wastewater.

There are lots of bacteria present in most all influent streams and in treatment plants. Some, of course, are disease-causing organisms but for the most part, the bacterial population consists of organisms active in the conversion of organic materials into harmless gases, water and air.

Bacteria may be classified in many ways such as shape, genus, species, size, etc. But for the purpose of this presentation, let's say that all of the organisms we are going to be talking about today, are single-celled forms of life.

These single-celled organisms grow and when they have attained a certain size, divide, becoming two. This is termed "reproduction by binary fission" with both of the "new" cells being identical in the physiological properties; identical to each other and to the one parent cell from which they came. Assuming an adequate food supply, they then grow and divide again like the original cell. Every time a cell splits to make two, we have a new generation.

One thing that should be pointed out here is that, as compared to certain people who are trying to accomplish something that is above and beyond the call of duty, the only thing these bacteria have in mind is to grow and reproduce! There are typically no heroes in the world of bacteria, even tho it is possible in science to produce super-bacteria for certain specific tasks, including those related to an increased capacity for effectiveness in the treatment of sewage.

Now, when bacteria grow and reproduce, they manufacture enzymes that we'll discuss later on.

Every time a cell splits, resulting in new organisms, we have a new generation which occurs in the range of every 20-30 minutes for most saprophytic bacteria. This is known as the exponential or logarithmic growth phase. So, at the exponential growth rate, the largest number of cells are produced in the shortest period of time. To give you some idea as to the growth factors of these bacteria, listen to this: - a single bacterial cell with a generation time of 20 minutes could produce approximately 2.2 times 10^{43} cells per day. Although it takes one trillion cells to weigh one gram, the total weight of such a culture would amount to 2.2×10^{31} grams, or approximately 24×10^{25} tons. Obviously, this cannot be true in nature because this mass is larger than that of the earth. So it is that in nature and in the laboratory, this growth cannot be maintained indefinitely, simply because the optimum environment of growth cannot be maintained. The amount of growth then, is the function of two variables: - environment and food. The pattern which actually results is known as the bacterial growth rate curve. This typical growth rate curve is the result of the four following phases of bacterial life:

PHASE I – Initially, when the bacteria are introduced or happen into a situation, they are in shock and little growth will take place until they adapt to the new environment. There will be, in addition, several generation times before the numbers start to increase significantly. This may be approximately one to three hours or longer, and is referred to as the initial or lag phase.

PHASE II – Once full growth and reproduction is underway, the curve develops to the logarithmic phase. This is that phase where the bacteria perform at their highest levels of capability. However, this cannot be a long-lived phase inasmuch as the food requirements start to become limited, and deleterious wastes increase so that, in time a point will be reached when there is not enough food to satisfy all the bacteria present.

THEN COMES PHASE III in which some bacteria will be growing and reproducing while others will be dying. The actual number of living organisms will remain fairly constant; this is called " the stationary phase".

PHASE IV – Finally, after a period of time, the environment becomes loaded with bacterial waste products, the food supply is depleted and the whole system begins to die off, simply because conditions are not right for maintaining the population in such large numbers. This is nature's way of adjusting the numbers of organisms to the amount of food available, or to put it another way, maintaining an optimum food-to-microorganism ratio. This die-off curve is also logarithmic and is referred to as the "log death phase".

Now, for all intents and purposes, the logarithmic growth rate and the logarithmic death rate have increased and decreased at approximately the same rate, so you end up with a bell-shaped curve.

Microorganisms and their enzyme systems are responsible for the many different chemical reactions produced in the degradation of organic matter. As I mentioned before, as the bacteria metabolize, grow and divide, they produce enzymes. These enzymes are high-molecular weight proteins. There are many different types of enzymes, depending upon the almost-innumerable reactions into which they enter. Collectively, they are grouped into two classes, the exoenzymes and the endoenzymes. Exoenzymes, produced within, but elaborated outside the bacterial cell break down more complex organic material to a size that can pass through the cell wall and cell membrane. The endoenzymes are active inside the cell wall and work within the cell to convert this material to products from which the cell grows and reproduces.

It is important to recognize the fact that colonies of bacteria are literally factories for the production of enzymes. The enzymes which are manufactured by the bacteria will be appropriate to the substrate in which the enzymes will be working and so you have infinite, automatic production of the right enzyme for the biological reduction of any waste material, providing you have the right bacteria to start with. Enzymes do not reproduce themselves whereas bacteria do.

Enzymes in biochemical reactions act as organic catalysts. The enzymes actually become a part of the action, but after having caused it, split off from it and are themselves unchanged. This action first involves a coupling of the enzyme and substrate to give an enzyme-substrate complex. After the biochemical reactions are completed and products formed, the enzyme is released for catalyzing another reaction. The rate of reaction may be increased by increasing the quality of the substrate or temperature up to a certain point, but beyond this, the rate of reaction ceases to increase because the enzyme concentration limits it.

All that has been said so far about the typical life functions: — the living, the reproduction, the dying and the reaction to the activity of the organisms and their enzyme systems is true whether the bacteria are good or bad; in a sewage plant or in a winery . . . wherever!

But since I'm here to discuss the role of bacteria in the treatment of sewage, let's get back to that subject.

Generally speaking, all bacteria, useful or otherwise, in a flow of sewage or industrial wastewater are there by happenstance. They remain, eat and reproduce because there is a metabolizable food supply for them in that substrate. And bear in mind that these organisms have one thing in mind: — live, grow and reproduce. They are completely unconcerned as to the quality of their workmanship as determined by the chemist in your laboratory.

If it is true that all treatment plants should be designed to take advantage of one of our great essential natural resources, the decomposition of organic materials by bacterial activity, then we ought to know something about the bacteria with which we are working. In addition, we should learn about what is being done by the scientific community to provide better or specific bacteria that can be introduced into treatment systems to maximize the effectiveness of them.

That is something you can equate to lower costs and an improved quality of effluent; even freedom from bad odors which may typically result from a condition wherein anaerobic bacteria become dominant and in their decomposition process, produce hydrogen sulfide gas and other similar by-products.

By studying the makeup of sewage and industrial wastewater streams, scientists can determine the best organisms to use in breaking down the specific organics involved and can work with design engineers and operational consultants, either to build treatment plants which will take advantage of new bacteriological techniques or to employ them in existing facilities.

It is said that the sum of man's recorded knowledge doubled from the time of Christ to 1940. It doubled again from 1940 to 1960 and once more in the decade from 1960 to 1970 and is expected to double again from 1970 to 1975! We are living in the midst of a knowledge expolsion.

One area of great accomplishment in recent years involves those certain disciplines in the field of bacteriology which have resulted in the availability of such so-called "miracle drugs" as penicillin and streptomycin, both of which are dependent in their production upon controlled cultures of living organisms.

I think it's interesting that Alexander Fleming, an Englishman, known for his sloppy housekeeping in the laboratory, discovered in one of his dirty Petri dishes, the growth which later was identified as penicillin and that the report of this discovery was widely distributed in Europe in the late 1920's. But it was World War II that brought his accomplishment out of the woodwork and into the field of prominence which it enjoys today and which earned for Mr. Fleming a knighthood in the 1950's! Sometimes it takes even great scientific discoveries many years to mature.

Today, we accept penicillin, streptomycin, aureomycin, terramycin, chloromycetin and other organically-produced antibiotics as being dependable and perhaps even essential. Certainly, millions of people have been benefited by the development of such products and the work and research goes on and on.

Almost like a windfall from this costly, exquisitely time-consuming and humanly exhausting research, has come much of the know-how to produce specific bacterial cultures that can be handled in a dry, stable and revivable form for use in breaking down organic materials in sewage. This is something that could not be accomplished 25 years ago . . . nor 15 years ago and perhaps not even 10 years ago!

When you consider the fact that the total organic load of wastewater or sewage is composed of many different and constantly changing constituents, it is pretty easy to see that it would be quite difficult, if not downright impossible, to degrade all of these organics by the addition of one organic or inorganic catalyst such as a polymer or enzyme, or even several enzymes! Enzymes are specific catalysts and do not reproduce. What's needed is the addition of an enzyme manufacturing system right in the sewage that can be predetermined as to its activity and performance and which has the initial or continuing capacity to "make the punishment fit the crime".

At the present time, the addition of specifically-cultured dry bacteria seems to be the least expensive and most generally reliable way to accomplish these desirable results.

In the oxidation of organic matter, you are limited to two possible means: – fire or bacteria. Since your treatment plant depends upon bacterial activity, it's important that we understand that aspect of it.

Bacteria accomplish the oxidation of organics while obtaining the energy necessary for growth and reproduction from the bio-chemical reactions of their own enzyme systems on the substrate. Without going into all the details of the very complex chemistry that is involved, let it suffice to say that bacterial oxidation of organic matter is usually carried out by dehydrogenation involving the transfer of hydrogen through enzyme change which brings about a transfer of electrons.

Biological systems involve oxidation-reduction reactions in which different compounds act as a final hydrogen acceptor. In aerobic systems, oxygen is the final hydrogen acceptor, while under anaerobic conditions, various reducible compounds act as hydrogen acceptors. Normally, biological treatment facilities are manufactured to utilize naturally-occurring micoorganisms involving heterogeneous populations. This population growth of microorganisms is dependent entirely upon chance inoculations. The organisms involved are from the intestinal tract, from the surrounding environment, the dust in the air and from the substrate that is being treated. There is little, if any, control over the type or numbers of organisms attained through these chance procedures. This fact is very evident when we assess the efficiencies of secondary treatment facilities in use today.

However, when you add the right, specific cultured bacteria in the proper proportions to this environment, you have established entirely new parameters of potential for the treatment situation. By programing the needed organisms into the system, you can convert more of the organics in the sewage or wastewater in less time than would otherwise be possible. For example:

A. The city of Hemphill, Texas, has a sewage treatment plant that includes a primary clarifier and a standard rate trickling filter. The plant is designed to handle 290,000 gallons per day, at 340 pounds of B.O.D., but the daily flow is typically less than half that amount, about 111,000 gallons. This plant has had a history of plant problems with moderate odors and poor removal rates of B.O.D. and suspended solids.

   Influent B.O.D. runs at about 447 ppm and suspended solids at a typical 164 ppm.

   Removal by plant treatment has typically produced an effluent with a B.O.D. of 163 ppm and 64 ppm of suspended solids, whereas the State of Texas requires a water quality with a maximum of 20 ppm of B.O.D. and suspended solids.

   R.S. Woodruff and Associates, Consulting Engineers for the City of Hemphill, recommended the application of specific cultured bacteria, and after a brief seeding phase, treatment has been maintained with very small amounts of this additive, with the result that daily effluent averages

over a period of many months show a B.O.D. of 15 ppm and a suspended solids reading of 10 ppm. That is a reduction of 90.8% on the original effluent B.O.D. readings and a reduction of 96.6% of the suspended solids — — not bad for a trickling filter plant!

In a bulk oil terminal in Chicago where work was being conducted under the direction of Mr. C.A. Caswell, Senior Associate of the consulting firm of Gurnham & Associates, wastewater containing high percentages of oils and greases is processed through a treatment facility before being introduced into a nearby receiving stream. When treatment with specific cultured dried bacteria was begun on April 6, 1970, the B.O.D. of a newly-constructed high-rate oxidation pond was 2,420 ppm and hexane soluble oils and greases was 2,040 ppm. The pond was covered with approximately 6 inches of floating grease and oil.

With a typical maintenance dosage of 1/2 lb. of DBC Plus every other day, effluent water quality showed a reduction of hexane soluble oils and greases of 97% which according to Mr. Caswell, is largely contributed to the effectiveness of the bacteria cultures being employed in this system.

B. In Northern California, there is a municipal treatment plant handling 1.6 million gallons per day of domestic sewage. Wastewater from the clarifier is discharged into ponds having a retention time of 30 days, after which the water flows into a slough.

Because of a normal overcast during the months of October, November, December and January each year, pond action which is dependent upon sunlight is not of the same quality as at other periods during the year.

Mr. George Serpa, Plant Superintendent, wanted to determine the effectiveness, if any, of his use of DBC Plus Dried Bacteria Cultures, through the plant and into the ponds as a means of improving water quality out of the ponds during the seasonal, four-month overcast.

A study period was conducted from July 7 to September 30, 1966, to define normal, pre-DBC Plus, plant efficiency. Treatment with DBC Plus was begun on October 3, 1966, and for the purposes of the test, was discontinued on January 6, 1967. Evaluation of the performance of the bacteria cultures was based upon laboratory tests made between October 3, 1966 and January 31, 1967.

Primary BOD reduction in the study period was 18.9%; with DBC Plus Dried Bacteria Cultures, it was 26.4%. With a raw sludge volatile solids reading of 81.7%, monthly gas production during the study period ran right at 6.5 cubic ft. per pound of volatile solids. With the addition of the specific, cultured bacteria, gas production jumped to 18.8 cubic ft. per pound of volatile solids. The concentration of sludge was improved from 2.2% to 2.6%. The CO_2 – methane percentage was unchanged during the period of this study. A small mat in the digester was eliminated and there were definite signs of stabilization of the pH of the supernate when the bacteria cultures were being used.

Bacterial activity resulting from the application if the dried bacteria cultures at the clarifier, produced a quality of effluent from the ponds that was better than in any other similar period. From this standpoint, also, the test was considered to be successful.

Mr. Serpa has continued the use of the dried bacteria cultures and as of the presentation of this report, continues to do so with success.

Other cities have found the proper application of the dried bacteria cultures to be effective in eliminating grease from lines, lift stations, treatment plants and digesters. Some use the cultures to increase sludge concentration or to improve volatile solids to gas conversion in anaerobic digesters.

So, interesting things are happening!

We are standing on the threshold of a great revolution in the treatment of sewage and industrial wastewater. The breakthrough has already been made. The revolution is here! You are in the same position as the doctor in 1942 when sulfa was first introduced or the medical practitioner in 1945 when penicillin first became available to him. He could not serve his patients as well as he knew how if he failed to employ these new antibiotics which were produced by microorganisms. And this reminds me of a story.

Once there was a farmer who was sitting in his living-room watching his television set one evening when the doorbell rang. As he opened the door, he saw his neighbor standing there and this neighbor said to him, "John, get your coat and come along with me to the schoolhouse tonight". "Why, what's going on down there this evening?" the farmer asked.

"There's a fellow there from the university who is going to give a talk and tell us how to farm better", the visitor replied.

"Well, heck" the farmer said, "you go on by yourself. I'll stay here and watch TV because I'm not farming as well as I know how now!"

You and I have a big responsibility today. We now know something about the upgrading of sewage and industrial wastewater treatment processing by the use of specific, cultured bacteria - - and why it makes sense from the scientific standpoint. But most of the rest of the world does not know it. And if you respect the evaluation of the noted ocean scientist, Dr. Jacques-Yves Cousteau, you will accept the fact that ultimately, our very lives depend upon the health and the welfare of our oceans and seas, the focal point of all water systems. You will also want to do your part to protect any part of this vital ecological system by "farming as well as you know how, now!"

Mr. Cousteau testified to a Senate Commerce Sub-Committee recently that damage done in the last 20 years represents 30 - 50% of the total damage that can be done to the oceans without causing a major calamity to the world. Some authorities say that a substantial reversal of the present ocean-damage process must take place within 10 years if life on this earth, as we know it, is to continue. Water is certainly one of our most vital resources and we can't take it for granted! There is no time to waste.

You and I are in a remarkable position of being able to do something about it - - not tomorrow, or next year, or 5 years from now - - but today by the use of the most modern scientific equipment and materials available, including the application of specific cultures of bacteria in our systems.

Certificate of Appreciation

TO

Gerald C. Bower

For Outstanding Service To

THE CHESAPEAKE
WATER POLLUTION CONTROL ASSOCIATION

The Chesapeake Association expresses its sincere appreciation and gratitude for the service performed by the above named individual.

Dated this 7th *day of* June *A. D.* 1972

WATER POLLUTION CONTROL FEDERATION 1928

President

Secretary

BOWER INDUSTRIES, INC.
CULTURED CHEMICALS DIVISION
1601 WEST ORANGEWOOD AVE. • ORANGE, CALIF. 92668

TRUSSVILLE, ALABAMA

Sewage Treatment Plant

A Report on the Use of

DBCplus™

Dried Bacteria Cultures

THE USE OF DBC PLUS DRIED BACTERIA CULTURES AT TRUSSVILLE SEWAGE TREATMENT PLANT TRUSSVILLE, ALABAMA

In May 1970, this trickling filter plant was grossly overloaded hydraulically, so much so that only a portion of the flow was being handled through the plant, the primary troublespot being a badly clogged trickling filter.

It was felt by management of Jefferson County Sanitary Division that a programmed application of DBC Plus Dried Bacteria Cultures would be effective in eliminating sludge and other organics from the drainage system of the trickling filter and treatment was begun shortly thereafter.

This letter from Mr. W. E. Cochran, Superintendent of the Trussville Sewage Treatment Plant, is his report of his experience with DBC Plus Dried Bacteria Cultures in this situation.

TRUSSVILLE SEWAGE TREATMENT PLANT
R.F.D. 2, Box A-1
Trussville, Alabama 35173

The Trussville Wastewater Treatment Plant, under the jurisdiction of Jefferson County Sanitary Division, is a bio-filter plant with a capacity of 0.3 M.G.D. This plant consists of a primary settling tank, a bio-filter, a final settling tank, and a digester. The plant is also equipped with a barminutor, chlorinator, pumps, etc.

The sewage treated by the Trussville Plant is classified as domestic sewage; very weak, with an excessive amount of infiltration. The average suspended solids of the influent for 1970 was 100 P.P.M.; with the average five-day B.O.D. of the influent being 86 P.P.M. The only explanation I can give for the low B.O.D. is that the composition of the sewage is low in organic matter due to the excessive infiltration.

The Trussville Plant was placed in operation in 1936. Jefferson County Sanitary Division assumed control of the plant on March 1, 1965. At this time, the plant had been out of working condition for a number of years; it was necessary for all units and equipment to be overhauled, or replaced. The two major problems encountered were bringing the digester to the desired PH; and the clearing of the void spaces in the bio-filter.

With judicious control of the pumping of raw sludge to feed the digester and the use of lime, the digester contents slowly worked up to a ph of 6.6. Due to the fact that this digester is an unheated digester, and without a mixing device, along with a weak sewage influent, the ph would not rise above 6.6. Methane gas was not being produced.

The bio-bilter had been allowed to deteriorate to the extent of weeds and bushes having grown on the filter media. Large trees were adjacent to the bio-filter, resulting in leaf accumulation on the filter bed, and in the void spaces of the media. This condition proved to be more than just a surface problem, as the clogging extended deep into the filter bed.

CONTINUED →

The bio-filter surface was cleaned, and adjacent trees were cut. Ponding and filter fly problem was excessive. All effort to reduce this condition, without removing the filter media, was unsuccessful.

The decision was made to try a dried bacteria culture to accomplish the work of clearing the bio-filter voids; and to correct the digester ph.

"DBC PLUS" was introduced into the plant influent in the dosages and amounts recommended by the manufacturer. Less than two hundred pounds of "DBC PLUS" were used.

The use of this product accomplished the desired purpose of clearing the bio-filter. It also improved the operating characteristics of the digester.

We are well pleased with the results we have obtained with the use of this product.

W. E. Cochran
Superintendent
Trussville Sewage Plant

March 5, 1971

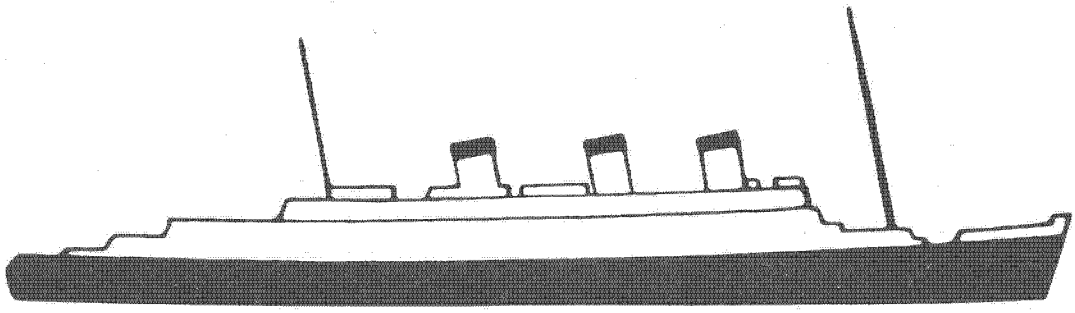
BOWER INDUSTRIES, INC.
CULTURED CHEMICALS DIVISION
1601 WEST ORANGEWOOD AVE. • ORANGE, CALIF. 92668

THE QUEEN MARY

A REPORT ON THE USE OF

DBCplus™

DRIED BACTERIA CULTURES



DBCplus

CULTURED CHEMICALS DIVISION BOWER INDUSTRIES, INC.
1601 WEST ORANGEWOOD AVE. • ORANGE, CALIFORNIA 92668
Phone (714) 633-8334

QUEEN MARY REPORT

When the Queen Mary docked in Long Beach, California on December 9, 1967 after her last great 15,000 mile cruise, this grand old monarch of the sea was destined to begin a new career as a maritime museum, convention center and hotel for the City of Long Beach.

In order to prepare her for this new role, a great deal of work had to be done throughout the ship. So it was that on April 6, 1968 the Queen Mary was carefully nudged into the Admiral Morrell drydock at the Long Beach Naval Station. Here she remained for six weeks during which time the ship was sandblasted, the bottom repainted, over ninety hull openings were sealed and three of the four propellers and shafts were removed.

Also, 8,000 tons of machinery, consisting of the entire facilities in three of the four great engine rooms were removed to make space for the new construction.

A considerable amount of burning with acetylene torches was called for in the removal of this vast amount of equipment. The bilge area in these engine rooms was filled with oily water which was regarded by the Fire Department in the City of Long Beach as presenting a serious fire hazard, so they refused permits to the Lipsett Company personnel to work in this area until this oil had been removed or rendered non-flammable and non-explosive.

When it was discovered that it would be impossible to pump any of this material over the side, the approximately 800,000 gallons of oily wastewater became a major problem. According to executives of the Lipsett Company, charged with the task of clearing the engine room areas, at least 20% of the mixture was lubricating oil and wasted fuel.

Someone in the City of Long Beach had heard about DBC Plus Dried Bacteria Cultures as a result of information that was made available to them about this product a few weeks earlier. So it was that Mr. Mitch Lipsett of the Lipsett Company contacted Cultured Chemicals Division of Gerald C. Bower, Inc., Orange, California to obtain information regarding the use of DBC Plus Dried Bacteria Cultures in this unique situation.

Personnel from Cultured Chemicals Division inspected the bilge area of the Queen Mary and recommended a treatment procedure. The bilge was divided into ten compartments, each containing approximately 80,000 gallons of oily wastewater, 800,000 gallons all together. It was suggested that 15 pounds of DBC Plus, Type L be mixed in 15 to 20 gallons of water and sloshed into each of these 10 compartments. The oil and water mixture with the DBC Plus Dried Bacteria Cultures added to it was to be recirculated with pumps for 24 to 48 hours.

The Lipsett Company ordered enough DBC Plus Dried Bacteria Cultures, Type L to treat two of these 80,000 gallon compartments. However, since it was too inconvenient to recirculate this waste material they simply poured the DBC Plus Dried Bacteria Cultures into this area without the called for agitation.

Forty-eight hours after this treatment was made, Fire Department officials O.K.'d the burning by dismantling crews and the entire engine room removal project proceeded as above without incident, until all compartments had been cleared.

Within 6 weeks, this water had been so purified by the action of the DBC Plus Dried Bacteria Cultures that it was possible to discharge it into the harbor without creating an oil slick and without doing damage to the marine life in that area. Harbor Department and Fish and Game officials were impressed with the performance of the DBC Plus Dried Bacteria Cultures in this application.

Then, when it became necessary to ballast the ship to compensate for the loss of the machinery and other structural members which had been removed, fuel tanks were filled with a non-corrosive drilling mud to which DBC Plus Dried Bacteria Cultures, Type L had been added. The hope was that the action of the bacteria would eliminate gassing that invariable ensues when such work is done, causing dangerous conditions if vented; and if not vented, the possible rupturing of the tanks.

An inspection fifteen months after the drilling mud with DBC Plus Dried Bacteria Cultures had been pumped into the fuel tanks showed that no gassing was occurring nor was there a significant surfacing of residual oil which would normally have been anticipated.

Everyone concerned with this project has been pleased with the cost saving, safety features of DBC Plus Dried Bacteria Cultures in this unique situation and the project has been terminated.

The refurbished Queen Mary is now permanently anchored at Long Beach and is serving as a convention center and recreational attraction.

SEPTEMBER, 1971

FOR INFORMATION CONTACT

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CULTURED CHEMICALS DIVISION
1601 WEST ORANGEWOOD AVE • ORANGE CALIF 92668

LINCOLN WATER POLLUTION CONTROL FACILITY

Stockton, California

A Report on the Use of

DBCplus™

Dried Bacteria Cultures

The Lincoln Water Pollution Control Facility is a 1.6 mgd plant, handling domestic sewage only. Wastewater from the clarifier is discharged into ponds having a retention time of 30 days, after which the water flows into a slough.

Because of a normal overcast during the months of October, November, December and January each year, pond action which is dependent upon sunlight is not of the same quality as at periods during the year.

Mr. George Serpa, Plant Superintendent, wanted to determine the effectiveness, if any, of his use of DBC Plus Dried Bacteria Cultures, through the plant and into the ponds as a means of improving water quality out of the ponds during the seasonal, four-month overcast.

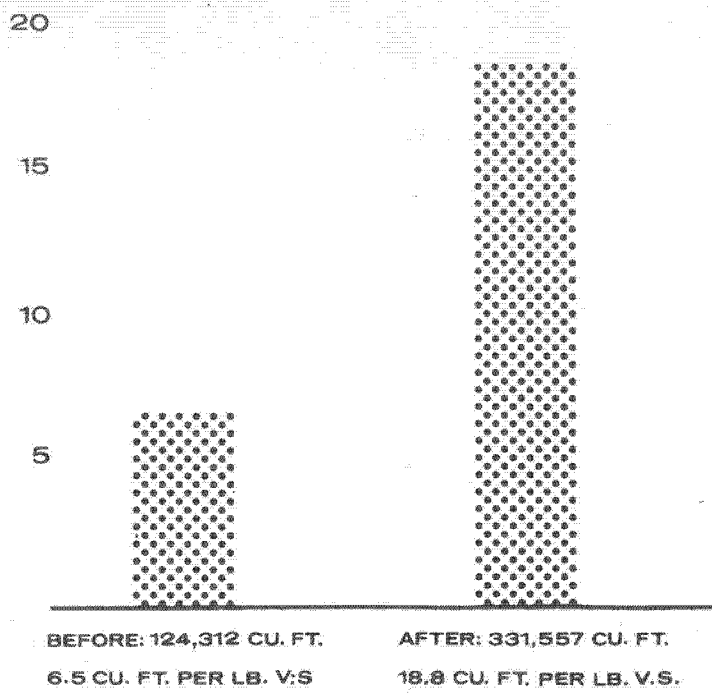
A study period was conducted from July 7 to September 30, 1966, to define normal, pre-DBC Plus, plant efficiency. Treatment with DBC Plus was begun on October 3, 1966, and for the purposes of the test, was discontinued on January 6, 1967. Evaluation of the performance of the bacteria cultures was based upon laboratory tests made between October 3, 1966 and January 31, 1967.

A substantial increase in the conversion of volatile solids to methane gas was observed, a small mat in the digester was eliminated, primary BOD reduction was substantially improved and pH of the supernatant showed definite signs of stabilization.

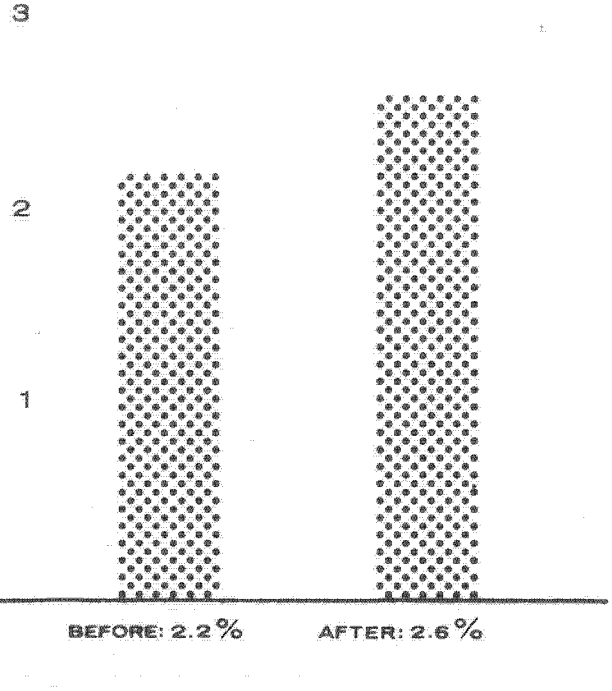
Bacterial activity from DBC Plus Dried Bacteria Cultures in the ponds was such as to produce a quality of effluent that was better than in any other similar period. From this standpoint also, the test was considered to be successful.

Mr. Serpa has continued the periodic use of DBC Plus Dried Bacteria Cultures and as of the writing of this report, continues to do so with success.

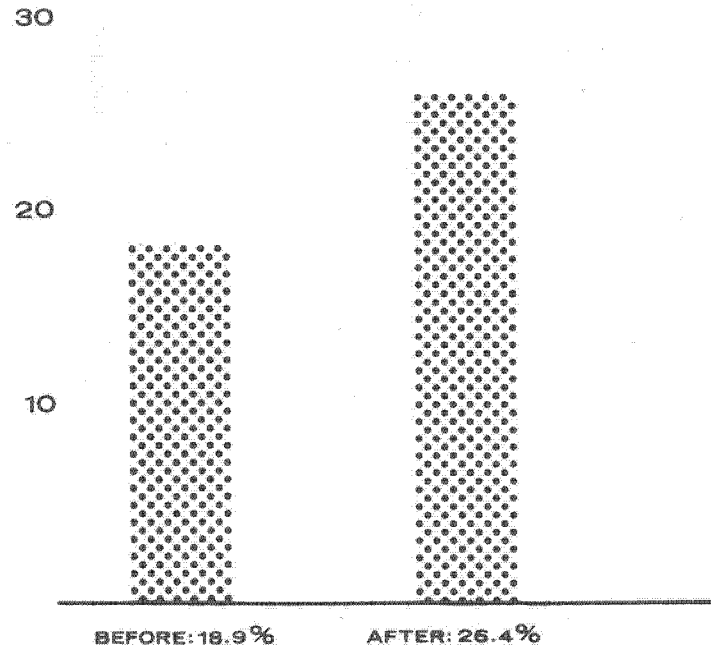
Average Monthly Gas Production



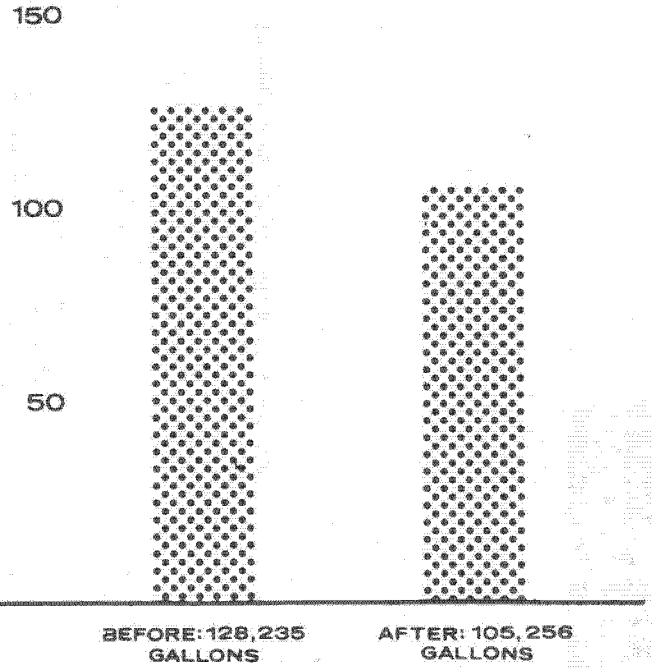
Sludge Concentration Analysis



Primary BOD Reduction (raw sludge - 81.7% V.S.)



Gallons of Sludge Pumped to Digester (monthly average)

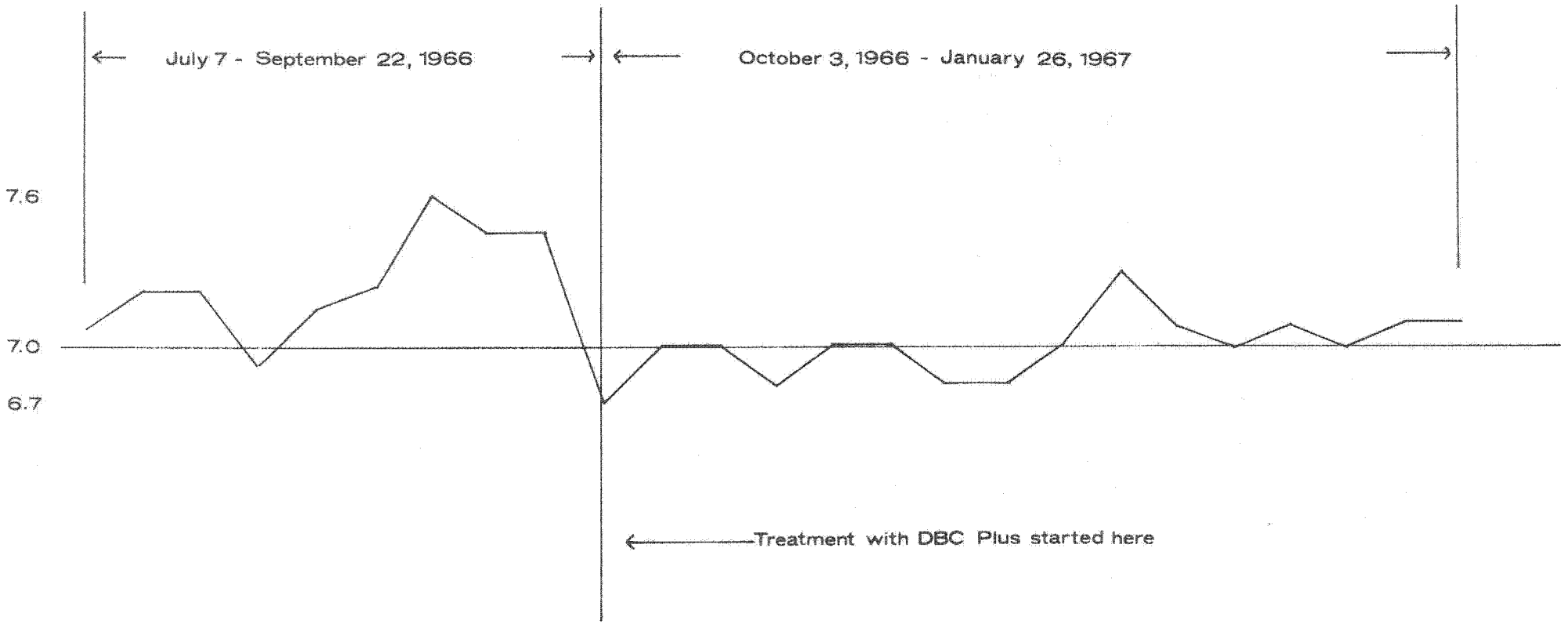


The increase in sludge concentration and the reduction of BOD and in the amount of sludge pumped to the digester coincided with the treatment of influent at the headworks with DBC Plus Dried Bacteria Cultures.

CO_2 - Methane percentage was unchanged during the period of this evaluation.

Study period: July 7 - September 30, 1966 and October 3, 1966 - January 31, 1967.

pH Stabilization Analysis



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CULTURED CHEMICALS DIVISION
1601 WEST ORANGEWOOD AVE. • ORANGE, CALIF. 92668

Huntington Beach EDITION

DAILY PILOT

Today's Final N.Y. Stocks

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City Testing 'Germ Warfare' on Smelly Dump

By ALAN DIRKIN
Of the Daily Pilot Staff

Billions of bugs may solve Huntington Beach's problem mud dump by eating it.

A test team from an Orange-based company has been spraying a pond in the 39-acre Steverson brothers dump in an attempt to prove that crude oil, blamed for offensive odors by homeowners in southeast Huntington Beach, can be removed.

The process involves mixing dried bacteria cultures in a nutrient and spraying the mixture. The trained bacteria become active and then eat all dead organic matter, including oil, which was formed from decomposed plants and animals.

"We know we can solve the problem —we've tackled tougher jobs than this," Marden Chlarson, a sales representative for Gerald C. Bower Inc., said this morning. "All we have to do is to convince the Steversons that this is the way to go."

The firm has completed one six-day test at the dump — located behind the Southern California Edison plant and used for the deposit of rotary mud from oil well drilling — and believes it has stopped the odors in the test area.

"If you could isolate the pond we have tested you would find no odor coming from it," Chlarson said.

Joseph and Carl Steverson own the dump and allowed the company to conduct experiments on restoring an estimated one million cubic yards of mud and oil waste — 80 feet deep in parts — to usable material.

Hauling the present oozing mass for disposal in thin layers at other refuse sites has been deemed too expensive by city officials and the Steversons in considering alternate solutions.

Another avenue that has been explored is spreading the mass over a large area and mixing it with sand to compact it.

Assistant City Administrator Brander Castle pointed out that the difficulty with this approach is that the only available land is owned by the Southern California Edison Company. "It also would be an expensive procedure," Castle added.

Another idea suggested is to put a concrete slab over the 39-acre lot and build an elevated shopping center on pilings over the area. "It would have a nice ocean view but would be awfully expensive, too," Castle said.

The material used by Bower company is called DBCplus. Chlarson explained that there are 21 cultures in the strain that have been trained and refined to form a greater working force than nature provided.

"If you put 50,000 of them on a piece of paper they would look like a white fleck of dust," he said.

He said that there must be a head of water over the area for the bacteria to grow in. The bacteria eat all dead organic matter and are harmless.

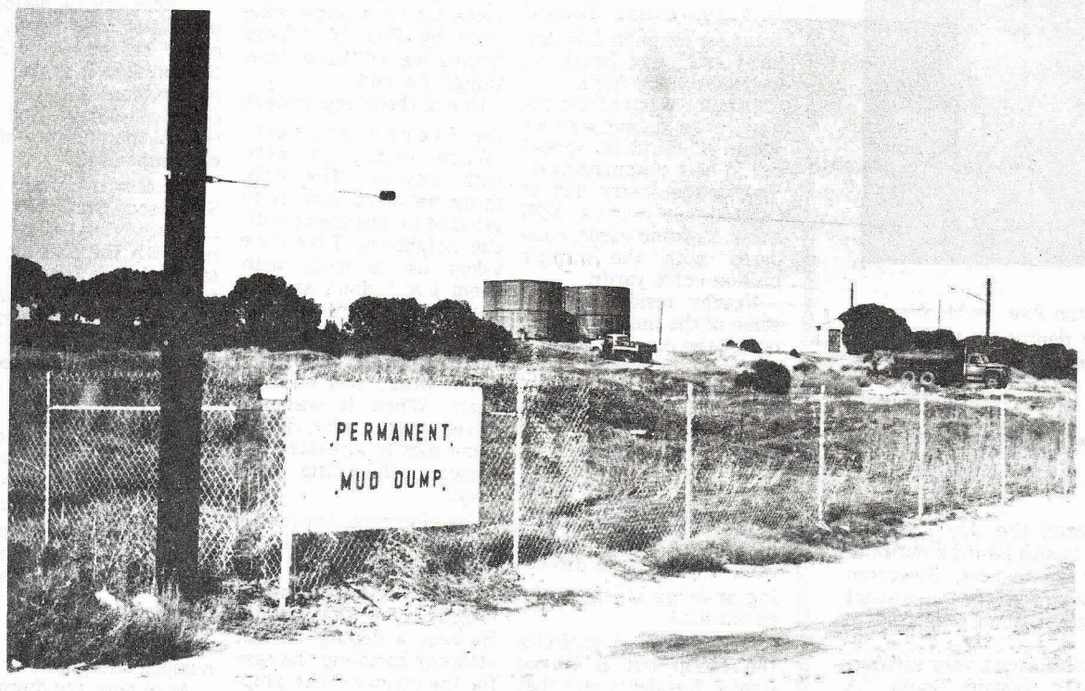
"We even mix the bacteria and the nutrient in barrels by hand," Chlarson said.

Once the oil has been eaten, there is no problem with the bugs. "They die," Chlarson said.

What would be left would be soil plus water which could be drained off. "But the soil would be very valuable because it would contain all the dead bugs and would be a highly organic fertilizer," Chlarson claimed.

He pointed out that his company had done much similar work in waste disposal for oil companies in Santa Barbara County.

Chlarson declined to give an estimate of the cost of the treatment but claimed that although it would be initially expensive it would be the most profitable course to the Steversons in the long run. The fertilizer could be sold and the dump zoned for the building of homes and thus sold at a high value per acre.



DAILY PILOT Staff Photo

THIS IS THE STEVERSON BROTHERS DUMP FROM THE MAGNOLIA STREET SIDE
Can Bugs Bug the Oily Plot That's Bugging Homeowners in Huntington Beach?

DA Levels Complaint Over Mud Dump Odors

The district attorney's office has filed a complaint against operators of the controversial rotary mud dump in Huntington Beach.

The complaint charges that state health and safety code provisions on noxious odors were violated Jan. 12 when refinery wastes were dumped at the site.

Homeowners near the dump at Hamilton Avenue and Magnolia Street have complained to city and county Air Pollution Control District officials about offensive smells coming from the dump.

The complaint was filed in Central Orange County Superior Court against three brothers, Joseph, Ben and Carl Steverson, who own the 39-acre dump.

Filing of the complaint follows a recent hearing conducted by the APCD in Edison High School in which the district took signed statements from homeowners about the odors.

Although the county has taken the first legal action against the Steversons, the City of Huntington Beach has served notice it is planning similar proceedings.

The city council has scheduled a public hearing for 7:30 p.m. March 22 in Edison High School to hear evidence from homeowners on whether a public nuisance exists at the dump, used for the deposit of rotary mud from oil well drilling.

Meanwhile, Joseph Steverson said today that an Orange company, Gerald C. Bower Inc., was making progress in treating the oil wastes with dried bacteria cultures that devour organic matter, including oil. "It will cost several thousand dollars, but we are going to use their spray to clean the dump up and sell it for residential uses," Steverson said.

He declined to estimate how long the cleanup would take.

☆ ☆ ☆

Oil Pit Hearing Monday

HUNTINGTON BEACH – City councilmen have scheduled a public hearing at 7:30 p.m. Monday at Edison High School to listen to residents' complaints about odors from an oil dump at Brookhurst Street and Magnolia Avenue.

"The hearing is intended to give city councilmen direction as to which course to take in dealing with the dump," said City Administrator Doyle Miller.

City Atty. Don P. Bonfa said he would act as coordinator for the hearing, and will call on representatives of Steverson Brothers, operators of the 40-acre dumping ground for oil drilling wastes which they've operated since 1938.

Bonfa said he also will call on representative residents whose homes are near the dumping ground so that they can voice their complaints.

Also expected to be present at the meeting Monday are representatives of the Gerald Bower Co. of Orange, a firm which has been conducting tests to destroy the dump odors by introducing certain types of bacteria into the oil wastes.

Spokesmen for both Steverson and the Bower firm say they are encouraged by the result. The bacteria apparently "eat" the oily wastes, leaving behind fertile soil. Patch tests at the Steverson site have shown good results, Bower Co. spokesmen said.

Samples of "before" and "after" materials are scheduled for display at Monday's hearing.

Steverson Brothers already have been cited by the County Air Pollution Control District. The firm is scheduled for trial May 4 in Westminster municipal court on charges of violating APCD regulations dealing with foul odors.

Estimates as to the cost of eliminating the odors through the bacterial approach have been ranging from $80,000 to $100,000.

The city has eyed the Steverson property for some time as a potential park site to be joined with another municipal park nearby, but the current condition of the land has prevented serious consideration.

Officials have commented publicly that the property would be difficult to accept even as a gift because the oil wastes would have to

HB Product Eats Waste Materials

By PAUL CHAPPLE
Register Staff Writer

ORANGE—A company here is marketing a cleansing agent you won't find on the grocery shelf. Nor would you expect to see it at all unless through a microscope.

Gerald C. Bower and M.B. Chlarson sell dried bacteria which, the men report, can eat waste material including oil deposits.

Actually, bacteria have been eating waste materials from the year One, but it is only in fairly recent times that man has decided to package them and send them around to do specific jobs.

A recent job for Bower and Chlarson has been cleaning up 800,000 gallons of bilge water from the Queen Mary which one day will drop its gangplanks in open invitation as a major Long Beach tourist attraction.

Several pounds of Bower's bacteria were dropped into the smelly bilge tanks. In six weeks, the bilge water became so pure that harbor department officials said the water could be dumped into Long Beach Harbor. And the State Fish & Game Department said it was all right with them, too.

More recently, the Bower company has been conducting a test at an oil wastes dump in Huntington Beach where oil-drilling residue has been dumped sine 1938.

Persons living near the 40-acre Steverson Brothers dump at Magnolia Street and Hamilton Avenue had been complaining of odors, and the Steversons in January were served with a "notice to desist."

"We are confining our testing to a small patch at Steverson's," said Bower. "But the results are encouraging. We dumped several pounds of bacteria into a certain area, added water, and the odor is disappearing and so is the oily sludge."

Whether the bacteria will be eventually "employed" to clean up the entire Steverson dump area awaits further testing.

"We can do the whole job, covering the 40 acres, for well under $100,000," said Bower. "It would take less than a year to finish the job."

This is the acreage which a month ago City Parks Director Norm Worthy said, "the city wouldn't take as a gift," because of the slimy, oozy condition. City Administrator Doyle Miller said the same.

But Bower's bacteria might change things. Property valuations in the general area of Steverson's dump run from $35,000 to $50,000 per acre, real estate brokers say.

So the Bower cleanup price, converting valueless property into worthwhile land, could prove a bonanza.

Bower and Chlarson aren't pledging victory. But they point with pride to what happened on the Queen Mary. Also to the experience of the Getty Oil Co. in Santa Maria where Bower's "bugs" cleaned up 3,700 barrels of heavy, tar-like crude oil in 15 months.

Bower's bugs also cleaned up a lagoon at Topanga which "was giving off offensive odors." In three months, the water in the lagoon was clear, attractive and clean of odors.

The Bower company purchases dried bacteria of several types from specialty firms which grow them in cultures. The dried bacteria, packed in nutrient powder, are shipped in barrels to the Bower firm where "mixing" is done.

The bacteria, however, do not harm plants or animals, even humans, its sponsors say.

After consuming the waste matter, the bacteria simply die, leaving no foreign matter behind.

The bacteria remain dormant until water is introduced. When that happens, the bacteria feed on the nutrient and then upon the surrounding waste materials, be it oil, human wastes, garbage or algae.

Bower explains that the bacteria must be agitated occasionally to keep them busy. Otherwise, they would cease their work. So workmen periodically must stir the water containing the bacteria and their nutrient until the job is done.

"Public acceptance of bacteria as a means of combatting odor and waste problems has been slow in coming," admits Bower. "But bacteria action is as old as time. It is nature's way of disposing of materials and is beginning to make inroads into industry. It has already been a success in sewage treatment plants, cesspools, septic tanks. We'll hear more about it as more tests are made.

(Register photo)

HUNTINGTON BEACH OIL DUMP WASTES PURIFIED BY 'BUGS'
M. B. Chlarson, Left, Gerald Bower Say Bacteria 'Did It'

Solution to Oil Blight?

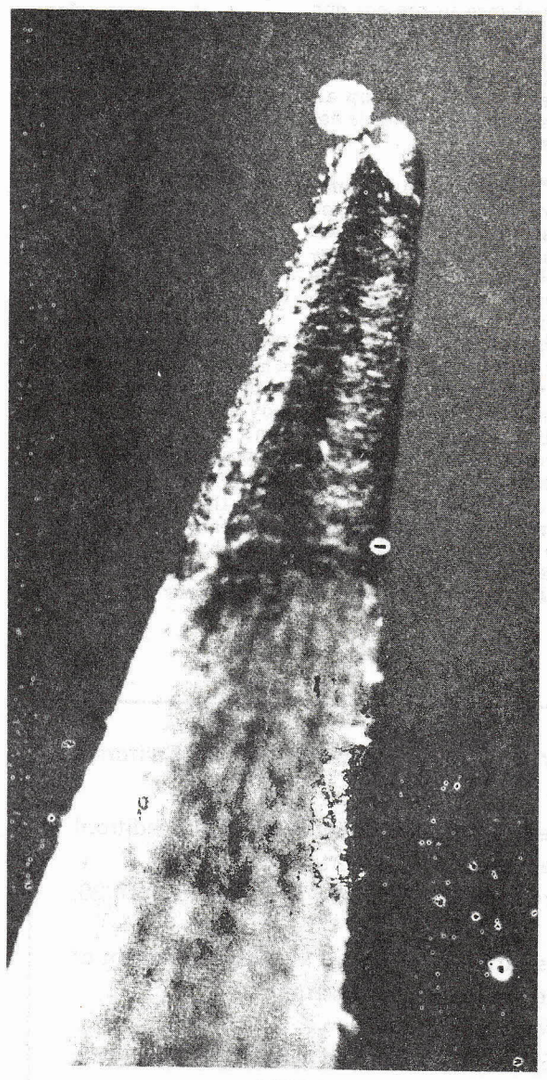
Instead of remaining a sticky local mess, the Huntington Beach mud dump near the Edison steam plant may become a testing ground for future solutions to oil blight.

This is the hope that is emerging from the controversy over the 39-acre Steverson brothers' dump at Magnolia Street and Adams Avenue.

After homeowners complained about foul odors emanating from the site where oil drilling wastes are deposited, the city and the owners were presented with a seemingly impossible problem: how to clean up the mess. The estimated one million cubic yards of oil and mud, 80 feet deep in parts, defied all normal approaches. There was nowhere else to take it and no easy way to compact it.

But a private company, Gerald C. Bowers Inc. of Orange, is spraying a bacteria solution on the dump that literally eats organic matter, including oil. The owners are buying the spray and it is reported that the mess could be cleaned in a year, particularly since the city and county are forcing the issue by taking legal action over the noxious odors.

A welcome side benefit is that in the bacteria spray the city may find a useful weapon in the cleanup of oil spills from the many wells in Huntington Beach.



150,000 BACTERIA ON TIP OF PENCIL
May Solve Ecological Problems, Say Experts

Oily Mud Solution Considered

A new way to solve the problem of getting rid of oily mud from drilling operations is being considered as a result of the controversy over the Steverson Brothers mud dump in Huntington Beach.

City Attorney Don Bonfa said the city's oil committee have been directed to study the feasibility of an ordinance that would require all wastes from wells to be cleared of oil before being removed from the site.

The city council asked for a report on such an ordinance within 60 days.

The suggestion was made by Councilman Al Coen who said he got the idea

Charge Filed Against Refinery Waste Dump

HUNTINGTON BEACH —A complaint charging violation of the State Health and Safety Code has been filed against three owners of a crude oil waste dump site.

The complaint, filed in Central Orange County Municipal Court, alleges three brothers—Ben, Carl and Joe Steverson—violated provisions of the code governing noxious odors when they allowed dumping of refinery wastes Jan. 12.

Neighbors near the

be subpoenaed to testify.

Authorities estimate a million cubic yards of oil drilling wastes have accumulated in the dump over the last 30 years. The Huntington Beach dump is the only one of its kind in Orange County and is a convenient disposal point for firms in Long Beach and Los Angeles.

The Air Pollution Control District last month served the Steversons with a notice that they were in violation of the code. The complaint filed

5-0 COUNCIL VOTE

Oil Dump Declared a Public Nuisance

HUNTINGTON BEACH —A dump that has been accumulating oil drilling wastes for 30 years has been declared a public nuisance by the City Council, the first step toward possible court action against its owners.

But councilmen, voting unanimously Monday night, instructed city officials to negotiate first with the owners, then report back to the council in June. No court action will be taken until the council orders it, councilmen said.

Since housing tracts have sprung up near the dump in the city's southeast corner, neighbors have complained that it is a health hazard and dangerously attractive to children and pets.

Caused Stir

The dump, up to 80 feet deep, covers most of 40 acres and contains mostly drilling mud, a substanct used to cool, clean and lubricate oil drills. It is very difficult to dry out once it becomes saturated with oil. It is, instead, dumped.

Dump owner Joseph L. Steverson caused a stir last February by announcing he would deposit a unique type of bacteria in the dump. The laboratory

representative for Gerald C. Bower Inc., said the first patch of bacteria deposited in one of the oil pools has worked well.

He said that if the bacteria, termed DBC Plus, were spread throughout the dump, all oil would be consumed within 12 to 15 months.

Protests from neighbors, however, forced the issue before the City Council. A public hearing was held in nearby Edison High School last month and continued last Monday.

Difficult to Prove

An attorney for Stevenson argued that public nuisance is difficult to prove in court and that no evidence had been offered to prove the dump was a nuisance.

The council, however, voted 5 to 0 to declare it a nuisance. Councilman Donald Shipley was absent, and Councilman Norma Gibbs abstained because she had not attended the original hearing.

The controversy seems far from resolution, however. Steverson said Tuesday that he would continue his plan to clean up the dump regardless of city demands. He said he wants to reclaim the land for development.

Los Angeles Times
CC R PART II †
FRIDAY, FEBRUARY 5, 1971

FORMIDABLE QUESTION—Aerial photo shows oil drilling waste dump at intersection of Magnolia St. and Hamilton Ave. in Huntington Beach. Nearby residents and Edison High School, top left, complain of odors from dump, which covers 40 acres at depths up to 80 feet.
Times photo by Vince Streano

City Has a Sticky Mess on Its Hands

BY LARRY PRYOR
Times Staff Writer

HUNTINGTON BEACH—City officials have a sticky problem on their hands: what to do with a million cubic yards of oil drilling wastes.

The wastes have been accumulating in a dump for about 30 years. During that time they have smelled, but until recently there hasn't been anyone to smell them.

Urban growth has changed that. There are now homes in the $30,000 class to the east on Hamilton Ave. and the south on Magnolia St. Edison High School opened a year and a half ago several hundred yards away.

Now thousands of noses are wrinkling.

"It reminds me of natural gas," said a secretary at Edison High. "We keep getting calls from classes saying the pilot light went out and they're going to asphyxiate."

"It's like being attacked by poisonous gas," said Mrs. Peggy Sword, 9092 Bobbie Circle, a leading force in getting the city to have the dump closed down.

Through her efforts, the Air Pollution Control District last month issued a notice of violation to the dump owners, Steverson Bros., and the case is now before the district attorney. But a citation is not expected to cure the problem.

"These criminal cases aren't very satisfactory," said City Atty. Donald Bonfa. "A judge will give the operator a $25, $50 or $100 fine. He'll pay it and then where are you?"

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Continued from First Page

The dimensions of the problem are formidable. The wastes, mostly drilling muds that are used to cool, clean and lubricate oil drills, cover much of the 40-acre site to depths of 80 feet. They are in liquid state and are held in by 15-foot high earthworks

The mud, mined mostly from special deposits in Wyoming, has a particular density that keeps deep wells from having their sides blown out, but that property also makes the mud almost impossible to dry.

When the mud becomes saturated with oil and sand, some oil companies spread it on the ground in long strips of less than an inch thick and plow it under.

The Huntington Beach dump is the only one of its kind in Orange County. It is a convenient disposal point for firms in Los Angeles and Long Beach, as well as county itself.

To truck wastes from the dump to inland areas where it could be spread would be a mammoth task. Trucks that carry dirt at construction sites hold about 25 cubic yards, compared with the dump's million cubic yards.

Nearby residents claim some of the mud is getting out of the dump bit by bit and ends up in their driveways and living rooms.

The mud flows onto the streets when it rains, they way, and cars track it to their homes. the area is also popular with pets, who track the stuff back. (There are also reports of pets falling in and drowning or being killed by the chemicals.)

A 5-foot fence encircles the dump but it is not strong. Residents fear that children will get into the area.

Dr. James W. Mason, a chemist who lives about a half mile from the dump, and is a member of the city's Environmental Council, favors the city's buying the dump and resorting to some stopgap measure, such as covering it with polyethelene to contain the odor, until a more permanent solution is reached.

"We don't see a solution yet," said Doyle Miller, city administrator. "We've got to know what the costs are and what the alternatives are."

Miller has been charged by the City Council to come up with some solutions by Feb. 16. "We're hoping we will have something," he said.

One of the dump owners, Joe Steverson, said, "We're willing to work with anyone. The only thing we don't want is to get into an argument with the neighbors. They've asked us to meet with them but I don't see the point. They've already made up their minds that the place smells."

The dump was once by itself. When it was annexed to the city, it became part of a residential-agricultural zoning category.

Development became a fact and the complaints began.

"The question is how to remedy it," said Ralph Hansen, a deputy district attorney handling the case for the county. "The property could be condemned and taken over but the city is not interested because of the costs."

City Atty. Bonfa points out the case is unique.

"We could approach this like a weed abatement case," he said, "and have the owner either remove the nuisance or have the city do it for him and assess him for the cost. But in this case the cost of removal would exceed the fair market value of the property."

Mrs. Sword argues that the city is in a pickle because it hasn't charged a barrel tax on oil extracted within the city limits.

"There are 27 major oil producing cities along the coast," she said, "and Huntington Beach is the only one without a barrel tax. Other cities have used it to control the nuisance of the oil companies."

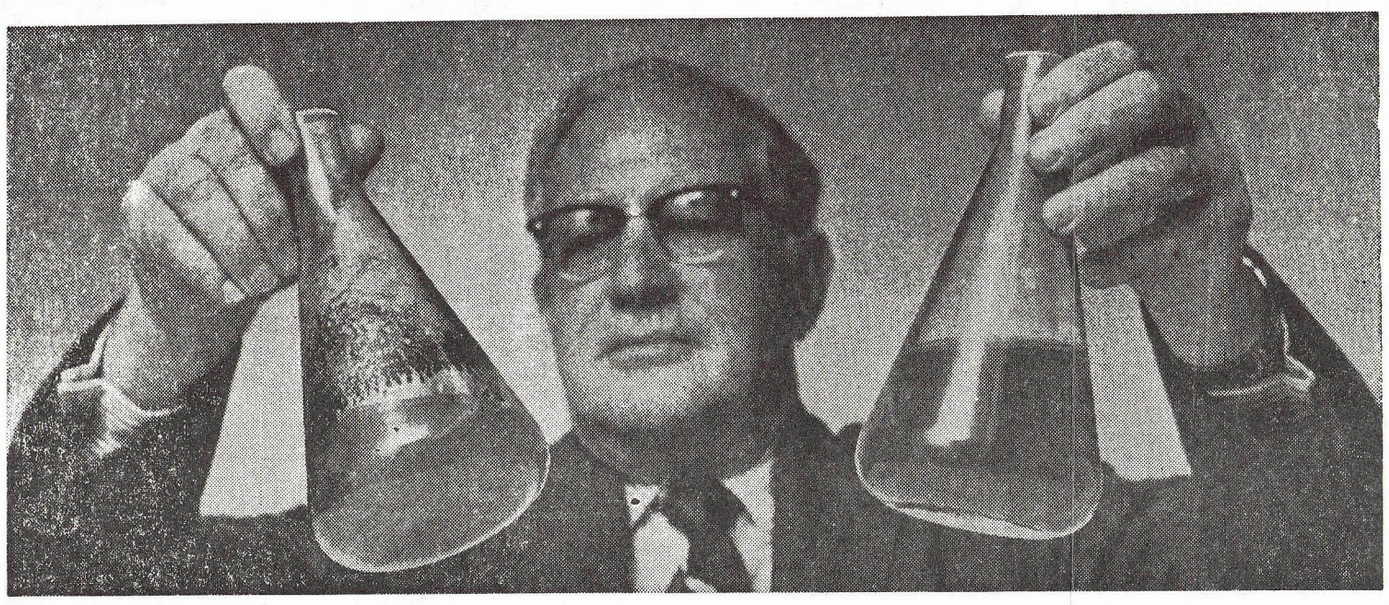
She also maintains that Steverson Bros. has consistently violated its permit with the County Water Pollution Control District by allowing wastes other than drilling muds to be put into the dump.

The charge is backed up by the Air Pollution Control District. On Jan. 12 a district inspector said he saw materials being put in late at night that were not allowed by the permit.

A hearing on Jan. 19 brought out more than 150 residents and resulted in about 20 formal complaints being filed, an unusually high number in a noxious odor case.

As of now, the dump has been alleged to be in violation of a nuisance regulation. But nuisances are subjective. "It may be offensive to them," said Joe Steverson, "but it isn't to me."

Los Angeles Times
CC R PART II †
FRIDAY, FEBRUARY 12, 1971



LITTLE ACHIEVERS — Gerald Bower, president of firm that created oil-eating micro-organisms, holds beaker with water taken from a Huntington Beach pond and another beaker of same type of water in final decomposition stage after the bacteria were exposed.
Times photos by Deris Jeannette

Bugs May Devour Smelly Oil Wastes

BOX OF BACTERIA—Marden Chlarson sifts dry (but not dead) Type L bacteria in 25-pound box. When distributed for use it is mixed in water before being mixed in the oil or waste material.

BY W. B. ROOD
Times Staff Writer

HUNTINGTON BEACH—A bug that can eat nearly 18 million gallons of crude oil wastes deserves a better name than Type L.

But that's the name of a microscopic creature officials here feel may be able to gobble up the sticky, black pools that have helped give this city the nickname of Oiltown U.S.A.

Even now, Type L's by the billions are munching away in an attempt to prove they can devour the city's biggest petroleum headache —a 40-acre dump site in which oil well drilling wastes have been accumulating for about 30 years.

Preliminary results are encouraging. A report, not yet completed, shows the micro-organisms have transformed the rotten egg-like smell of waste matter into a mild scent, resembling that of freshly turned earth.

And solid waste matter has been reduced in test samples from 1,500 parts per million (ppm) to less than 85 (ppm.)

"When the guy came by my office and said he had some bugs that could eat our oil, I thought he was joking," Oil Superintendent Herb Day said in an interview Thursday.

"But if these bugs work, they could be used anyplace we have a spill, and we've got plenty of sumps around."

Type L comes in a light brown powder, which is half bugs and half food for them. There are billions of the organisms in each pound, and when mixed with water, the bugs spring to life, doubling in number every two hours.

Chemists claim the bugs are harmless to anything but their intended waste target—be it oil or sewage—and will even eat a dab of the Type L powder to prove it.

Another nice thing about the bugs is they know when to quit. When the wastes are gone, the bugs die leaving nothing but a harmless, dry residue.

According to Gerald C. Bower—president of the Orange company, which created Type L and three other forms of inordinately hungry bacteria—smelly, sticky wastes can be transformed into harmless by-products: carbon dioxide, water and air.

"We can take the contents of that dump and turn it into water of sufficient quality that it can be pumped right into the sewer system," Bower said.

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Continued from First Page

Type L also may soon see service on a new frontier, the ocean oil spill. Use of the bug for seagoing spills has been hampered by its tendency to disperse from the floating oil.

"We are working on a sort of flotation raft to keep them from dispersing," said Bower.

Type L already has eaten its way into favor with the city of Long Beach, where the bug compound was called into service aboard the Queen Mary.

Construction aboard the famous liner had been slowed in 1968 by noxious fumes from 800,000 gallons of oily waste water in the ship's bilges. The fumes presented a fire hazard to welding torches.

In six weeks, the Type L bacteria had purified bilge wastes to such an extent that officials approved pumping the material into the harbor.

Bower says it has not always been easy to overcome skepticism toward Type L, which he says is totally harmless to humans and plant life.

"A few years ago, people looked at us like we were quacks, because there were all kinds of witch doctors coming around promising miracles," he said.

Sold Company

The discoverer of Type L, a chemist named Ed Noeker, went bankrupt trying to sell his bugs. He died shortly after selling the company to Bower in 1965.

But Bower's bugs have come into their own, and now his business is snowballing.

"We've been given a chance to make a presentation at a seminar on sewage treatment at Texas A&M in early March. This is the first time we've had the chance to present our program to a group like this."

Convincing clients they need bugs to clean up already smelly wastes is not easy.

"When you go to somebody and tell him you want to put bugs in his waste products, he'll probably say, 'Hell, I've got bugs enough,'" said Marden Chlarson, the man who brought Type L bugs to Huntington Beach.

"I read about the problem the city was having with that dump and just dropped in on the owner one day."

Joe Steverson, part owner of the dump, agreed to try the Type L treatment. A portion of one 2.5-million-gallon pool has been treated with the bug compound for a peroid of four weeks.

"The results have been very favorable so far," said Steverson in an interview. "I feel personally the bugs haven't been there long enough to give us real hope, but they have improved the area where they are."

Chlarson and Bower feel Steverson's 18 million gallons of liquid oil wastes could be reduced to harmless waste water in less than a year.

"When they pump out the waste water, there would be nothing but dry fertile soil left," said Bower.

Director of Harbors and Beaches Vince Moorhouse, who has been named to head the city's search for a way to clean up Steverson's dump, is intrigued by possibilities of Type L bug treatment.

"If this is the solution, it's really a big breakthrough. It could be the answer for all types of blight in our city," he said.

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