8.2 Measurement without using attached extractor (as shown in example)

° Introduction

Note that extraction ratio varies with measuring range.

	Sample : Solvent	Extraction Example
20 ppm range	1 : 1	100mℓ : 100mℓ
5 ppm range	2 : 1	200mℓ : 100mℓ

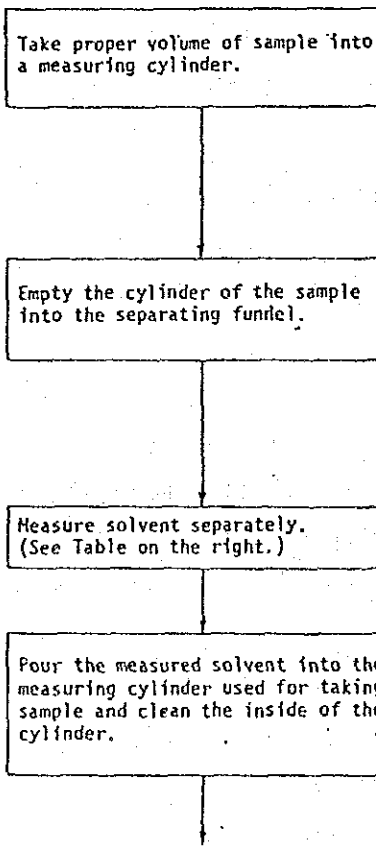
° Materials required

- 500mℓ or 300mℓ separating funnel
- Measuring cylinder (20 ppm ..... 100mℓ × 2 / 5 ppm 200mℓ, 100mℓ)
- Hydrochloride acid (diluted one to one with distilled water)
- Solvent (purified carbon tetrachloride for measuring oil or Flon S-316)
- Filter paper, anhydrous sodium sulfate, etc. as required

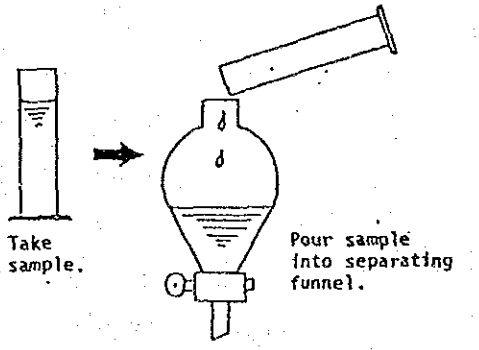
° Select measuring range.

Perform zero and span calibrations for the selected range.

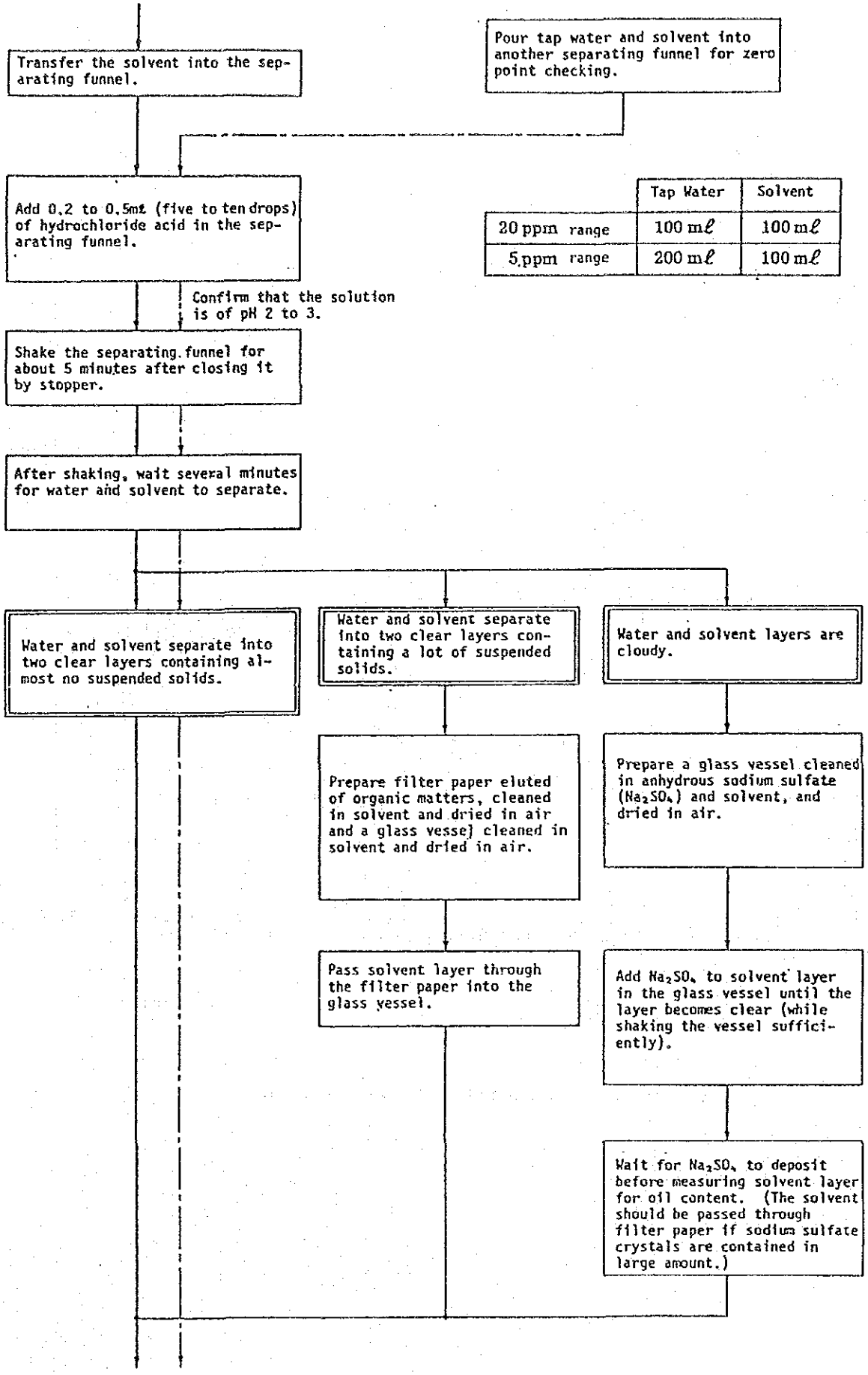
° Operating procedure

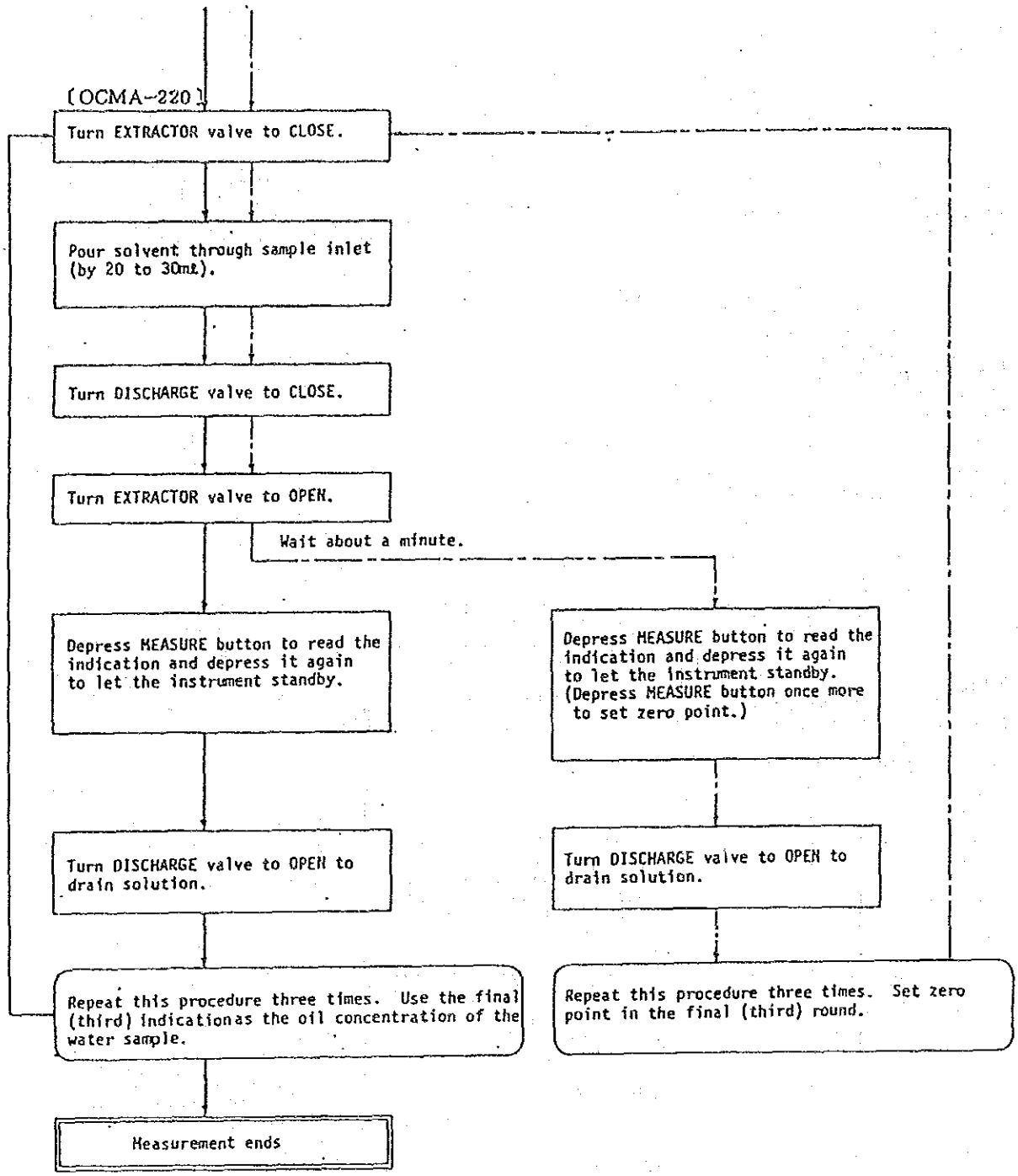


	Volume
20 ppm range	80~100 mℓ
5 ppm range	160~200 mℓ



	Volume of Solvent
20 ppm range	Same with sample volume
5 ppm range	1/2 of sample volume


Transfer the solvent into the separating funnel.
Pour tap water and solvent into another separating funnel for zero point checking.
Add 0.2 to 0.5mℓ (five to ten drops) of hydrochloride acid in the separating funnel.
Tap Water
Solvent
20 ppm range
100 mℓ
100 mℓ
5 ppm range
200 mℓ
100 mℓ
Confirm that the solution is of pH 2 to 3.
Shake the separating funnel for about 5 minutes after closing it by stopper.
After shaking, wait several minutes for water and solvent to separate.
Water and solvent separate into two clear layers containing almost no suspended solids.
Water and solvent separate into two clear layers containing a lot of suspended solids.
Water and solvent layers are cloudy.
Prepare filter paper eluted of organic matters, cleaned in solvent and dried in air and a glass vessel cleaned in solvent and dried in air.
Prepare a glass vessel cleaned in anhydrous sodium sulfate (Na_2SO_4) and solvent, and dried in air.
Pass solvent layer through the filter paper into the glass vessel.
Add Na_2SO_4 to solvent layer in the glass vessel until the layer becomes clear (while shaking the vessel sufficiently).
Wait for Na_2SO_4 to deposit before measuring solvent layer for oil content. (The solvent should be passed through filter paper if sodium sulfate crystals are contained in large amount.)



Set zero point in the manner indicated by broken lines before measurement.

9. Maintenance

Repeated measurement of water sample containing lots of suspended solids will lead clogging in the filter. If solution level in the extractor chamber does not drop when introducing extraction solution into the analyzer section(*1), filter element should be replaced in the manner indicated by the operation symbol ⑥. Normally, it takes about 15 seconds for the solution level to drop to a certain prescribed level. Replace the filter element when this rate exceeds 30 seconds.

(Note) (*1): Incomplete discharge of solution causes the residual solution to stagnate in the piping led to the analyzer section. This may also prevent the level in extraction chamber from dropping in the subsequent measurement. Turn EXTRACTOR valve to ① CLOSE. Turn DISCHARGE valve to ⑧ OPEN and back to ⑤ CLOSE instantaneously and then turn EXTRACTOR valve to ⑥ OPEN in an attempt to remove stagnant solution from the piping.

[How to replace filter element]

① Remove buckle to dismantle cover.
② Loosen filter assembly lock screw to remove filter block.
③ Take packing out of the filter block and replace filter element.
(Assemble the filter in the reverse sequence.)

(Confirmation)

After assembling the filter, confirm the following before fixing the buckle: Turn DISCHARGE valve to CLOSE and EXTRACTOR valve to OPEN. Pour 20 to 30mℓ of carbon tetrachloride through the sample inlet and wait about a minute to check that the filter is free from leakage. If any leak is identified, re-examine packing and other parts.

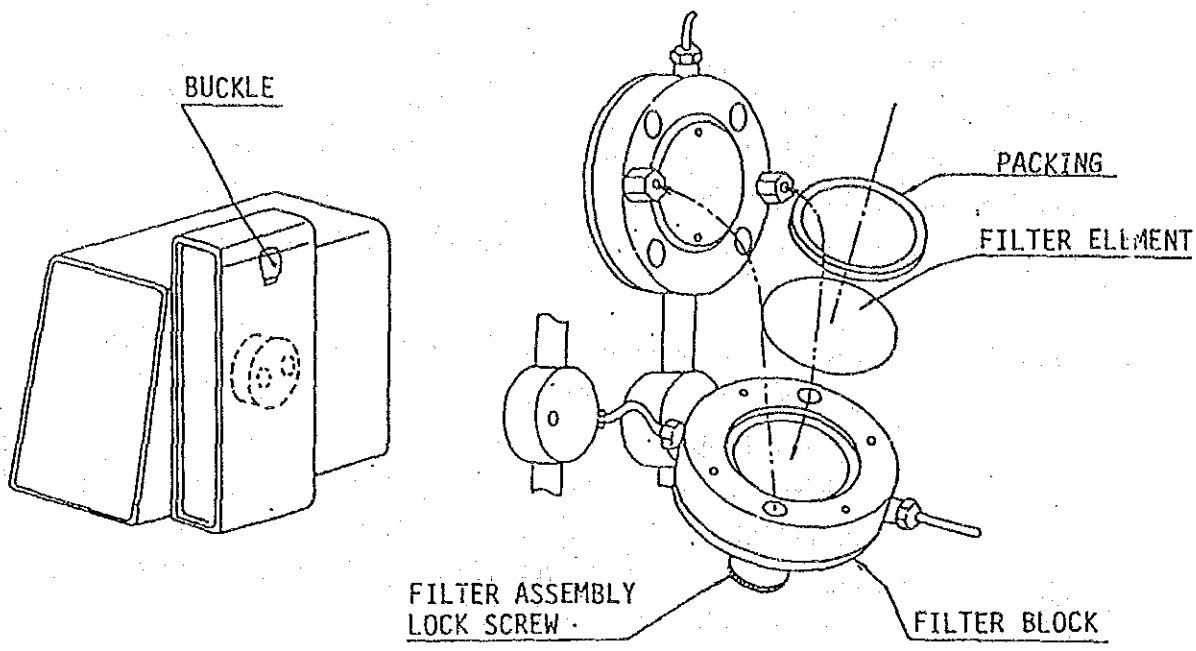
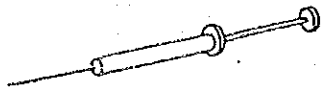
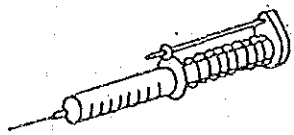
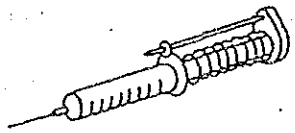
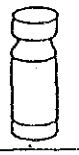
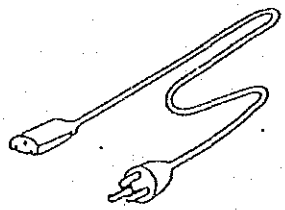
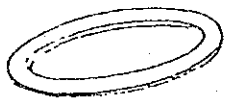


Fig. 9-1 Filter Element Replacement

10. Troubleshooting

Symptom	Cause	Remedy
Solvent does not flow into analyzer section when EXTRACTOR valve is turned to OPEN.	Solution remains in the piping due to incomplete discharge in the preceding measurement.	Lengthen discharging time.
	Filter element is clogged.	Replace filter element.
Meter cannot be calibrated.	Solvent is not purified.	Replace solvent with purified one.
A Zero calibration cannot be achieved.	Foreign substance (Including waterdrops is present in the cell.)	Disassemble and clean the cell. Replace filter element. (Optical adjustment is required after reassembling.)
B Span calibration cannot be achieved.	Abnormal span solution	Prepare proper span solution.
	Improper adjustment of GAIN control.	Adjust GAIN control.
Indication noise is of abnormally large volume.	Power source is unstable.	Use stable power source.
	Zero calibration was performed with the measuring cell containing foreign substances (including waterdrops).	Disassemble and clean the cell. (Optical adjustment is required after reassembling.)
No liquid crystal display is obtained when POWER button is depressed.	Fuse is broken.	Replace fuse.

11. Parts List — Accessories

Item No.	Description		Part No.
1	Calibration micro-syringe (25μℓ)		9039-0001-00
2	Measuring syringe for sample (20mℓ max.)		
3	Measuring syringe for solvent (20mℓ max.)		
4	Oil separation element (5 sheets/set) (ø40)		9039-0004-00
5	Calibration B-heavy oil (10mℓ)		9018-0006-00
6	Power cord (2.4m)		
7			
8	Packing (for filter block)		

HORIBA

INSTRUCTIONS
OCMA-220
OIL CONTENT ANALYZER

PREPARATION

Allow 30 minutes for warming up after POWER is turned on.
Depress RANGE to select measuring range (5 ppm or 20 ppm) and set EX.TIME to appropriate position.
Place a 100 or 200 mℓ glass beaker with approx. 10 mℓ water in it underneath sample discharge pipe.

CALIBRATION

A-1. Turn EXTRACTOR to CLOSE (1). Pour x^* mℓ of *tap water* and y^* mℓ of solvent into inlet (2).
A-2. Depress EXTRACT (3). Extraction will stop automatically at the time preset on EX.TIME. Check to see separation of water and solvent at monitor window (4). Turn DISCHARGE to CLOSE (5) and EXTRACTOR to OPEN (6). Wait one minute.
A-3. Press MEASURE (7) and adjust *ZERO*** to read display at zero.
A-4. Press MEASURE (7) again and turn DISCHARGE to OPEN (8).
A-5. Turn EXTRACTOR to CLOSE (1). Pour x^* mℓ of *span solution* and y^* mℓ of solvent into inlet (2).
A-6. Follow A-2.
A-7. Press MEASURE (7) and adjust *SPAN*** to read display at the value of span solution.
A-8. Follow A-4.
A-9. Repeat A-1 through A-8 three (3) times for better results.

MEASURE SAMPLE

B-1. Turn EXTRACTOR to CLOSE (1). Pour x^* mℓ of *sample water* and y^* mℓ of solvent into inlet (2).
B-2. Follow A-2.
B-3. Press MEASURE (7) and read data on display.
B-4. Follow A-4.
B-5. Repeat B-1 through B-4 three (3) times for accurate data.

* For 20 ppm range: $x = 15$, $y = 15$ For 5 ppm range: $x = 20$, $y = 10$
** Depress the knob to adjust *ZERO* or *SPAN*.

REMARKS

Use pure solvent specified by the manufacturer. See manual for CHECK button.

CAUTION

Solvent is harmful to health. Avoid skin contact or breathing of the vapors. A good ventilation of the laboratory is suggested.

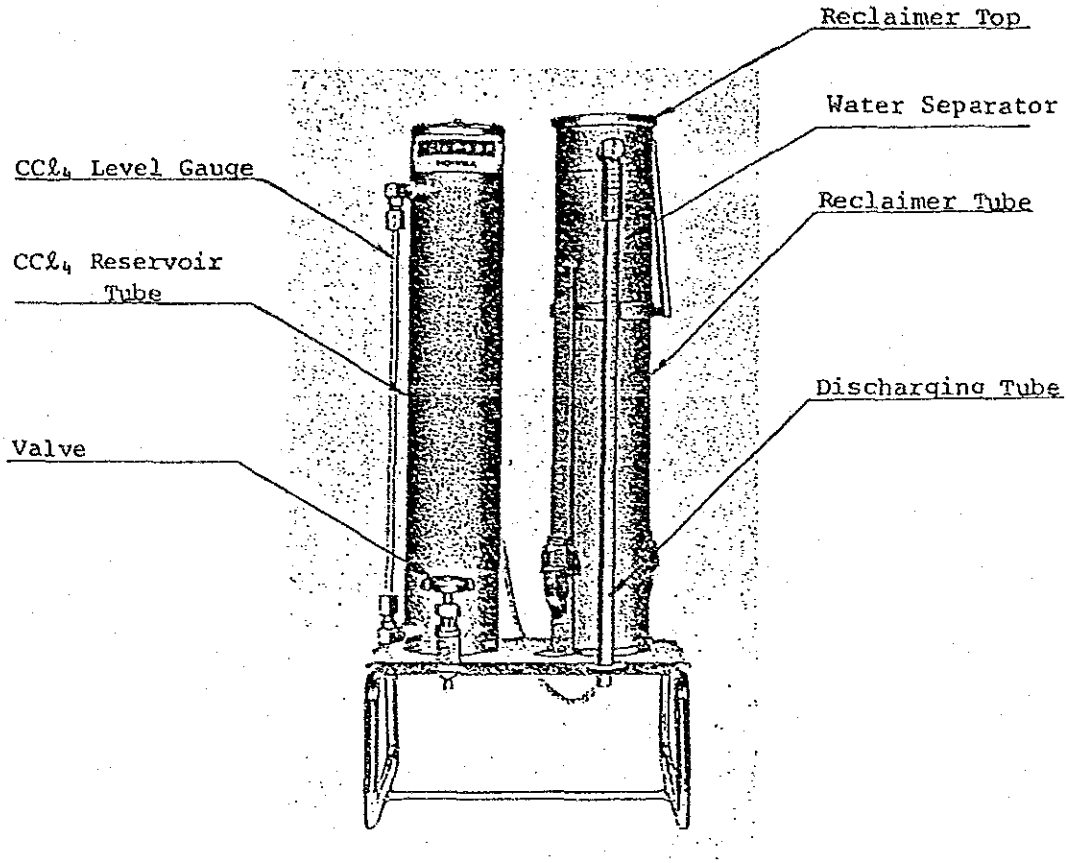
HORIBA CCℓ_4 RECLAIMER

HORIBA, Ltd.

2, Miyanohigashi, Kissyoin, Minami-Ku, Kyoto, Japan

cable: HORIBA KYOTO

1. DESCRIPTIONS



2. ACCESSORIES

Oil-adsorbent (500g):	2 cans
FILTER:	2 pcs.
Instruction Manual:	1 pc.

Specifications are subject to change without notice.

3. OPERATION

- Place beakers underneath $CC\ell_4$ Reclaimer Tube and Discharging Tube respectively.
- Close valve at the bottom of $CC\ell_4$ Reservoir Tube.
- Remove top from $CC\ell_4$ Reclaimer Tube and pour approximately 1ℓ of fresh $CC\ell_4$. (At this stage, pour $CC\ell_4$ gently not to let $CC\ell_4$ overflow from the discharging tube.) Confirm that the $CC\ell_4$ travels through the connecting pipe and flows into the $CC\ell_4$ Reservoir Tube. (Initial passage of $CC\ell_4$ through the Reclaimer Tube will take some time.)
- Pour approximately 100 mℓ of tap water into the $CC\ell_4$ Reclaimer Tube.
- Open Reservoir valve and receive all $CC\ell_4$ into the beaker. Close the valve, and gently pour this $CC\ell_4$ into the $CC\ell_4$ Reclaimer from the beaker. Repeat this procedure for about three times. This completes the preparation. Henceforth, clean $CC\ell_4$ will be stored at the $CC\ell_4$ Reservoir Tube just by dumping the waste from OCMA-200 Oil-in-Water Analyzer, and clean $CC\ell_4$ will be available by simply opening the valve whenever needed. The water from the waste overflows from the discharging tube and gets discharged.

NOTE:

1. DO NOT OPEN RECLAIMER TUBE TOP EXCEPT WHEN NECESSARY.
2. ABSOLUTELY REFRAIN FROM POURING OTHER SOLVENT THAN $CC\ell_4$ SUCH AS ALCOHOL, ACETON OR DETERGENTS INTO THE RECLAIMER.

4. REPLACING THE OIL-ADSORBENT

The serviceable life of the oil-adsorbent is dependent, on the volume of waste treated and degree of oil concentration in the treated waste, but as a guide line, it is safely assumed as until the oil concentration in the reclaimed $CC\ell_4$ reaches 1 ppm. The oil concentration in the reclaimed $CC\ell_4$ reaches 1 ppm when 1 g of oil is trapped in the oil-adsorbent of 500 g. It is recommended, therefore, to occasionally carry out a control test comparing with a fresh $CC\ell_4$, and whenever the concentration reaches 1 ppm at zero point, to renew the oil-adsorbent.

To renew the oil-adsorbent, take following steps:

(1) Remove connecting tube at the bottom of the reclaimer tube and recover $CC\ell_4$ and water remaining in the reclaimer.

(2) Unlock and remove water separator from the reclaimer tube.

(3) Remove net from reclaimer tube and take out the oil-adsorbent within.

(4) Replace with a new oil-adsorbent, and revert the procedure to assemble.

5. REPLACING FILTER IN WATER SEPARATOR

The FILTER in the water separator is for separating the water and $CC\ell_4$. When the FILTER is clogged, it will delay the $CC\ell_4$ to flow into Reservoir Tube from Reclaimer Tube, and therefore, the FILTER should be replaced when this happened.

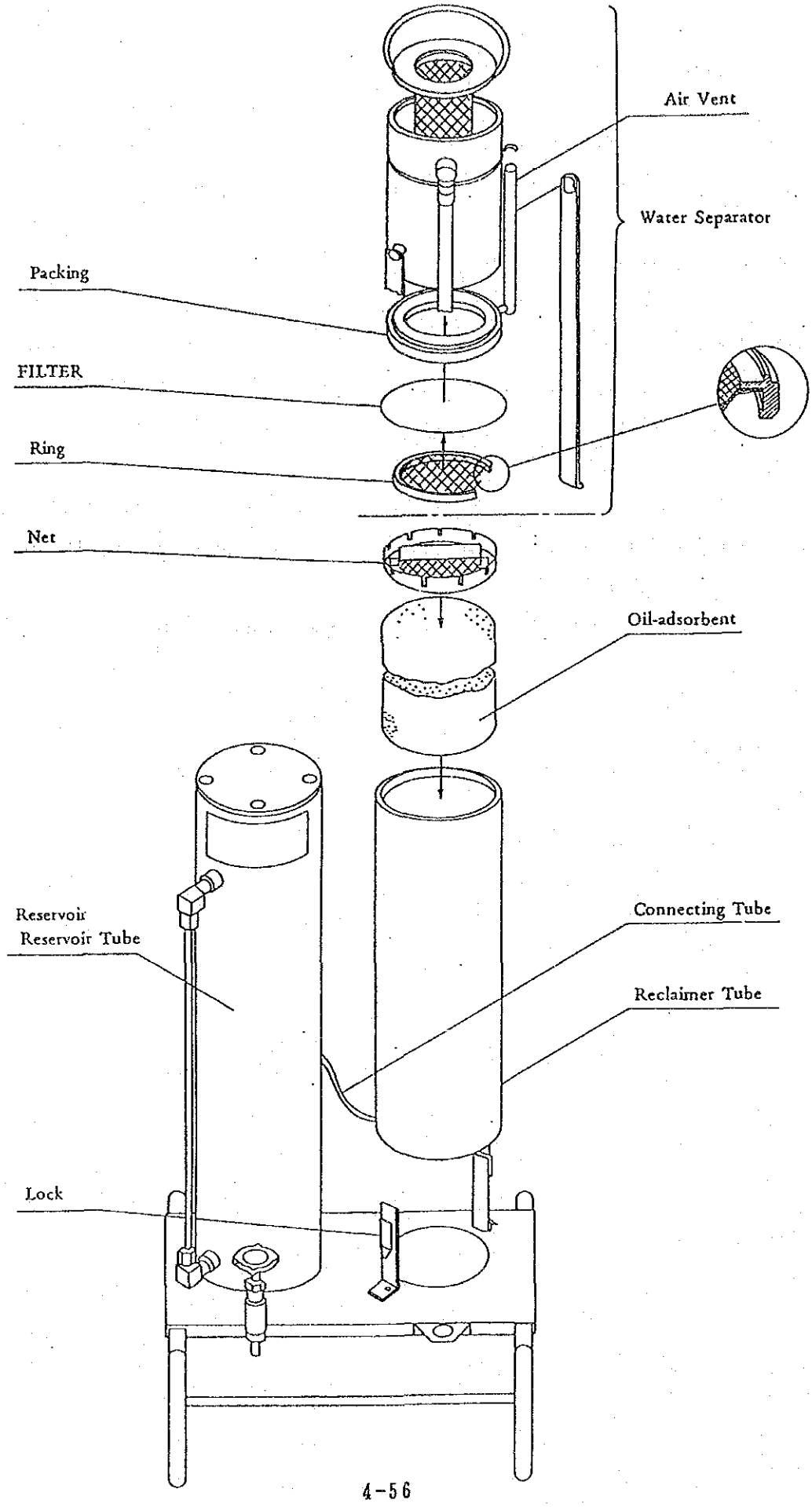
To replace the filter:

(1) Follow the procedure as described in the replacement of the oil-adsorbent.

(2) Remove the air vent from the packing of the water separator, and remove the ring to remove the FILTER. In this procedure, the packing should not be removed from the water separator.

(3) Place new FILTER upon the packing.
Adjusting the small hole on the ring with the hole on the packing, place the ring upon the FILTER and gently press downward, and then fit it therein. Do not let the FILTER wrinkle.

(4) Assemble the water separator reverting the procedure taken when disassembled.


Air Vent
Water Separator
Packing
FILTER
Ring
Net
Oil-adsorbent
Reservoir
Reservoir Tube
Connecting Tube
Reclaimer Tube
Lock

APPENDIX R2 – 3

Designation: D 2035 - 80[ε1]

Standard Practice for Coagulation-Flocculation Jar Test of Water[1]

This standard is issued under the fixed designation D 2035; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

[ε1] NOTE—Editorial corrections, including the addition of 1.3, were made in March 1989.

1. Scope

1.1 This practice covers a general procedure for the evaluation of a treatment to reduce dissolved, suspended, colloidal, and nonsettleable matter from water by chemical coagulation-flocculation, followed by gravity settling. The procedure may be used to evaluate color, turbidity, and hardness reduction.

1.2 The practice provides a systematic evaluation of the variables normally encountered in the coagulation-flocculation process.

1.3 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 1129 Definitions of Terms Relating to Water[2]
D 1192 Specification for Equipment for Sampling Water and Steam[2]
D 1193 Specification for Reagent Water[2]
D 1293 Test Methods for pH of Water[2]
D 1889 Test Method for Turbidity of Water[2]
D 3370 Practices for Sampling Water[2]

3. Definitions

3.1 For definitions of terms used in this practice, refer to Definitions D 1129.

4. Summary of Practice

4.1 The coagulation-flocculation test is carried out to determine the chemicals, dosages, and conditions required to achieve optimum results. The primary variables to be investigated using the recommended practice include, but are not limited to:

4.1.1 Chemical additives,
4.1.2 pH,
4.1.3 Temperature, and
4.1.4 Order of addition and mixing conditions.

5. Significance and Use

5.1 This practice permits the evaluation of various coagulants and coagulant aids used in the treatment of water and waste water for the same water and the same experimental conditions.

5.2 The effects of concentration of the coagulants and coagulant aids and their order of addition can also be evaluated by this practice.

6. Interferences

6.1 There are some possible interferences that may make the determination of optimum jar test conditions difficult. These include the following:

6.1.1 *Temperature Change (During Test)*—Thermal or convection currents may occur, interfering with the settling of coagulated particles. This can be prevented by temperature control.

6.1.2 *Gas Release (During Test)*—Flotation of coagulated floc may occur due to gas bubble formation caused by mechanical agitator, temperature increase or chemical reaction.

6.1.3 *Testing-Period*—Biological activity or other factors may alter the coagulation characteristics of water upon prolonged standing. For this reason the period between sampling and testing should be kept to a minimum, with the time being recorded.

7. Apparatus

7.1 *Multiple Stirrer*—A multiposition stirrer with continuous speed variation from about 20 to 150 rpm should be used. The stirring paddles should be of light gage corrosion-resistant material all of the same configuration and size. An illuminated base is useful to observe the floc formation. Precautionary measures should be taken to avoid heat being imparted by the illumination system which may counteract normal settling.

7.2 *Jars (or Beakers)*, all of the same size and shape; 1500-mL Griffin beakers may be used (1000-mL recommended minimum size).

7.3 *Reagent Racks*—A means of introducing each test solution to all jars simultaneously. There should be at least one rack for each test solution or suspension. The racks should be similar to that shown in Fig. 1.

8. Reagents

8.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the

[1] This practice is under the jurisdiction of ASTM Committee D-19 on Water and is the direct responsibility of Subcommittee D19.03 on Sampling of Water and Water-Formed Deposits and Surveillance of Water.

Current edition approved July 3, 1980. Published October 1980. Originally published as D 2035 - 64 T. Last previous edition D 2035 - 74.

[2] *Annual Book of ASTM Standards*, Vol 11.01.

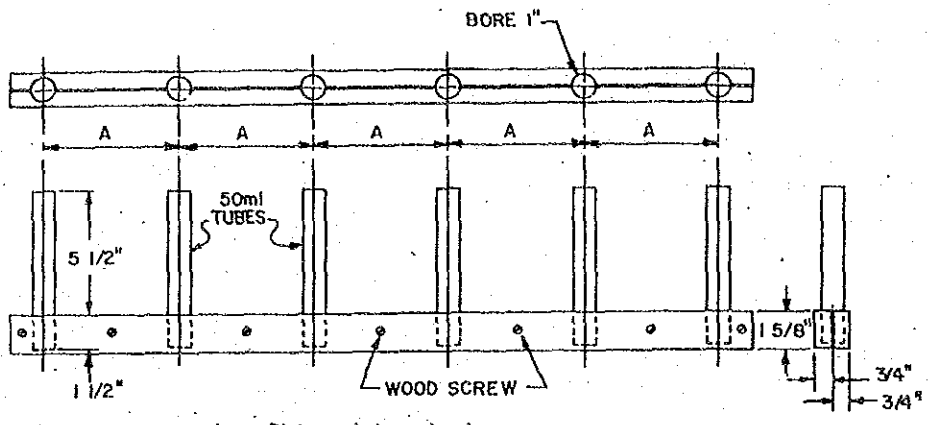


FIG. 1 Reagent Rack for Multiple Stirrer Jar Test Apparatus

Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.[3] Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

8.2 *Purity of Water*—Unless otherwise indicated, reference to water for reagent preparation shall be understood to mean Type IV reagent water conforming to Specification D 1193.

8.3 The following chemicals and additives are typical of those used for test solutions and suspensions. The latter, with the exception of coagulant aids, may be prepared daily by mixing chemicals with water to a concentration of 10 (±0.1) g/L (1.0 mL of test solution or suspension when added to 1 L of sample is equivalent to 10 mg/L):

Prime Coagulants
- Alum[$Al_2(SO_4)_3 \cdot 18H_2O$]
- Ferric sulfate [$Fe_2(SO_4)_3 \cdot xH_2O$]
- Ferric chloride ($FeCl_3 \cdot 6H_2O$)
- Ferrous sulfate ($FeSO_4 \cdot 7H_2O$)
- Magnesium carbonate ($MgCO_3 \cdot 3H_2O$)
- Sodium aluminate ($NaAlO_2$)

Coagulant Aids
- Activated silica
- Anionic } Polyelectrolytes
- Cationic }
- Nonionic Polymer

Oxidizing Agents
- Chlorine (Cl_2)
- Chlorine dioxide (ClO_2)
- Potassium permanganate ($KMnO_4$)
- Calcium hypochlorite [$CaCl(ClO) \cdot 4H_2O$]
- Sodium hypochlorite (NaClO)

Alkalis
- Calcium carbonate ($CaCO_3$)
- Dolomitic lime (58 % CaO, 40 % MgO)
- Lime, hydrated [$Ca(OH)_2$]
- Magnesium oxide (MgO)
- Sodium carbonate (Na_2CO_3)
- Sodium hydroxide (NaOH)

Weighting Agents
- Bentonite
- Kaolin
- Other clays and minerals

Miscellaneous
- Activated carbon (powdered)

8.4 *Coagulant Aids*—There are numerous commercially available coagulant aids or polyelectrolytes. All polyelectrolytes are classified anionic, cationic or nonionic, depending upon their composition. These aids may have the ability to produce large, tough, easily-settled floc when used alone or in conjunction with inorganic coagulants. A small dosage (under 1 mg/L) may permit a reduction in the dosage of, or complete elimination of, the coagulant. In the latter case, the polyelectrolyte would be considered the prime coagulant rather than a coagulant aid. Aids come in powdered and liquid form. Powdered aids should be prepared as 0.1 % solutions with appropriate aliquots to provide proper dosage. Always add powdered aids to the dissolving water rather than the reverse, and add slowly to the shoulder of a vortex created by stirring. If a vortex is not formed, the dry powder will merely collect on the surface of the water in gummy masses and become very difficult to dissolve. Dissolving time may vary from several minutes to several hours. Suggested manufacturers' procedures for wetting, dissolving, and storing should be followed when available. Liquid forms can be readily prepared to the above strength without difficulty.[4]

[3] "Reagent Chemicals, American Chemical Society Specifications," Am. Chemical Soc., Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see "Reagent Chemicals and Standards," by Joseph Rosin, D. Van Nostrand Co., Inc., New York, NY, and the "United States Pharmacopeia."

[4] A periodically updated "Report on Coagulant Aids for Water Treatment" is published by the Environmental Protection Agency Office of Water Supply, Cincinnati, Ohio 45268, listing coagulant aids that may be used in water treatment without adverse physiological effects on those using the water, based on information submitted by the manufacturers or distributors, or both.

Sample _____ pH _____ Turbidity _____ Date _____

Location _____ Color _____ Temperature _____ Sample Size _____ ml

	JAR NUMBER					
	1	2	3	4	5	6
Chemicals, mg/litre (a)						
Flash Mix Speed, rpm						
Flash Mix Time, min						
Slow Mix Speed, rpm						
Slow Mix Time, min						
Temperature, °F						
Time First Floc, min						
Size Floc						
Settling rate						
Turbidity						
Color						
pH						

(a) Indicate order of addition of chemicals.

FIG. 2 Jar Test Data

9. Sampling

9.1 Collect the water sample under test in accordance with the applicable Specification D 1192 and Practices D 3370.

10. Procedure

10.1 Measure equal volumes (1000 mL) of sample into each of the jars or 1500-mL Griffin beakers. As many sample portions may be used as there are positions on the multiple stirrer. Locate beakers so that the paddles are off-center, but clear the beaker wall by about 6.4 mm (¼ in.). Record the sample temperature at the start of the test.

10.2 Load the test chemicals in the reagent racks. Use one rack for each series of chemical additions. Make up each tube in the rack to a final volume of 10 mL, with water, before using. There may be a situation where a larger volume of reagent will be required. Should this condition prevail, fill all tubes with water to a volume equal to the largest volume of reagent in the reagent rack. When adding slurries, it may be necessary to shake the rack to produce a swirling motion just prior to transfer.

10.3 Start the multiple stirrer operating at the "flash mix" speed of approximately 120 rpm. Add the test solution or suspensions, at predetermined dosage levels and sequence. Flash mix for approximately 1 min after the additions of chemicals. Record the flash mix time and speed (rpm).

10.4 Reduce the speed as necessary to the minimum required to keep floc particles uniformly suspended throughout the "slow mix" period. Slow mix for 20 min. Record the time for the first visible floc formation. Every 5 min (during the slow mix period), record relative floc size and mixer speed (rpm). If coagulant aids are used, mixing speed is critical because excessive stirring tends to break up early floc formation and may redisperse the aid.

10.5 After the slow mix period, withdraw the paddles and observe settling of floc particles. Record the time required for the bulk of the particles to settle. In most cases this time will be that required for the particles to settle to the bottom of the beaker; however, in some cases there may be interfering convection currents. If so, the recorded settling time should be that at which the unsettled or residual particles appear to be moving equally upward and downward.

10.6 After 15 min of settling, record the appearance of floc on the beaker bottom. Record the sample temperature. By means of a pipet or siphon, withdraw an adequate sample volume of supernatant liquor from the jar at a point one half of the depth of the sample, to conduct color,[5] turbidity, pH and other required analyses, (Note) determined in accordance with Test Methods D 1889 and D 1293. A suggested form for recording results is appended (see Fig. 2).

NOTE—Tests for residual chemicals should be included, for example, alum; residual Al_2O_3; copperas; residual Fe_2O_3; etc.

10.7 Repeat steps 10.1 through 10.6 until all pertinent variables have been evaluated.

10.8 The times given in 10.3, 10.4, and 10.6 are only suggestions.

11. Reproducibility

11.1 It is recognized that reproducibility of results is

[5] For the color determination, reference is made to *Standard Methods for the Examination of Water and Waste Water*, Fourteenth edition, American Public Health Association, Inc., New York, NY, 1975, pp. 64-71.

important. To demonstrate reproducibility, the so-called 3 and 3 procedure is suggested. In this procedure, duplicate sets of 3 jars each are treated simultaneously with the same chemical dosages in jars 1 and 4, 2 and 5, and 3 and 6.

APPENDIX R2-4

APPENDIX R2-4

Text Book of Information Retrieval Technology

Information Retrieval Using Databases

1. Database

A database consists of many file, and each file consists of information for each documents contained, such as title, author, journal name, abstract.

2. How to use information retrieval system (DIALOG)

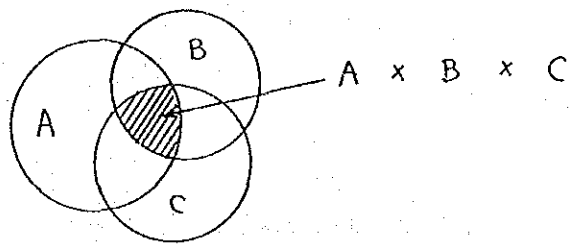
Step 1: Write your idea what you want as a statement

Ex. "Behavior of oil spill in seawater"

Step 2: Analyze the idea and statement and divide to several concepts composed

Concept A: Oil spill
Concept B: Seawater
Concept C: Behavior

Idea what you want = "Concept A" x "Concept B" x "Concept C"



Step 3: List up words and phrases, which will be used in the literature for each concept.

Ex. Concept A:
oil spill, spilled oil, spill, spills, oil dispersion, dispersed oil, dispersed oils, oil effluent, etc.

Concept B:
sea, ocean, seawater, sea water, Arabian Gulf, marine

Concept C:
Behavior, behaviour, particle, particles, concentration, concn(abbreviation of "concentration" in Chemical Abstracts, etc.

Step 4: Arrange the words and phrases using gramma of the systes
An example of DIAlOG

Concept A:
OIL?(1N)(SPILL? + DISPERS? + EFFLUENT?)

Concept B:
SEA + OCEAN + MARINE + SEAWATER + ARABIAN(w)GULF

Concept C:
BEHAVIO? + PARTICLE? + CONCENTRATION + CONCN

Step 5: FILE 411 DIALINDEX

(1) Select files, using file number or category name

(2) how many documents are collected in each file is found

Step 6
(1) Begin files, which are selected using information obtained in step 5. (2)
(2) Execution of information retrieval
(3) Elimination of the duplicated documents over the files
(4) Print information selected.

3. Example

3.1 Example of information retrieval using File 411 DIALINDEX

3.1.1 Subject: Behavior of oil spill in seawater

Retrieval usning File 411 DIALINDEX

B 411
SET FILES 2, 6, 8, 40, 41, 44, 103, 399

S OIL?(1N)(SPILL? OR DISPERS? OR EFFLUENT?)(F)(SEA OR MARIE OR SEAWATER OR ARABIAN(W)GULF AND (BEHAVIOR? OR CONCENTRAT? OR CONCN)

File	Items description	Number of documents retrieved
2:	INSPEC 2 69-92/9201W2	9
6:	NTIS 64-92/9201B1	150
8:	COMPENDEX PLUS 1970-1991/NOV	146
40:	ENVIROLINE 70-91/OCT	186
41:	POLLUTION ABSTRACTS 70-91/NOV	119
44:	AQUATIC SCIENCE ABSTRACTS 78-91/SEP	220
103:	ENERGY SCIENCE & TECHNOLOGY 74-91/DEC(ISS23)	368
399:	CA SEARCH 1967-1991 UD=11522	47

3.1.2 Subject: Pretreatment of oil contaminated seawater by coagulation

S OIL?(F)COAGULANT?(F)(SEA OR OCEAN OR MARINE OR SEAWATER OR ARABIAN(W)GULF)

File	Items description	Number of documents retrieved
2:	INSPEC 2 69-92/9201W2	1
6:	NTIS 64-92/9201B1	4
8:	COMPENDEX PLUS 1970-1991/NOV	3
40:	ENVIROLINE 70-91/OCT	2
41:	POLLUTION ABSTRACTS 70-91/NOV	2
44:	AQUATIC SCIENCE ABSTRACTS 78-91/SEP	3
103:	ENERGY SCIENCE & TECHNOLOGY 74-91/DEC(ISS23)	5
399:	CA SEARCH 1967-1991 UD=11522	8

3.1.3 Subject: Effect or damage of oil to RO membrane

S OIL?(3N)(RO OR REVERSE(W)OSMOSIS OR MEMBRANE?)(F)(EFFECT? OR DAMAGE? OR PERFORMANCE?)

File	Items description	Number of documents retrieved
2:	INSPEC 2 69-92/9201W2	4
6:	NTIS 64-92/9201B1	9
8:	COMPENDEX PLUS 1970-1991/NOV	23
40:	ENVIROLINE 70-91/OCT	1
41:	POLLUTION ABSTRACTS 70-91/NOV	1
44:	AQUATIC SCIENCE ABSTRACTS 78-91/SEP	5
103:	ENERGY SCIENCE & TECHNOLOGY 74-91/DEC(ISS23)	21
399:	CA SEARCH 1967-1991 UD=11522	110

3.2 Example of information retrieval
Database: DIALOG
Files : No.6, 8, 40, 41, 44, 103, 399
Subject : Behavior of oil spill in seawater

3.3 Example of information retrieval
Database: STN
Subject : Coagulation of oil in seawater

3.4 Example of information retrieval
Database: NRS (National Retrieval System of King Abdulaziz City for Science and Technology
Subject : Oil spill in Seawater

3.2 Example of information retrieval
Database: DIALOG
Files : No.6, 8, 40, 41, 44, 103, 399
Subject : Behavior of oil spill in seawater

File(s) searched:

```
File   6:NTIS_64-92/9201B1
         (COPR. 1992 NTIS)
File   8:COMPENDEX PLUS_1970-1991/NOV (Copr. Engineering Info
         Inc. 1991)

File  40:ENVIROLINE_70-91/OCT
         (COPR. R. R. BOWKER COMPANY 1991)
File  41:POLLUTION ABSTRACTS _ 70-91/NOV
         (C. CAMBRIDGE SCIENTIFIC ABSTRACTS)
File  44:AQUATIC SCIENCE ABSTRACTS _ 78-91/SEP

File 103:ENERGY SCIENCE & TECHNOLOGY_74-91/DEC(ISS23)

File 399:CA SEARCH_1967-1991 UD=11522
         (Copr. 1991 by the Amer. Chem. Soc.)
```

Sets selected:

Set	Items	Description
1	214	OIL?(1N)(SPILL? OR DISPERS? OR EFFLUENT?)(5N)(SEA OR OCEAN OR MARINE OR SEAWATER OR ARABIAN()GULF)(5N)(BEHAVIOR? OR PARTICLE? OR CONCENTRAT? OR CONCN)
2	120	S1 AND LA=(ENGLISH OR JAPANESE) NOT DT=(PA OR PATENT) FROM 8,41,44,103
3	15	S1 AND LA=(ENGLISH OR JAPANESE) FROM 399
4	14	S3/NPT
5	27	S1 NOT LA=? FROM 6
6	25	OIL?(1N)(SPILL? OR DISPERS? OR EFFLUENT?)(5N)(SEA OR OCEAN OR MARINE OR SEAWATER OR ARABIAN()GULF)(5N)(BEHAVIOR? OR PARTICLE? OR CONCENTRAT? OR CONCN) FROM 40
7	186	S2 OR S4 OR S5 OR S6
8	186	ID S7 (sorted in duplicate order)
9	139	RD S7 (unique items)
10	170	OIL?(3N)(RO OR REVERSE()OSMOSIS OR MEMBRANE?)(F)(EFFECT? OR DAMAGE? OR PERFORMANCE?)
11	110	S10 FROM 399
12	60	S10 NOT S11
13	104	S11/NPT
14	164	S13 OR S12
15	153	RD S14 (unique items)
16	152	S15 NOT S9
17	8	OIL?(F)COAGULAT?(F)(SEA OR OCEAN OR MARINE OR SEAWATER OR ARABIAN()GULF) FROM 399
18	8	RD S17 (unique items)
19	8	S18 NOT S9
20	138326	19 NOT S16
21	8	S19 NOT S16

Prints requested : ('*' indicates user print cancellation)

	Date	Time	Description
①	08dec	23:29EST	P263: PR S9/5/1-139
②	08dec	23:36EST	P264: PR S16/5/1-152
③	08dec	23:38EST	P265: PR S21/5/1-8

Total items to be printed: 299

<DIALOG File 6: (COPR. 1992 NTIS)>
1047829 NTIS Accession Number: PB84-164144
Response of Crude Oil Slicks to Dispersant Treatment at Sea, 1978 Tests
(Final rept. Jan 78-Dec 80)
JBF Scientific Corp., Wilmington, MA.
Corp. Source Codes: 063395000;
Sponsor: American Petroleum Inst., Washington, DC.; Municipal Environmental Research Lab., Cincinnati, OH.
Report No.: EPA-600/2-84-067A
Mar 84 89p
Languages: English
Journal Announcement: GRAI8410
See also PB84-164151. Prepared in cooperation with American Petroleum Inst., Washington, DC.
NTIS Prices: PC A05/MF A01
Country of Publication: United States
Contract No.: EPA-R-806056
Four small research oil spills (3.54 cu m each) were made to compare the physical and chemical behavior of crude oils on the sea with and without dispersant treatment. Work was performed 90 km southeast of New York Harbor under a research ocean dumping permit from the U.S. Environmental Protection Agency (EPA). Each spill was made from a research vessel and was tracked by vessel and aircraft for several hrs. Two crude oils were used; one spill of each was treated with dispersant after 30 min, and one was allowed to weather naturally as an experimental control. A self-mix dispersant was sprayed on the two treated slicks from a helicopter that had been fitted with a spray system delivering droplets whose mean diameter was approximately 2 mm. More than 750 samples of background water, water under the slicks, and surface water were taken for chemical analysis. Sampling continued for 6 to 7 hr after each spill. Aerial photographs were taken, and representative photographs are presented in this report. Currents and winds were measured, leading to interpretation of physical transport of the oils. This report complements earlier work performed in 1975 and 1978.
Descriptors: *Crude oil; *Physical properties; *Chemical properties; *Transport properties; Research projects; Dispersing; Aerial surveys; Sampling; Tests; Sites; Chemical analysis
Identifiers: *Oil spills; Oil pollution control; NTISEPAORD
Section Headings: 70 (Chemistry--Physical Chemistry); 68D* (Environmental Pollution and Control--Water Pollution and Control); 99F (Chemistry--Physical and Theoretical Chemistry)

DIALOG

8

COMPENDEX® PLUS

Information Retrieval Service

FILE DESCRIPTION

The COMPENDEX® PLUS database provides coverage of the world's significant engineering and technological literature. COMPENDEX PLUS is produced by Engineering Information, Inc., and corresponds to the printed publication *Engineering Index*, plus additional conference records from the Engineering Meetings file. Each record in COMPENDEX PLUS is a reference to a journal article, technical report, engineering society publication, book, conference proceedings, or individual conference paper, and includes a concise abstract describing the document. Author-prepared abstracts are used when available. The COMPENDEX PLUS database utilizes both controlled vocabulary and classification codes to enhance subject searching. Approximately 25% of the documents indexed are published in a language other than English.

Prior to January 1988, COMPENDEX PLUS existed as two databases, COMPENDEX® (File 8) and Ei ENGINEERING MEETINGS® (File 165). File 165 was merged into COMPENDEX PLUS (File 8) in 1988 in order to facilitate one-step searching.

SUBJECT COVERAGE

- Aeronautical and Aerospace Engineering
- Applied Physics (High Energy, Plasma, Nuclear and Solid State)
- Bioengineering and Medical Equipment
- Chemical Engineering, Ceramics, Plastics and Polymers, Food Technology
- Civil and Structural Engineering, Environmental Technology
- Electrical, Instrumentation, Control Engineering, Power Engineering
- Electronics, Computers, Communications
- Energy Technology and Petroleum Engineering
- Engineering Management and Industrial Engineering
- Light and Optical Technology
- Marine Engineering, Naval Architecture, Ocean and Underwater Technology
- Mechanical Engineering, Automotive Engineering and Transportation
- Mining and Metallurgical Engineering, Materials Science

SOURCES

Publications from around the world are indexed, including approximately 4,500 journals, publications of engineering societies and organizations, approximately 2,000 conferences per year, technical reports, and monographs.

DIALOG FILE DATA

Inclusive Dates:	1970 to the present
Update Frequency:	Monthly (approximately 17,500 records per update)
File Size:	Over 2.2 million records as of January 1988

ORIGIN

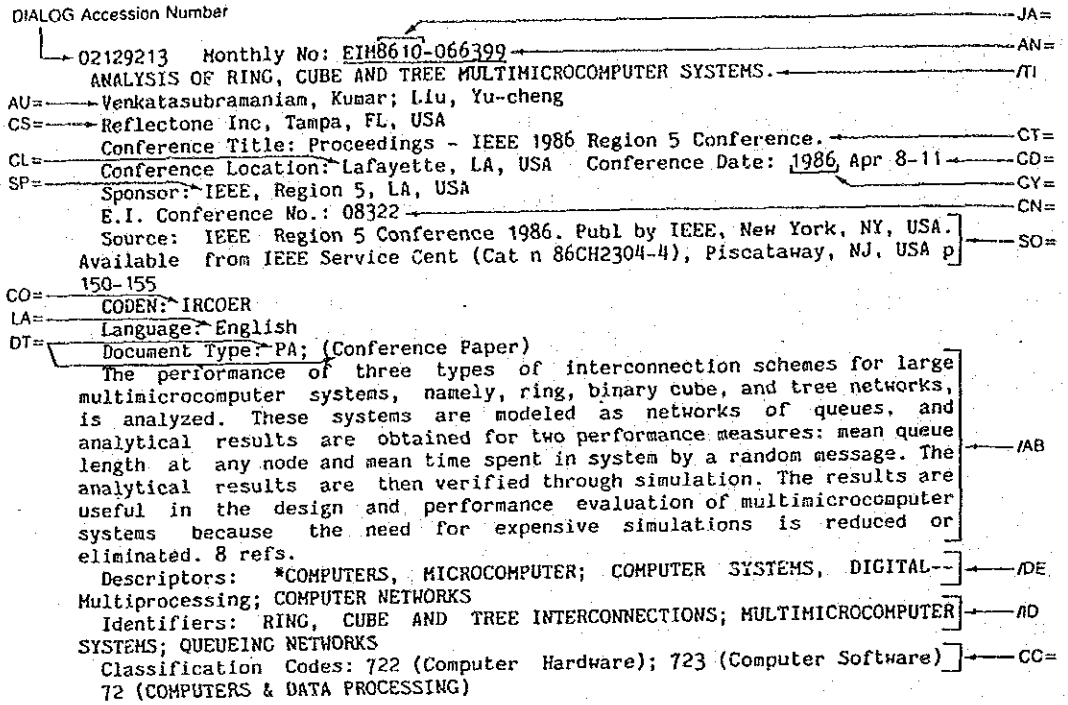
COMPENDEX PLUS is produced by Engineering Information, Inc. Questions concerning database content should be directed to:

Communications Services Department
Engineering Information, Inc. (Ei)
345 East 47th Street
New York, NY 10017

Telephone: 800/221-1044 (outside New York State)
212/705-7635
Telex: 4990438
Cable: ENGINFOR NEWYORK

COMPENDEX® PLUS
DIALOG FILE 8

SAMPLE RECORD



SEARCH OPTIONS

BASIC INDEX

SEARCH SUFFIX+	DISPLAY CODE	FIELD NAME	INDEXING	SELECT EXAMPLES
/AB	AB	Abstract	Word	S BINARY(W)CUBE/AB
/DE	DE	Descriptor[1]	Word & Phrase	S DIGITAL(L)MULTIPROCESS? S COMPUTERS, MICROCOMPUTER/DE
/ID	ID	Identifier[2]	Word & Phrase	S (TREE AND INTERCONNECT?)/ID S QUEUEING NETWORKS/ID
/TI	TI	Title[3]	Word	S RING(W)CUBE(1W)TREE/TI

+If no suffix is specified *all* Basic Index fields are searched.
[1]Also /DF.
[2]Also /IF.
[3]Does not include Conference Title.

DIALOG Information Retrieval Service

6

NTIS

FILE DESCRIPTION

NTIS is produced by the National Technical Information Service (NTIS) of the U.S. Department of Commerce, the central source for the public sale and dissemination of U.S. government-sponsored research. The database consists of unclassified government-sponsored research, development, and engineering reports, as well as other analyses prepared by government agencies, their contractors, or grantees. Included in this coverage are federally generated machine-readable data files and software, U.S. government inventions available for licensing, federally generated translations, and reports prepared by non-U.S. governments and exchanged with federal agencies. An increasing proportion of the database consists of unpublished material originating outside the U.S. The NTIS database corresponds to several printed publications including *Government Reports Announcements & Index* (GRA&I) and twenty-six abstract newsletters such as *Government Inventions for Licensing*. Most NTIS records include an indicative or informative abstract.

NTIS is available from DIALOG for searching online and in compact-disc format, with DIALOG OnDisc NTIS: see the DIALOG File Data section below.

SUBJECT COVERAGE

The NTIS database includes material from both the "hard and soft" sciences, including topics of immediate, broad interest, such as environmental pollution and control, energy conservation, technology transfer, health planning, societal problems, and urban and regional development and planning. The non-U.S. material emphasizes information of potential industrial interest from Western Europe and Japan. A representative list of the subject areas in NTIS is given below:

- Administration and Management
- Aeronautics and Aerodynamics
- Agriculture and Food
- Astronomy and Astrophysics
- Atmospheric Sciences
- Behavior and Society
- Biomedical Technology and Engineering
- Building Industry Technology
- Business and Economics
- Chemistry
- Civil Engineering
- Communication
- Computers, Control, and Information Theory
- Electrotechnology
- Energy
- Environmental Pollution and Control
- Health Planning
- Industrial and Mechanical Engineering
- Library and Information Sciences
- Materials Sciences
- Mathematical Sciences
- Medicine and Biology
- Military Sciences
- Missile Technology
- Natural Resources and Earth Sciences
- Navigation, Guidance, and Control
- Nuclear Science and Technology
- Ocean Technology and Engineering
- Photography and Recording Devices
- Physics
- Propulsion and Fuels
- Space Technology
- Transportation
- Urban and Regional Technology

SOURCES

The NTIS database represents the reports of three major U.S. federal government agencies: U.S. Department of Energy (DOE), U.S. Department of Defense (DoD), National Aeronautics and Space Administration (NASA), plus many other agencies.

DIALOG FILE DATA

	File 6 Online	DIALOG OnDisc NTIS Current Disc 1	DIALOG OnDisc NTIS Archival Disc 2
Coverage:	1964 to the present	1984 to the present	1980-1983
File Size:	Over 1.4 million records	250,000 records	277,000 records
Updates:	Biweekly (about 5,000/month)	Quarterly	Closed

ORIGIN

NTIS is produced by the National Technical Information Service, U.S. Department of Commerce. Questions concerning file content should be directed to:

National Technical Information Service (NTIS)
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161

Telephones:

General information:	703/487-4600
Specific questions concerning database or subject content:	703/487-4642
To order reports:	703/487-4650

Copies of reports retrieved in the NTIS database may be ordered online via DIALORDER℠ using ORDER NTIS, ORDER NTISJPN (users in Japan only), or ORDER NITSUK. Method of payment must be indicated (see Yellowsheets for details).

NTIS
DIALOG FILE 6

SAMPLE RECORD

DIALOG Accession Number

1254950 DE87002818/XAB — RN=
Advanced Manipulation for Autonomous Mobile Robots — /TI
AU= Babcock, S. M. ; Hamel, W. R. ; Killough, S. M.
CS= Oak Ridge National Lab., TN.
CS= Corp. Source Codes: 021310000; 4832000
SP= Sponsor: Department of Energy, Washington, DC.
RN= Report No.: CONF-870301-3; CESAR-86/52
PY= 1986 9p
International topical meeting on remote systems and robotics in hostile environments, Pasco, WA, USA, 29 Mar 1987. Portions of this document are illegible in microfiche products. — NT=
LA= Languages: English Document Type: Conference proceeding — DT=
NTIS Prices: PC A02/MF A01 Journal Announcement: GRAI8716; NSA1200 — JA=
CP= Country of Publication: United States
CN= Contract No.: AC05-84OR21400
This paper describes the development, mechanical configuration, and control system architecture of a lightweight, high performance, seven-degree-of-freedom manipulator at the Center for Engineering Systems Advanced Research (CESAR). Current activities focusing on modeling and parameter identification will provide a well-characterized manipulator for analytical and experimental research in manipulator dynamics and controls, coordinated manipulation, and autonomous mobile robotics. (ERA citation 12:020816) — /AB
Descriptors: *Manipulators; Computerized Simulation; Control Systems; Dynamics; Remote Handling; *Robots — /DE
Identifiers: ERDA/420203; NTISDE — /ID
Section Headings: 94F (Industrial and Mechanical Engineering--Tooling, Machinery, and Tools) — /SH

SEARCH OPTIONS

BASIC INDEX

SEARCH SUFFIX+	DISPLAY CODE	FIELD NAME	INDEXING	SELECT EXAMPLES
/AB	AB	Abstract	Word	S CONTROL(W)SYSTEM/AB
/DE	DE	Descriptor[1]	Word & Phrase	S REMOTE(W)HANDLING/DE S COMPUTERIZED SIMULATION/DE
/ID	ID	Identifier[2]	Word & Phrase	S NTISDE/ID S SAVANNAH RIVER PLANT/ID
/SH	SH	Section Heading	Word & Phrase	S INDUSTRIAL(1W)MECHANICAL(W)ENGINEERING/SH S "INDUSTRIAL AND MECHANICAL ENGINEERING"/SH
/TI	TI	Title	Word	S MOBILE(W)ROBOT?/TI

+If no suffix is specified *all* Basic Index fields are searched.
[1]Also /DE*, /DF, /DF*.
[2]Also /ID*, /IF, /IF*.

ADDITIONAL INDEXES

SEARCH PREFIX	DISPLAY CODE	FIELD NAME	INDEXING	SELECT EXAMPLES
—	AN	Accession Numbers[4]		
AU=	AU	Author	Phrase	S AU=HAMEL, W. R.
CN=	CN	Contract Number	Phrase	S CN=AC05-84OR21400
CP=	CP	Country of Publication[3]	Word & Phrase	S CP=(UNITED(W)STATES) S CP=UNITED KINGDOM
CS=	CS	Corporate Source	Word	S CS=(OAK(W)RIDGE(F)LAB)
DT=	DT	Document Type	Phrase	S DT=CONFERENCE PROCEEDING
—	FN	File Name[4]		
JA=	JA	Journal Announcement[4]	Phrase	S JA=NSA1200
LA=	LA	Language[5]	Phrase	S LA=ENGLISH
NT=	NT	Note[4]	Word	S NT=(REMOTE(W)SYSTEMS)
PY=	PY	Publication Year	Phrase	S PY=1986
RN=	RN	Report Number	Phrase	S RN=CONF-870301-3
RN=	RN	NTIS Accession Number[6]	Phrase	S RN="DE87002818/XAB"
RN=	RN	CAS Registry Number[3,7]	Phrase	S RN=8001-35-2
SH=	SH	Section Heading Code	Phrase	S SH=94F
—	SO	Source Information[8]		
SP=	SP	Sponsoring Organization[9]	Phrase	S SP=DEPARTMENT OF ENERGY?
UD=	—	Update[4]	Phrase	S UD=8708
ZZ=	—	Related Subject Terms[10]	Phrase	(SELECT from EXPAND display)

[3]For records from 1980 forward.
[4]Available only online.
[5]For records from 1979 forward.
[6]Searchable using AN= ondisc.
[7]Searchable using RG= ondisc.
[8]Display information varies according to type of document retrieved.
[9]For records from 1974 forward.
[10]Available only in ondisc command mode.

DIALINDEX®

Index to DIALINDEX/OneSearch® Collections

DIALINDEX®

データベース コレクション

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157 AIDSLINE	
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18 PTS F&S INDEX®	
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158 DIOGENES®	
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319 CHEMICAL BUSINESS NEWSBASE	
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2 INSPEC	
6 NTIS	
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390 BEILSTEIN ONLINE	
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COMMERCE BUSINESS DAILY, ファイル195,194	CBD
COMPANY NEWS (会社ニュース) (注: このカテゴリー内の全ファイルに CO= フィールドがあります)	NEWSCO
15 ABI/INFORM®	
16 PTS PROMT™	
30 ASIA-PACIFIC	
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211 NEWSEARCH™	
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481 DELPHES EUROPEAN BUSINESS	
484 COURIER PLUS™	
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557 MOODY'S® CORPORATE NEWS – INTERNATIONAL	
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613 PR NEWSWIRE	
621 PTS NEW PRODUCT ANNOUNCEMENTS/PLUS®	
635 BUSINESS DATELINE®	
648 TRADE & INDUSTRY ASAP™	
649 NEWSWIRE ASAP™	
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2 INSPEC	
6 NTIS	
8 COMPENDEX*PLUS™	
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275 COMPUTER DATABASE™	
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FILE 411

DIALINDEX®

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484 COURIER PLUS™	
346 CONSUMER REPORTS	
647 MAGAZINE ASAP™	
D&B DIRECTORYファイル	DUNSINTL
516 D&B – DUN'S MARKET IDENTIFIERS®	
518 D&B – INTERNATIONAL DUN'S MARKET IDENTIFIERS®	
520 D&B – CANADIAN DUN'S MARKET IDENTIFIERS®	
(防衛: DEFENSE & AEROSPACE INDUSTRY 航空宇宙産業)	DEFBUS
6 NTIS	
80 PTS AEROSPACE/DEFENSE MARKETS & TECHNOLOGY®	
108 AEROSPACE DATABASE	
194 COMMERCE BUSINESS DAILY	
195 COMMERCE BUSINESS DAILY	
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545 INVESTEXT®	
563 ICC INTERNATIONAL BUSINESS RESEARCH	
587 JANE'S DEFENSE & AEROSPACE NEWS/ANALYSIS	
588 DMS/FI CONTRACT AWARDS	
624 McGRAW-HILL PUBLICATIONS ONLINE	
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636 PTS NEWSLETTER DATABASE™	
665 FEDERAL ACQUISITION REGULATIONS	
669 FEDERAL REGISTER	
DEFENSE TECHNOLOGY (防衛技術)	DEFTECH
2 INSPEC	
6 NTIS	
8 COMPENDEX*PLUS™	
92 IHS INTERNATIONAL STANDARDS AND SPECIFICATIONS	
108 AEROSPACE DATABASE	
265 FEDERAL RESEARCH IN PROGRESS	
DRUG DIRECTORIES (医薬品ディレクトリー)	DRUGDIR
70 SEDBASE	
141 MARTINDALE ONLINE	
229 DRUG INFORMATION FULLTEXT	
271 CONSUMER DRUG INFORMATION FULLTEXT	
304 THE MERCK INDEX ONLINE™	
EDUCATION (教育)	EDUCAT
1 ERIC	
7 SOCIAL SCISEARCH®	
11 PsycINFO®	
46 A-V ONLINE	
54 EXCEPTIONAL CHILD EDUCATION RESOURCES	
88 ACADEMIC INDEX™	
121 BRITISH EDUCATION INDEX	
(電子工学とコンピュータ科学) ELECTRICAL ENGINEERING & COMPUTER SCIENCE	EECOMP
2 INSPEC	
6 NTIS	
8 COMPENDEX*PLUS™	
92 IHS INTERNATIONAL STANDARDS AND SPECIFICATIONS	
103 ENERGY SCIENCE AND TECHNOLOGY 83-	
104 ENERGY SCIENCE AND TECHNOLOGY 74-82	
108 AEROSPACE DATABASE	
144 PASCAL	
275 COMPUTER DATABASE™	
675 COMPUTER ASAP™	

カテゴリー	略語
(電子とコンピュータ産業) ELECTRONICS & COMPUTERS INDUSTRY	ELECTRON
15 ABI/INFORM®	
16 PTS PROMT™	
18 PTS F&S INDEX®	
148 TRADE & INDUSTRY INDEX™	
211 NEWSEARCH™	
238 SUPERTECH	
275 COMPUTER DATABASE™	
481 DELPHES EUROPEAN BUSINESS	
545 INVESTEXT®	
563 ICC INTERNATIONAL BUSINESS RESEARCH	
621 PTS NEW PRODUCT ANNOUNCEMENTS/PLUS®	
624 McGRAW-HILL PUBLICATIONS ONLINE	
635 BUSINESS DATELINE®	
636 PTS NEWSLETTER DATABASE™	
637 JOURNAL OF COMMERCE	
648 TRADE & INDUSTRY ASAP™	
675 COMPUTER ASAP™	
EMBASEファイル72;172;173	"EMBASE"
ENERGY(エネルギー)	ENERGY
2 INSPEC	
6 NTIS	
8 COMPENDEX*PLUS™	
63 TRIS	
69 ENERGYLINE®	
89 GEOREF	
103 ENERGY SCIENCE AND TECHNOLOGY 83-	
104 ENERGY SCIENCE AND TECHNOLOGY 74-82	
108 AEROSPACE DATABASE	
109 NUCLEAR SCIENCE ABSTRACTS	
144 PASCAL	
241 ELECTRIC POWER DATABASE	
257 P/E NEWS	
399 CA SEARCH® 67-	
465 ARAB INFORMATION BANK	
636 PTS NEWSLETTER DATABASE™	
637 JOURNAL OF COMMERCE	
669 FEDERAL REGISTER	
ENERGYカテゴリー+ファイル987	ENERGYP
987 PETROLEUM EXPLORATION & PRODUCTION (会員のみ)	
ENERGY SCIENCE AND TECHNOLOGY, ファイル 103,104	EST
ENGINEERING (工学)	ENG
2 INSPEC	
6 NTIS	
8 COMPENDEX*PLUS™	
14 ISMEC	
32 METADEX®	
63 TRIS	
92 IHS INTERNATIONAL STANDARDS AND SPECIFICATIONS	
96 FLUIDEX	
108 AEROSPACE DATABASE	
113 STANDARDS & SPECIFICATIONS	
238 SUPERTECH	
240 PAPERCHEM	
293 ENGINEERED MATERIALS ABSTRACTS®	
295 WORLD TRANSLATIONS INDEX	
315 CHEMICAL ENGINEERING AND BIOTECHNOLOGY ABSTRACTS	
ENVIRONMENT (環境)	ENVIRON
5 BIOSIS PREVIEWS® 69-	
6 NTIS	
8 COMPENDEX*PLUS™	
28 OCEANIC ABSTRACTS	
40 ENVIROLINE®	
41 POLLUTION ABSTRACTS	

3.3 Example of information retrieval
Database: STN
Subject : Coagulation of oil in seawater

```
=> S OIL?(L)COAGULAT?(L)(SEA OR OCEAN OR MARINE OR SEAWATER OR ARABIAN GULF)
        172356 OIL?
         28541 COAGULAT?
         32391 SEA
         23842 OCEAN
         24334 MARINE
         20627 SEAWATER
           549 ARABIAN
          2104 GULF
           101 ARABIAN GULF
                 (ARABIAN(W)GULF)
L1             5 OIL?(L)COAGULAT?(L)(SEA OR OCEAN OR MARINE OR SEAWATER OR
                 ARABIAN GULF)
```

```
L1   ANSWER 5 OF 5  COPYRIGHT 1991 ACS
AN   CA80(12):63643j
TI   Treating an oil-containing waste water
AU   Fukumori, Rokuro
CS   Asada Chemical Industry Co., Ltd.
SO   Japan., 3 pp.
PI   JP 48018069  2 Jun 1973  Showa
AI   JP 68-70586  28 Sep 1968
IC   C02C; B01D; B01J
SC   60-2 (Sewage and Wastes)
SX   51
DT   P
CO   JAXXAD
PY   1973
LA   Japan
AN   CA80(12):63643j
AB   An oil slick is treated with a coagulating agent, e.g., an Al
     compd., alginic acid, a cellulose deriv., polymd. acrylic acid, or
     polymd. acrylamide, in combination with a finely powd. foamed
     polyolefin or polystyrene.  The waste water is then agitated and
     filtered.  In an example, 15-30 ppm of a basic Al chloride is added
     to the waste water (turbidity 50-200.degree., temp. 30-5.degree., pH
     7.5-11.5, oil content 20-30 ppm) after which 10 g powd. foamed
     polystyrene is added per ton of waste water, followed by
     air-bubbling agitation.  The results show a redn. of turbidity to
     5-10.degree., oil content 2 ppm, and pH 7.0-8.0.
```

3.4 Example of information retrieval
Database: NRS (National Retrieval System of King Abdulaziz City for Science and Technology
Subject : Oil spill in Seawater

FLAG	SET	DOCUMENT	POSTING	REMARKS
	1	4325	11876	***/ OIL
	2	328	616	***/ OILS
	3	4421	12492	/1+2@
	4	2329	6618	***/ SEA
	5	255	380	***/ OCEAN
	6	1208	1795	***/ MARINE
	7	405	624	***/ SEAWATER
	8	0	0	***/ SEA <1> WA
	9	3172	9417	/4+5+6+7+8@
	10	2329	6618	***/ SEA
	11	0	0	***/ OEEAN
	12	1208	1795	***/ MARINE
	13	405	624	***/ SEAWATER
	14	203	546	***/ SEA <1> WATER
	15	3109	9583	/10+11+12+13+14@
	16	58	128	***/ SPILL
	17	7	8	***/ SPILLAGE
	18	63	136	/16+17@
	19	29	271	/3*15*18@
	20	117	244	***/ RO
	21	129	642	***/ REVERSE <1> OSMOSIS
	22	215	886	/20+21@
	23	702	1820	***/ DESALINATION
	24	1	10	/3*22*23@
	25	35	70	TTL/ REVERSE <1> OSMOSIS
	26	82	82	TTL/ RECOVERY
PRT	27	1	3	/25*26@

**********#00001**********

INTRNL CNTL NO	:	9103001508
CATEGORY	:	ENVIRONMENT AND POLLUTION
ANALYST INITL.	:	SJT
DOCUMENT TYPE	:	GOVERNMENT AND ORGANIZATION DOCUMENT
TITLE	:	Khaleej Mardumah Oil slick: Clean-up operations
CORPORATE AUT.	:	Royal Commission for Jubail and Yanbu, Madinat Al-Jubail Al-Sinaiyah, SA
PAGINATION	:	17p
PUBLICATN DATE	:	1991/00/00
PUBLISHER INF.	:	Royal Commission for Jubail and Yanbu, Madinat Al-Jubail Al-Sinaiyah, SA
TEXT LANGUAGE	:	ENGLISH
ABSTRACT	:	The seawater cooling facility of the Royal Commission of Jubail and Yanbu provides cooling water essential for the industrial processes of primary industries located at Jubail. The threat posed by the oil spill to this facility was potentially disastrous as a massive oil slick impacting the intake canal would cause a complete paralysis of operations at the oil refineries, petrochemical plants and major industrial operations. Booms of various types and sizes were set up in the intake canal for protection. Nothing was left to chance. But the threat never materialized as the Khaleej Mardumah oil slick operation was successful. Every patch of oil that reached Mardumah was trapped, recovered and removed. This publication records the response to the emergency at the Khaleej Mardumah area of Jubail posed by the oil slick hitting the Arabian coast during 4 March-April 23, 1991.
DESCRIPTORS	:	Arabian Gulf; Khaleej Mardumah; Oil slick; Water pollution; Royal Commission for Jubail and Yanbu; Cleaning operations; Cleaning; Removal; Industries; Seawater cooling facility
STORAGE MEDIA	:	PAPER COPY
AVAILABILITY	:	KACST. Source

APPENDIX R2 — 5

APPENDIX-　Results of Information Retrieval

1. Data Base: STN File CA
   Subject:　Behavior of oil spill to ocean

1．使用データベース　STN FILE CA
2．検索期間　1967-
3．検索結果

```
=> S OIL?(1A)(SPILL? OR DISPERS? OR EFFLUENT?)(5A)(SEA OR OCEAN OR MARINE OR SEAWATE
R OR ARABIAN GULF)(5A)(BEHAVIOR? OR PARTICLE? OR CONCENTRAT? OR CONCN)
        172356 OIL?
          3556 SPILL?
        105791 DISPERS?
         34622 EFFLUENT?
         32391 SEA
         23842 OCEAN
         24334 MARINE
         20627 SEAWATER
           549 ARABIAN
          2104 GULF
           101 ARABIAN GULF
                 (ARABIAN(W)GULF)
        132708 BEHAVIOR?
        164864 PARTICLE?
        112717 CONCENTRAT?
         68511 CONCN
L2          13 OIL?(1A)(SPILL? OR DISPERS? OR EFFLUENT?)(5A)(SEA OR OCEAN
               OR MARINE OR SEAWATER OR ARABIAN GULF)(5A)(BEHAVIOR? OR P
               ARTICLE? OR CONCENTRAT? OR CONCN)

=> S L2 AND (ENGLISH OR JAPAN)/LA
       5896525 ENGLISH/LA
       1032382 JAPAN/LA
L3          12 L2 AND (ENGLISH OR JAPAN)/LA
                                  └──── English and Japanese only
=> S L3 NOT P/DT
       1602145 P/DT
L4          11 L3 NOT P/DT
                        └──. Except Patent
```

抄録付きで出力

L4 ANSWER 1 OF 11 COPYRIGHT 1991 ACS
AN CA115(2):15045k
TI Oil spills in mangroves: a conceptual model based on long-term field observations
AU Jacobi, Claudia Maria; Schaeffer-Novelli, Yara
CS Inst. Biocienc., Univ. Sao Paulo
LO Sao Paulo 05499, Brazil
SO Ecol. Modell., 52(1-2), 53-9
SC 61-2 (Water)
SX 51
DT J
CO ECMODT
IS 0304-3800
PY 1990
LA Eng
AN CA115(2):15045k
AB A conceptual model is proposed for evaluating residence time of oil in mangrove environments. It assumes that, after oil has spread over a mangrove coastline, it remains in the environment by retention in the sediment. Removal is mainly in assocn. with seaward particle export. Since detritus export depends on tidal flush, the area affected by an oil spill can be divided into sections parallel to the coastline having different removal rates increasing seaward (under little river flush and regular topog.).

L4 ANSWER 2 OF 11 COPYRIGHT 1991 ACS
AN CA113(24):217563x
TI Trace element and biotic changes following a simulated oil spill on a mudflat in Port Valdez, Alaska
AU Peder, H. M.; Naidu, A. S.; Paul, A. J.
CS Inst. Mar. Sci., Univ. Alaska
LO Fairbanks, AK 99775-1080, USA
SO Mar. Pollut. Bull., 21(3), 131-7
SC 61-2 (Water)
SX 4, 12, 51
DT J
CO MPNBAZ
IS 0025-326X
PY 1990
LA Eng
AN CA113(24):217563x
AB A mudflat in Port Valdez, Alaska, was examd. to det. the effects of exptl. addns. of Prudhoe Bay crude oil on metal chem. and harpacticoid copepod abundance. Hydrocarbon concns. were at background levels 30 days after the final addn. of oil. The short residence time of oil added to sediments is attributable to phys. removal of oil by tides, low sediment permeability, and low affinity of hydrocarbons for periglacial clay surfaces. Elemental concns., except Si, were lower in oiled than in unoiled sediments. Elemental depletion in oil-impacted sediments is attributable to mobilization of metals from oxide/hydroxide sediment phases or to desorption from clay due to lowering of Eh-pH of sediments subsequent to oil addn. In oiled sediments, the abundance of the harpacticoid copepods Harpacticus uniremis, Halectinosoma gothiceps, and Heterolaophonte was similar to or higher than values within unoiled plots. The reasons for lack of deleterious effects of oil on copepods in Port Valdez are not yet understood.

L4 ANSWER 3 OF 11 COPYRIGHT 1991 ACS

AN CA109(6):43158u
TI Summary of Protecmar experiments, the French dispersant offshore trials program
AU Bocard, Christian; Castaing, Gilles; Ducreux, Jean; Gatellier, Claude; Croquette, Jean; Merlin, Francois
CS Inst. Fr. Petr.
LO Rueil-Malmaison 92506, Fr.
SO Oil Chem. Pollut., Volume Date 1986, 3(6), 471-84
SC 61-2 (Water)
SX 51
DT J
CO OCPOEJ
IS 0269-8579
PY 1987
LA Eng
AN CA109(6):43158u
AB Six campaigns of dispersant offshore trials were conducted from 1979 to 1985 off the French Mediterranean and Brittany coasts. On the whole, 30 slicks were treated with several dispersants applied from ships by different spraying systems, from helicopters equipped with an underslung bucket and from aircraft. Different techniques were tested in order to optimize the application of dispersants in different situations: use of a variable flow rate system to spray neat concs. from ships, methods of directing ships and aircrafts to ensure a selective distribution of dispersant and a good coverage of slicks. Getting a mass balance of dispersed oil on the basis of oil concn. measurements was difficult in most cases. The effects of dispersants were distinguished between a short-term or primary effect which is related to the diln. of the smallest oil droplets and a delayed or secondary effect, characterized by the enhancement of the longer-term natural dissemination. The main limiting parameters were the sea-surface energy and subsurface currents, the dispersant/oil ratio and the poorly controlled herding effect of dispersants.

L4 ANSWER 4 OF 11 COPYRIGHT 1991 ACS
AN CA102(18):154443h
TI An experimental marine ecosystem response to crude oil and Corexit 9527: part 1 - fate of chemically dispersed crude oil
AU Wong, C. S.; Whitney, F. A.; Cretney, W. J.; Lee, K.; McLaughlin, F.; Wu, Jinping; Fu, Tianbao; Zhuang, Dongfa
CS Inst. Ocean Sci.
LO Sidney, BC, Can.
SO Mar. Environ. Res., 13(4), 247-63
SC 61-2 (Water)
SX 51
DT J
CO MERSDW
IS 0141-1136
PY 1984
LA Eng
AN CA102(18):154443h
AB The fate of Prudhoe Bay crude oil, labeled with n(1-14C)-hexadecane [63582-90-1] and dispersed with Corexit 9527 [60617-06-3], was studied for 24 days in a polyethylene bag enclosure of seawater by time-series observations of the alkane compn. of the crude oil, oil fluorescence, 14C-labeled hexadecane in the particulate phase, bacterial biomass, amts. of sedimented material, and parameters of temp., salinity, particulate org. C and N, and nutrients. By the 7th day, convective and diffusive mixing, important mechanisms for

the dispersion of oil, resulted in a fairly homogeneous distribution of oil throughout the enclosed water column. Rapid bacterial biodegrdn. removed the n-alkane fraction initially, while oil-Corexit dispersion suppressed phytoplankton growth. After 7 days, with the recovery of phytoplankton growth, much of the aged oil sedimented with sinking of diatoms.

L4 ANSWER 5 OF 11 COPYRIGHT 1991 ACS
AN CA101(10):78472d
TI Fate of a tritiated Ekofisk crude oil in a controlled ecosystem experiment with North Sea plankton
AU Laake, Morten; Tjessem, Kjell; Rein, Knut
CS Inst. Microbiol. Plant Physiol., Univ. Bergen
LO Bergen N-5000, Norway
SO Environ. Sci. Technol., 18(9), 641-7
SC 61-2 (Water)
SX 51
DT J
CO ESTHAG
IS 0013-936X
PY 1984
LA Eng
OS CJACS
AN CA101(10):78472d
AB Flexible plastic enclosures were employed with the main intent of detg. the fate of an Ekofisk crude oil exposed to North Sea spring conditions. By use of a T-labeled Ekofisk crude oil a dynamic model was developed that allowed calcn. of vertical mass fluxes with depth based on actual concn. profiles and measured sedimentation rates. It was concluded that adsorption and subsequent sedimentation of plankton and org. detritus may cause a rapid sinking of petroleum hydrocarbons. Microbial mineralization seemed to be insignificant on a short-term scale.

L4 ANSWER 6 OF 11 COPYRIGHT 1991 ACS
AN CA92(24):203288x
TI Behavior and effectiveness of dispersants at sea and at shorelines
AU Mackay, Donald; Watson, Alex; Ng, Cecilia; Nadeau, Stuart
CS Dep. Chem. Eng. Appl. Chem., Univ. Toronto
LO Toronto, ON M5S 1A4, Can.
SO Am. Pet. Inst. Publ., 4308(Proc. - Oil Spill Conf., (Prev., Behav., Control, Cleanup)), 447-52
SC 61-8 (Water)
SX 51
DT J
CO APIPCO
PY 1979
LA Eng
AN CA92(24):203288x
AB The effects of surface turbulence on dispersion and on the behavior of the dispersed or undispersed oil at shorelines were studied by attempting to simulate an open ocean surface and a shoreline in the lab. The exptl. variables studied were type of oil, type of shoreline, water salinity, dispersant type, the oil to dispersant ratio, and the method of applying the dispersant. The effectiveness of a dispersant was profoundly affected by turbulence level. Wave action caused sand beaches to filter dispersed oil from the water column resulting in enhanced, but possibly reversible, oil penetration. Larger oil particles captured sand particles and sank. The use of dispersants on oil advancing on shores or even on the

shoreline itself could prove advantages.

L4 ANSWER 7 OF 11 COPYRIGHT 1991 ACS
AN CA89(14):113475q
TI Physical and chemical behavior of crude oil slicks on the ocean
CS JBF Scientific Corp.
LO Wilmington, Mass., USA
SO API Publ., 4290, 98 pp.
SC 51-1 (Fossil Fuels, Derivatives, and Related Products)
SX 60
DT J
CO APIPCO
PY 1976
LA Eng
AN CA89(14):113475q
AB The phys. and chem. behavior of fresh crude-oil slicks on the open North Atlantic was detd. by following several small deliberate spills under varying sea conditions for up to 2 days. Low-mol.-wt. hydrocarbons were rapidly lost from the slicks, and the petroleum content of the water below the slicks returned to normal levels within a few h.

L4 ANSWER 8 OF 11 COPYRIGHT 1991 ACS
AN CA89(12):94850q
TI Some studies of an oil spillage due to the Jacob Maersk accident
AU Canelas, L. D.; Calejo Monteiro, J. D.
CS Gabinete Area Sines
LO Lisbon, Port.
SO API Publ., 4284(Proc. Oil Spill Conf. (Prev., Behav., Control, Cleanup)), 281-8
SC 61-8 (Water)
SX 51
DT J
CO APIPCO
PY 1977
LA Eng
AN CA89(12):94850q
AB The 1st anal. was carried out 6 days after the spillage. Nonpolar hydrocarbon concns. were 43-51% above the usual values. After a 2nd spillage about 1 wk later, the oil concns. in the water were the highest obsd. Dissolved O concns. and BOD at 5 coastal stations show that apparently there was no stress on marine populations during the sampling period. Nutrient values indicate that remineralization is on-going. NO3- and PO43- were present in higher concns.

L4 ANSWER 9 OF 11 COPYRIGHT 1991 ACS
AN CA88(16):107559h
TI Hydrocarbons in the water column
AU Shaw, D. G.
CS Univ. Alaska
LO Fairbanks, Alaska, USA
SO Fate Eff. Pet. Hydrocarbons Mar. Ecosyst. Org., Proc. Symp., Meeting Date 1976, 8-18. Edited by: Wolfe, Douglas A. Pergamon: Elmsford, N. Y.
SC 51-0 (Fossil Fuels, Derivatives, and Related Products)
SX 23, 25, 26, 61, 66, 68, 69, 75, 78
DT C
CO 37BKAP
PY 1977

LA Eng
AN CA88(16):107559h
AB A review, with 52 refs., of H2O-hydrocarbon interaction from the perspective of the degree of aggregation of hydrocarbon mols. in H2O.

L4 ANSWER 10 OF 11 COPYRIGHT 1991 ACS
AN CA86(15):101627r
TI Fundamental studies on the effect of petroleum pollution on marine organisms. II. Lethal concentrations of oil-spill emulsifier components for marine phytoplankton
AU Tokuda, Hiroshi
CS Dep. Fish., Univ. Tokyo
LO Tokyo, Japan
SO Nippon Suisan Gakkaishi, 43(1), 103-6
SC 4-3 (Toxicology)
DT J
CO NSUGAF
PY 1977
LA Japan
AN CA86(15):101627r
AB The min. lethal concns. of oil-spill emulsifier components (9 petroleum solvents and 16 nonionic surfactants) were lower for Skeletonema costatum than for Nitzschia closterium. The toxicity of petroleum solvents increased with increasing arom. content. Surfactants contg. hydrophobic groups had higher toxicity than those without hydrophobic groups. Surfactants contg. ester groups were less toxic than those contg. ether groups. The toxicity of surfactants also correlated with the hydrophile-lipophile balance(HLB).

L4 ANSWER 11 OF 11 COPYRIGHT 1991 ACS
AN CA86(13):84405x
TI Fundamental studies on the effect of petroleum pollution on marine organisms. I. Lethal concentrations of oil-spill emulsifiers for some marine phytoplankton
AU Tokuda, Hiroshi; Arasaki, Seibin
CS Dep. Fish., Univ. Tokyo
LO Tokyo, Japan
SO Nippon Suisan Gakkaishi, 43(1), 97-102
SC 4-3 (Toxicology)
DT J
CO NSUGAF
PY 1977
LA Japan
AN CA86(13):84405x
AB The min. lethal concns. of 84 oil-spill emulsifiers manufd. in 1971-5 ranged from <1 to >10,000 ppm for Skeletonema costatum, Nitzschia closterium and Chlamydomonas. S costatum was the most sensitive, whereas Chlamydomonas the least. The latest products had a lower toxicity.

2. Data Base: STN File CA

Subject : Performance degradation of RO membrane by oil

```
=> S OIL?(3A)(RO OR REVERSE OSMOSIS OR MEMBRANE?)(L)(EFFECT? OR DAMAGE? OR PERFORMAN
CE?)
        172356 OIL?
          2195 RO
         16249 REVERSE
          8460 OSMOSIS
          6780 REVERSE OSMOSIS
                 (REVERSE(W)OSMOSIS)

         172000 MEMBRANE?
           1941943 EFFECT?
          75701 DAMAGE?
          71412 PERFORMANCE?
L5           44 OIL?(3A)(RO OR REVERSE OSMOSIS OR MEMBRANE?)(L)(EFFECT? OR
               DAMAGE? OR PERFORMANCE?)

=> S L4 NOT P/DT
        1602145 P/DT
L6           11 L4 NOT P/DT

=> S L6 AND (ENGLISH OR JAPAN)/LA
        5896525 ENGLISH/LA
        1032382 JAPAN/LA
L7           11 L6 AND (ENGLISH OR JAPAN)/LA
```

抄録付きで出力

```
L7   ANSWER 1 OF 11  COPYRIGHT 1991 ACS
AN   CA115(2):15045k
TI   Oil spills in mangroves: a conceptual model based on long-term
     field observations
AU   Jacobi, Claudia Maria; Schaeffer-Novelli, Yara
CS   Inst. Biocienc., Univ. Sao Paulo
LO   Sao Paulo 05499, Brazil
SO   Ecol. Modell., 52(1-2), 53-9
SC   61-2 (Water)
SX   51
DT   J
CO   ECMODT
IS   0304-3800
PY   1990
LA   Eng
AN   CA115(2):15045k
AB   A conceptual model is proposed for evaluating residence time of oil
     in mangrove environments.  It assumes that, after oil has spread
     over a mangrove coastline, it remains in the environment by
     retention in the sediment.  Removal is mainly in assocn. with
     seaward particle export.  Since detritus export depends on tidal
     flush, the area affected by an oil spill can be divided into
     sections parallel to the coastline having different removal rates
     increasing seaward (under little river flush and regular topog.).
```

L7 ANSWER 2 OF 11 COPYRIGHT 1991 ACS
AN CA113(24):217563x
TI Trace element and biotic changes following a simulated oil spill on a mudflat in Port Valdez, Alaska
AU Feder, H. M.; Naidu, A. S.; Paul, A. J.
CS Inst. Mar. Sci., Univ. Alaska
LO Fairbanks, AK 99775-1080, USA
SO Mar. Pollut. Bull., 21(3), 131-7
SC 61-2 (Water)
SX 4, 12, 51
DT J
CO MPNBAZ
IS 0025-326X
PY 1990
LA Eng
AN CA113(24):217563x
AB A mudflat in Port Valdez, Alaska, was examd. to det. the effects of exptl. addns. of Prudhoe Bay crude oil on metal chem. and harpacticoid copepod abundance. Hydrocarbon concns. were at background levels 30 days after the final addn. of oil. The short residence time of oil added to sediments is attributable to phys. removal of oil by tides, low sediment permeability, and low affinity of hydrocarbons for periglacial clay surfaces. Elemental concns., except Si, were lower in oiled than in unoiled sediments. Elemental depletion in oil-impacted sediments is attributable to mobilization of metals from oxide/hydroxide sediment phases or to desorption from clay due to lowering of Eh-pH of sediments subsequent to oil addn. In oiled sediments, the abundance of the harpacticoid copepods Harpacticus uniremis, Halectinosoma gothiceps, and Heterolaophonte was similar to or higher than values within unoiled plots. The reasons for lack of deleterious effects of oil on copepods in Port Valdez are not yet understood.

L7 ANSWER 3 OF 11 COPYRIGHT 1991 ACS
AN CA109(6):43158u
TI Summary of Protecmar experiments, the French dispersant offshore trials program
AU Bocard, Christian; Castaing, Gilles; Ducreux, Jean; Gatellier, Claude; Croquette, Jean; Merlin, Francois
CS Inst. Fr. Petr.
LO Rueil-Malmaison 92506, Fr.
SO Oil Chem. Pollut., Volume Date 1986, 3(6), 471-84
SC 61-2 (Water)
SX 51
DT J
CO OCPOEJ
IS 0269-8579
PY 1987
LA Eng
AN CA109(6):43158u
AB Six campaigns of dispersant offshore trials were conducted from 1979 to 1985 off the French Mediterranean and Brittany coasts. On the whole, 30 slicks were treated with several dispersants applied from ships by different spraying systems, from helicopters equipped with an underslung bucket and from aircraft. Different techniques were tested in order to optimize the application of dispersants in different situations: use of a variable flow rate system to spray neat concs. from ships, methods of directing ships and aircrafts to ensure a selective distribution of dispersant and a good coverage of slicks. Getting a mass balance of dispersed oil on the basis of oil concn. measurements was difficult in most cases. The effects of dispersants were distinguished between a short-term or primary effect which is related to the diln. of the smallest oil droplets and a delayed or secondary effect, characterized by the enhancement of the longer-term natural dissemination. The main limiting parameters were the sea-surface energy and subsurface currents, the dispersant/oil ratio and the poorly controlled herding effect of dispersants.

L7 ANSWER 4 OF 11 COPYRIGHT 1991 ACS
AN CA102(18):154443h
TI An experimental marine ecosystem response to crude oil and Corexit 9527: part 1 - fate of chemically dispersed crude oil
AU Wong, C. S.; Whitney, F. A.; Cretney, W. J.; Lee, K.; McLaughlin, F.; Wu, Jinping; Fu, Tianbao; Zhuang, Dongfa
CS Inst. Ocean Sci.
LO Sidney, BC, Can.

SO Mar. Environ. Res., 13(4), 247-63
SC 61-2 (Water)
SX 51
DT J
CO MERSDW
IS 0141-1136
PY 1984
LA Eng
AN CA102(18):154443h
AB The fate of Prudhoe Bay crude oil, labeled with n(1-14C)-hexadecane [63582-90-1] and dispersed with Corexit 9527 [60617-06-3], was studied for 24 days in a polyethylene bag enclosure of seawater by time-series observations of the alkane compn. of the crude oil, oil fluorescence, 14C-labeled hexadecane in the particulate phase, bacterial biomass, amts. of sedimented material, and parameters of temp., salinity, particulate org. C and N, and nutrients. By the 7th day, convective and diffusive mixing, important mechanisms for the dispersion of oil, resulted in a fairly homogeneous distribution of oil throughout the enclosed water column. Rapid bacterial biodegrdn. removed the n-alkane fraction initially, while oil-Corexit dispersion suppressed phytoplankton growth. After 7 days, with the recovery of phytoplankton growth, much of the aged oil sedimented with sinking of diatoms.

L7 ANSWER 5 OF 11 COPYRIGHT 1991 ACS
AN CA101(10):78472d
TI Fate of a tritiated Ekofisk crude oil in a controlled ecosystem experiment with North Sea plankton
AU Laake, Morten; Tjessem, Kjell; Rein, Knut
CS Inst. Microbiol. Plant Physiol., Univ. Bergen
LO Bergen N-5000, Norway
SO Environ. Sci. Technol., 18(9), 641-7
SC 61-2 (Water)
SX 51
DT J
CO ESTHAG
IS 0013-936X
PY 1984
LA Eng
OS CJACS
AN CA101(10):78472d
AB Flexible plastic enclosures were employed with the main intent of detg. the fate of an Ekofisk crude oil exposed to North Sea spring conditions. By use of a T-labeled Ekofisk crude oil a dynamic model was developed that allowed calcn. of vertical mass fluxes with depth based on actual concn. profiles and measured sedimentation rates. It was concluded that adsorption and subsequent sedimentation of plankton and org. detritus may cause a rapid sinking of petroleum hydrocarbons. Microbial mineralization seemed to be insignificant on a short-term scale.

L7 ANSWER 6 OF 11 COPYRIGHT 1991 ACS
AN CA92(24):203288x
TI Behavior and effectiveness of dispersants at sea and at shorelines
AU Mackay, Donald; Watson, Alex; Ng, Cecilia; Nadeau, Stuart
CS Dep. Chem. Eng. Appl. Chem., Univ. Toronto
LO Toronto, ON M5S 1A4, Can.
SO Am. Pet. Inst. Publ., 4308(Proc. - Oil Spill Conf., (Prev., Behav., Control, Cleanup)), 447-52
SC 61-8 (Water)

SX 51
DT J
CO APIPCO
PY 1979
LA Eng
AN CA92(24):203288x
AB The effects of surface turbulence on dispersion and on the behavior of the dispersed or undispersed oil at shorelines were studied by attempting to simulate an open ocean surface and a shoreline in the lab. The exptl. variables studied were type of oil, type of shoreline, water salinity, dispersant type, the oil to dispersant ratio, and the method of applying the dispersant. The effectiveness of a dispersant was profoundly affected by turbulence level. Wave action caused sand beaches to filter dispersed oil from the water column resulting in enhanced, but possibly reversible, oil penetration. Larger oil particles captured sand particles and sank. The use of dispersants on oil advancing on shores or even on the shoreline itself could prove advantages.

L7 ANSWER 7 OF 11 COPYRIGHT 1991 ACS
AN CA89(14):113475q
TI Physical and chemical behavior of crude oil slicks on the ocean
CS JBF Scientific Corp.
LO Wilmington, Mass., USA
SO API Publ., 4290, 98 pp.
SC 51-1 (Fossil Fuels, Derivatives, and Related Products)
SX 60
DT J
CO APIPCO
PY 1976
LA Eng
AN CA89(14):113475q
AB The phys. and chem. behavior of fresh crude-oil slicks on the open North Atlantic was detd. by following several small deliberate spills under varying sea conditions for up to 2 days. Low-mol.-wt. hydrocarbons were rapidly lost from the slicks, and the petroleum content of the water below the slicks returned to normal levels within a few h.

L7 ANSWER 8 OF 11 COPYRIGHT 1991 ACS
AN CA89(12):94850q
TI Some studies of an oil spillage due to the Jacob Maersk accident
AU Canelas, L. D.; Calejo Monteiro, J. D.
CS Gabinete Area Sines
LO Lisbon, Port.
SO API Publ., 4284(Proc. Oil Spill Conf. (Prev., Behav., Control, Cleanup)), 281-8
SC 61-8 (Water)
SX 51
DT J
CO APIPCO
PY 1977
LA Eng
AN CA89(12):94850q
AB The 1st anal. was carried out 6 days after the spillage. Nonpolar hydrocarbon concns. were 43-51% above the usual values. After a 2nd spillage about 1 wk later, the oil concns. in the water were the highest obsd. Dissolved O concns. and BOD at 5 coastal stations show that apparently there was no stress on marine populations during the sampling period. Nutrient values indicate that

remineralization is on-going. NO3- and PO43- were present in higher concns.

L7 ANSWER 9 OF 11 COPYRIGHT 1991 ACS
AN CA88(16):107559h
TI Hydrocarbons in the water column
AU Shaw, D. G.
CS Univ. Alaska
LO Fairbanks, Alaska, USA
SO Fate Eff. Pet. Hydrocarbons Mar. Ecosyst. Org., Proc. Symp., Meeting Date 1976, 8-18. Edited by: Wolfe, Douglas A. Pergamon: Elmsford, N. Y.
SC 51-0 (Fossil Fuels, Derivatives, and Related Products)
SX 23, 25, 26, 61, 66, 68, 69, 75, 78
DT C
CO 37BKAP
PY 1977
LA Eng
AN CA88(16):107559h
AB A review, with 52 refs., of H2O-hydrocarbon interaction from the perspective of the degree of aggregation of hydrocarbon mols. in H2O.

L7 ANSWER 10 OF 11 COPYRIGHT 1991 ACS
AN CA86(15):101627r
TI Fundamental studies on the effect of petroleum pollution on marine organisms. II. Lethal concentrations of oil-spill emulsifier components for marine phytoplankton
AU Tokuda, Hiroshi
CS Dep. Fish., Univ. Tokyo
LO Tokyo, Japan
SO Nippon Suisan Gakkaishi, 43(1), 103-6
SC 4-3 (Toxicology)
DT J
CO NSUGAF
PY 1977
LA Japan
AN CA86(15):101627r
AB The min. lethal concns. of oil-spill emulsifier components (9 petroleum solvents and 16 nonionic surfactants) were lower for Skeletonema costatum than for Nitzschia closterium. The toxicity of petroleum solvents increased with increasing arom. content. Surfactants contg. hydrophobic groups had higher toxicity than those without hydrophobic groups. Surfactants contg. ester groups were less toxic than those contg. ether groups. The toxicity of surfactants also correlated with the hydrophile-lipophile balance(HLB).

L7 ANSWER 11 OF 11 COPYRIGHT 1991 ACS
AN CA86(13):84405x
TI Fundamental studies on the effect of petroleum pollution on marine organisms. I. Lethal concentrations of oil-spill emulsifiers for some marine phytoplankton
AU Tokuda, Hiroshi; Arasaki, Seibin
CS Dep. Fish., Univ. Tokyo
LO Tokyo, Japan
SO Nippon Suisan Gakkaishi, 43(1), 97-102
SC 4-3 (Toxicology)
DT J
CO NSUGAF

PY 1977
LA Japan
AN CA86(13):84405x
AB The min. lethal concns. of 84 oil-spill emulsifiers manufd. in 1971-5 ranged from <1 to >10,000 ppm for Skeletonema costatum, Nitzschia closterium and Chlamydomonas. S costatum was the most sensitive, whereas Chlamydomonas the least. The latest products had a lower toxicity.

3. Data Base: STN File CA
   Subject : Coagulation of oil in seawater

```
=> S OIL?(L)COAGULAT?(L)(SEA OR OCEAN OR MARINE OR SEAWATER OR ARABIAN GULF)
        172356 OIL?
         28541 COAGULAT?
         32391 SEA
         23842 OCEAN
         24334 MARINE
         20627 SEAWATER
           549 ARABIAN
          2104 GULF
           101 ARABIAN GULF
                 (ARABIAN(W)GULF)
L1           5 OIL?(L)COAGULAT?(L)(SEA OR OCEAN OR MARINE OR SEAWATER OR
               ARABIAN GULF)
```

抄録付きで出力

```
L1   ANSWER 1 OF 5  COPYRIGHT 1991 ACS
AN   CA112(23):215558e
TI   The effects of dietary marine fish oils (omega-3 fatty acids) on
     coagulation profiles in men
AU   Lox, Charles D.
CS   Health Sci. Cent., Texas Tech. Univ.
LO   Lubbock, TX 79430, USA
SO   Gen. Pharmacol., 21(2), 241-6
SC   18-5 (Animal Nutrition)
DT   J
CO   GEPHDP
IS   0306-3623
PY   1990
LA   Eng
AN   CA112(23):215558e
AB   The effects of a low dose ingestion of omega-3 fatty acids (3 g of
     MaxEPA (900 mg .omega.-3 fatty acids) daily for 30 days) on clotting
     profiles were examd. in healthy men.  No effect was noted on either
     platelet aggregation or circulating prostaglandin levels.  Decreases
     were noted for total cholesterol and low-d. lipoprotein.  Clotting
     factor decreases were noted for factors primarily of the intrinsic
     pathway and several factors which promote fibrinolysis.  The low
     level ingestion of marine fish oil[probabaly has a beneficial effect
     on lipids and possibly the clotting profiles in healthy men.

L1   ANSWER 2 OF 5  COPYRIGHT 1991 ACS
AN   CA97(11):90906e
TI   The influence of marine oils on hemostasis
AU   Dyerberg, Joern
CS   Dep. Clin. Chem., Aalborg Hosp.
LO   Aalborg DK-9000, Den.
SO   Biol. Aspects Long Chain Fatty Acids Fish Oil Other Fats, Contrib.
     LIPIDFORUM Semin., 17-34.  Edited by: Marcuse, Reinhard.  Nord.
     Forum Lipidforsk. -teknol.: Goeteborg, Swed.
SC   18-5 (Animal Nutrition)
DT   C
CO   48COAQ
PY   1980
LA   Eng
```

AN CA97(11):90906e
AB Greenland Eskimos had higher plasma levels of high-d. lipoproteins and lower plasma cholesterol, triglyceride, low-d. lipoprotein, and very-low-d. lipoprotein levels than Danes, but when the Eskimos lived in Denmark these differences disappeared. These differences are attributed to the high level of marine oils in the diet of Eskimos, and the effects of polyunsatd. fatty acids of marine oils are discussed. In feeding tests with eicosopentaenoic acid [32839-30-8], platelet aggregation was decreased and bleeding time increased. Platelet fatty acid contents of Eskimo and Danish people are also compared; Eskimos had higher eicosapentaenoic acid and docosahexaenoic acid [32839-18-2] and lower arachidonic acid [506-32-1].

L1 ANSWER 3 OF 5 COPYRIGHT 1991 ACS
AN CA93(7):69420z
TI Effect of a marine oil high in eicosapentaenoic acid on blood lipids and coagulation
AU Saynor, R.; Verel, D.
CS Sheffield Cardiothorac. Unit, North. Gen. Hosp.
LO Sheffield S5 7AU, Engl.
SO IRCS Med. Sci.: Libr. Compend., 8(6), 378-9
SC 18-5 (Animal Nutrition)
DT J
CO IRLCDZ
IS 0305-6651
PY 1980
LA Eng
AN CA93(7):69420z
AB In 5 subjects fed normal diets but supplemented twice daily with 10 mL of a marine oil contg. high levels of eicosapentaenoic acid (I) [25378-27-2] over a period of 5 wk. high d. lipoprotein cholesterol [57-88-5] increased in all cases. In 4 of the 5 subjects there was a substantial fall in triglyceride level but no significant change in total cholesterol concn. A higher intake of I was required before any changes in coagulation could be obsd. in normal subjects.

L1 ANSWER 4 OF 5 COPYRIGHT 1991 ACS
AN CA80(18):99923q
TI Oil separation by air bubbling method using high polymer coagulants. I
AU Kondo, Goro; Asakura, Mitsuaki; Tanaka, Minoru
CS Kobe Univ. Merc. Mar.
LO Kobe, Japan
SO Mizu Shori Gijutsu, 14(11), 1161-9
SC 60-2 (Sewage and Wastes)
SX 51, 37, 46
DT J
CO MSYGAO
PY 1973
LA Japan
AN CA80(18):99923q
AB Oil sepn. by aeration is markedly accelerated by the addn. of inorg. salts. This method is suitable for treating tanker waste water, e.g. sea water ballast, but aggregation is slow in fresh water, e.g. industrial wastes. The aggregation of fine oil droplets is accelerated by the addn. of trace amts. of high polymer coagulants at 1-2 ppm and pH 3-4. The tested coagulants are primarily acrylamide.

L1 ANSWER 5 OF 5 COPYRIGHT 1991 ACS
AN CA80(12):63643j
TI Treating an oil-containing waste water
AU Fukumori, Rokuro
CS Asada Chemical Industry Co., Ltd.
SO Japan., 3 pp.
PI JP 48018069 2 Jun 1973 Showa
AI JP 68-70586 28 Sep 1968
IC C02C; B01D; B01J
SC 60-2 (Sewage and Wastes)
SX 51
DT P
CO JAXXAD
PY 1973
LA Japan
AN CA80(12):63643j
AB An oil slick is treated with a coagulating agent, e.g., an Al compd., alginic acid, a cellulose deriv., polymd. acrylic acid, or polymd. acrylamide, in combination with a finely powd. foamed polyolefin or polystyrene. The waste water is then agitated and filtered. In an example, 15-30 ppm of a basic Al chloride is added to the waste water (turbidity 50-200.degree., temp. 30-5.degree., pH 7.5-11.5, oil content 20-30 ppm) after which 10 g powd. foamed polystyrene is added per ton of waste water, followed by air-bubbling agitation. The results show a redn. of turbidity to 5-10.degree., oil content 2 ppm, and pH 7.0-8.0.

4. Data Base: DIALOG
   Subject : Behavior or oil spill to ocean

1．使用データベース　DIALOG　ONE SEARCH
2．検索期間
3．検索結果

```
?B 6,8,40,41,44,103,399
SYSTEM:OS  - DIALOG OneSearch
   File   6:NTIS_64-92/9201B1
            (COPR. 1992 NTIS)
 **FILE006: New prices effective Oct. 1 for NTIS documents.  See
 HELP NTISCODE for current prices; call NTIS at 703/487-4650 to order.
   File   8:COMPENDEX PLUS_1970-1991/NOV
            Copr. Engineering Info Inc. 1991)
   File  40:ENVIROLINE_70-91/OCT
            (COPR. R. R. BOWKER COMPANY 1991)
Use EIC acronym to order BOWKER documents.
   File  41:POLLUTION ABSTRACTS _ 70-91/NOV
            (C. CAMBRIDGE SCIENTIFIC ABSTRACTS)
   File  44:AQUATIC SCIENCE ABSTRACTS _ 78-91/SEP
 **FILE044: ALERTS ARE NOW AVAILABLE FOR ASFA
           See June Chronolog for more details
   File 103:ENERGY SCIENCE & TECHNOLOGY_74-91/DEC(ISS23)
 **FILE103: Use of File 103 is restricted. Please see ?RESTRICT
 File 103 has been reloaded. Accession numbers have changed.
   File 399:CA SEARCH_1967-1991 UD=11522
            (Copr. 1991 by the Amer. Chem. Soc.)
 **FILE399: Use is subject to the terms of your user/customer agreement.
   Use display code TI for TITLE only.  Formats 9 and 5 are now the same.

      Set  Items  Description
      ---  -----  -----------
      Set  Items  Description
      ---  -----  -----------
```

・流出油の挙動･･･　English or Japanese not patent

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S1        214   OIL?(1N)(SPILL? OR DISPERS? OR EFFLUENT?)(5N)(SEA OR OCEAN
                OR MARINE OR SEAWATER OR ARABIAN()GULF)(5N)(BEHAVIOR? OR PART-
                ICLE? OR CONCENTRAT? OR CONCN)
S2        120   S1 AND LA=(ENGLISH OR JAPANESE) NOT DT=(PA OR PATENT) FROM
                8,41,44,103
S3         15   S1 AND LA=(ENGLISH OR JAPANESE) FROM 399
S4         14   S3/NPT
S5         27   S1 NOT LA=? FROM 6
S6         25   OIL?(1N)(SPILL? OR DISPERS? OR EFFLUENT?)(5N)(SEA OR OCEAN
                OR MARINE OR SEAWATER OR ARABIAN()GULF)(5N)(BEHAVIOR? OR PART-
                ICLE? OR CONCENTRAT? OR CONCN) FROM 40
S7        186   S2 OR S4 OR S5 OR S6
S9        139   RD S7 (unique items)          ——— ①
```

オフラインで出力

5. Data Base: DIALOG
   Subject : Performance degradation of RO membrane by oil

Except patent

S10	170	OIL?(3N)(RO OR REVERSE()OSMOSIS OR MEMBRANE?)(F)(EFFECT? OR DAMAGE? OR PERFORMANCE?)
S11	110	S10 FROM 399
S12	60	S10 NOT S11
S13	104	S11/NPT
S14	164	S13 OR S12
S15	153	RD S14 (unique items)
S16	152	S15 NOT S9

オフラインで出力

6. Data Base: DIALOG
   Subject : Oil separation by coagulation

S17	8	OIL?(F)COAGULAT?(F)(SEA OR OCEAN OR MARINE OR SEAWATER OR ARABIAN()GULF) FROM 399
S19	8	S18 NOT S9
S21	8	S19 NOT S16

オフラインで出力 —③

S1	19	OIL?(F)COAGULAT?(F)(SEA OR OCEAN OR MARINE OR SEAWATER OR ARABIAN()GULF) FROM 6,8,40,41,44,103

オフラインで出力 —④

7. Data Base: JICST File 010
Subject : Behavior of oil spill to ocean

1．使用データベース　FICST FILE 010
2．検索期間　(1981.01 - 1991.17)　5,565,484 (1991.11.30 UPDATE)
3．検索結果

[1] S: 2,704 ｱﾌﾞﾗｵｾﾝ
[2] S: 806 ｶﾞﾝｺﾊｲｽｲ
[3] S: 1,177 ﾘｭｳｼｭﾂﾕ
[4] S: 4,049 ¥OR 1-3
[5] S: 21,151 ｶｲﾖｳ
[6] S: 8,740 ｶｲﾖｳｵﾀﾞｸ
[7] S: 67,737 ｶｲﾒﾝ
[8] S: 95,290 ¥OR 5-7
[9] S: 1,727 8*4
[10] S: 691,474 KW:ﾌﾞﾝｻﾝ&+KW:ﾕｿｳｷｮﾄﾞｳ+KW:ｶｸｻﾝ&+KW:ｷｮﾄﾞｳ+KW:ﾄﾞｳｽｲﾘｷｶﾞｸ+KW:ﾘｭｳﾀｲﾘｷｶﾞｸ&+KW:ﾏｸﾌﾞﾂ+KW:ｼﾐｭﾚｰｼｮﾝ+KW:ﾉｳﾄﾞ+KW:ﾘｭｳﾄﾞ&
[11] S: 397 9*10
[12] S: 383 LN=JA+EN
[13] S: 74 CI=B1+B2
[14] S: 383 12
[15] S: 1,859 KW:ﾌﾞﾝｻﾝｻﾞｲ
[16] S: 217 12#15
[17] S: 383 12

383件中100件をﾀｲﾄﾙで出力し関係のありそうなものを抄録で出力

#000006* JICST COPYRIGHT
CN 91A0254069, A91131684, K91060422
TI Ｅｘｘｏｎ Ｖａｌｄｅｚ号流出原油の消滅過程と移動
ET Ｆａｔｅ ａｎｄ ｔｒａｎｓｐｏｒｔ ｏｆ ｔｈｅ Ｅｘｘｏｎ Ｖａｌｄｅｚ ｏｉｌ ｓｐｉｌｌ.
AU GALT J. A, LEHR W J, PAYTON D L (National Oceanic and Atmospheric Administration, WA)
JN B0839A (ESTHA) (0013-936X) Ｅｎｖｉｒｏｎ Ｓｃｉ Ｔｅｃｈｎｏｌ
VN ＶＯＬ. ２５, ＮＯ. ２ ＰＡＧＥ. ２０２-２０９ 1991
CI (A) (d3) (EN) (USA) (写図６, 参９)
AB １９８９年３月２４日アラスカ湾Ｐｒｉｎｃｅ Ｗｉｌｌｉａｍ Ｓｏｕｎｄでの Ｅｘｘｏｎ Ｖａｌｄｅｚ号座礁による約２５万バレルの原油流出事故について，流出原油の性状と典型的消滅過程，ならびに地形，潮流および風などの現地環境データと原油風化分解に及ぼすそれらの作用に基づいて，実際の風化分解過程および浮遊油成分の移動についての３月２４日～４月９日の観測データを詳細に検証した
CC SB02040B, SB05040W (614.777(26), 614.7 OTHERS)
KW 海洋汚濁; 油汚染; 原油; 座礁; 流出油; アラスカ; 拡散; 移流; 蒸発散; 風化作用
FT [Ｖａｌｄｅｚ号]

8. Data Base : JOIS JICST
   Subject : Oil separation by coagulation

[18]	S:	59,030	KW:ｱﾌﾞﾗ&
[19]	S:	897	KW:ｺｽｲ&
[20]	S:	59,244	18+19
[21]	S:	463	ｷﾞﾖｳｼｭｳﾃﾞﾝﾃﾞﾝ
[22]	S:	3,762	ｷﾞﾖｳｼｭｳｼﾖﾘ
[23]	S:	18,123	ﾁﾝﾃﾞﾝ
[24]	S:	390	22*23
[25]	S:	820	21+24
[26]	S:	11	20*24
[27]	S:	21	25*20
[28]	S:	1,239	ｽﾅﾛｶ
[29]	S:	18	20*28
[30]	S:	17	29#27

(21+22×23) × (18+19)

27式中抄録の出力

#000003* JICST COPYRIGHT
CN 90A0269406, K90060800
TI 廃業した廃油再生設備の地下での地下水汚染の除去
ET Removal of the groundwater pollution below an abandoned waste oil refinery.
AU RIPPER P, FRUECHTENICHT H (Dr Trischler and Partner, Darmstadt, DEU)
JN A0070A (WSTED) (0273-1223) Water Sci Technol
VN VOL. 21, NO. 12 PAGE. 1841-1844 1989
CI (A) (a1) (EN) (GBR) (写図5)
AB HanauのPintsch地点では1984年まで廃油の再生が行なわれていた。同地の地下水の油汚染が発覚したので，地下水処理プラントを建設した。地下水の汲上げ，油水分離，エアストリッピング，凝集沈殿，活性炭ろ過を組合わせた。脂肪族塩素化合物，芳香族炭化水素はエアストリッピングで除去される。処理水は河川放流か地下へ再注入している
CC YE01030Y (662:628.2/.3)
KW 地下水汚濁; 廃油; 下水処理施設; 復旧; 油水分離; 凝集処理; 活性炭処理; 脂肪族塩素化合物; ストリッピング; 芳香族炭化水素; 地下水; 化学工場

1)
#0000001* JICST COPYRIGHT
CN 87A0218180, A87091548, K87050256
TI 含油廃水処理における最近の研究成果
ET Recent developments in the treatment of oily effluents.
AU ROQUES H, AURELLE Y (Inst. National des Sciences Appliqu··es, Toulouse, FRA)
JN A0070A (WSTED) (0273-1223) Water Sci Technol
VN VOL. 18, NO. 9 PAGE. 91-103 1986
CI (A) (b2) (EN) (GBR) (写図10, 表1, 参7)
AB 海中に漏洩した油が及ぼす環境上の問題点の本質と重要性を説明したのち，Ｓｔｏｋｅｓの法則に基づいて含油廃水処理の機構について解説。炭化水素は軽いものほど溶解度が高く，また不飽和度が増すと溶解度が高くなる。油滴２０μｍ以下の乳化油は，放置しても油は分離しない。コアレッサを通して油滴を集合させ粒径を増大させる方法，気泡に油滴を付着させて水との密度差を大きくして浮上分離する方法，炭化水素で濡れやすい材料を組み込んだ平行板分離槽を紹介し，最後に海域での浮上油を回収するオイルドラムスキマの構造，機能を解説
CC SB02040B (614.777(26))
KW 海洋汚濁; 油汚染; 含油廃水; 廃水処理; 油水分離; 油水分離装置; Ｓｔｏｋｅｓ流; 浮上法; 油回収船; 技術開発; 技術進歩

１１）　　Literature 11

#000001*　JICST COPYRIGHT

CN　83A0261449, A83142072, K83070456

TI　含油排水の高度処理技術に関する研究　Ⅰ　ヤシ殻繊維成形体を用いる浮上分離法

AU　富田繁，松田芳人，安部けい司，寺島一生（化技研保安環境化学部）

JN　F0353A (0388-3213) 化学技術研究所報告

VN　ＶＯＬ．７８，ＮＯ．４　ＰＡＧＥ．１９３－２０２ 1983

CI　(A) (a1) (JA) (JPN) (写図９，　表３，　参３)

AB　油水分離材と気ほうとを用いる新規油水分離法による含油排水の高度処理技術に関する基礎的研究を行った。すなわちバッチ式の油水分離装置を試作し，油分離材の材質，気ほうの吹込量と油水分離効果との関係，含油水の油滴径と処理効率，水質条件につき検討。結果，油水分離材として各種の材料が使用可能であるが，酢酸ビニル系合成樹脂を用いた表面処理ヤシ殻繊維三次元成形体が最も効果的であることを見いだした

CC　SC03040L (628.33)

KW　廃水処理；油水分離；含油廃水；浮上法；ヤシ；種子；植物繊維；酢酸ビニル/1；合成樹脂接着剤；表面処理；材料

<DIALOG File 6: (COPR. 1992 NTIS)>
617974 NTIS Accession Number: AD-A046 907/2

→ *Flocculation Behavior of Suspended Sediments and Oil Emulsions*

Bassin, N. Jay ; Ichiye, Takashi
Texas A and M Univ College Station Dept of Oceanography

Corp. Source Codes: 401203
Report No.: CONTRIB-666
27 Feb 76 7p
Document Type: Journal article
Journal Announcement: GRAI7804
Pub. in Jnl. of Sedimentary Petrology, v47 n2 p671-677 Jun 77.
NTIS Prices: PC A02/MF A01
Contract No.: N00014-75-C-0537; NSF-GA-26498

Laboratory studies performed upon the flocculation tendencies of dispersed clay particles and oil emulsions in both fresh and brackish waters demonstrate that oils and clays form spontaneous association colloids or colloidal electrolytes in the presence of dissolved salts. Oil sedimentation seems to be caused mainly by adsorption of oil films onto clay particles which are subsequently flocculated by electrolytic action, rather than by the adsorption of discrete oil globules onto the clay floccules. Observed sinks of surface oil slicks in marine areas may therefore be due to the colloidal flocculating abilities of the dissolved salt, rather than to inherent coagulation properties of oils and suspended clays. (Author)

Descriptors: *Oil spills; *Oil pollution; Clay; Adsorption; Agglomerates; Collecting methods; Emulsions; Particles; Salinity; Sea water; Sediments; Colloids
Identifiers: *Flocculation; Reprints; NTISDODXR
Section Headings: 13B (Mechanical, Industrial, Civil, and Marine Engineering--Civil Engineering); 68D (Environmental Pollution and Control--Water Pollution and Control)

<DIALOG File 6: (COPR. 1992 NTIS)>
323210 NTIS Accession Number: AD-758 321
Study of Hydrophilic Membranes for Oil-Water Separation
(Final rept.)
Milstead, Clyde E. ; Loos, John F.
Gulf Environmental Systems Co San Diego Calif
Corp. Source Codes: 407969
Report No.: GULF-EN-A12388; USCG-4305.2/7
Nov 72 89p
Journal Announcement: GRAI7310

Contract No.: DOT-CG-24291-A; CG-4305

A program was conducted to determine the feasibility of the concept of using hydrophilic membranes for oil-water separations and to evaluate conceptually its practical applicability for shipboard use. Twenty candidate membranes were screened with respect to oil rejection capabilities and product water flux. The most promising membrane, a surface-hydrolyzed cellulose acetate, showed essentially complete oil rejection and was further studied to evaluate its performance under various operating conditions. The effects of input feed temperature flow rate, salt concentrations, applied pressure, and type and concentration of oil contaminants were determined. Several simple cleaning procedures were investigated in an effort to restore product water flux after fouling of the membrane surface with oil. Preliminary designs for low-pressure systems to produce 100 and 1000 gpm of oil-free product were developed, based on a spiral-wound modular system. A summary of limitations and constraints of a proposed 100-gpm system for shipboard application is presented, along with spatial, weight, and energy requirements and economic factors for such a system. (Author)

Descriptors: *Oils; Material separation ; *Water pollution; Oils ; *Ship auxiliary equipment; Material separation ; *Membranes; Liquid filters ; Tests; Hydrolysis; Cellulose acetates; Salinity; Temperature; Performance(Engineering); Shipborne; Pressure; Design

Identifiers: *Oil pollution control; *Oil water separators; Oil wastes; Hydrophilicity; *Ultrafiltration; Flux(Rate); Bilge water; Spiral wound membranes; NTISCG

Section Headings: 13B (Mechanical, Industrial, Civil, and Marine Engineering--Civil Engineering); 13J (Mechanical, Industrial, Civil, and Marine Engineering--Marine Engineering); 68D* (Environmental Pollution and Control--Water Pollution and Control); 60G (Civil, Structural, and Marine Engineering--Marine Engineering)

<DIALOG File 8: >
03208180 E.I. Monthly No: EI9109114872
Title: Continuous anaerobic treatment of wastewater from a kraft pulp mill.
Author: Minami, Kiyoshi; Okamura, Kazuo; Ogawa, Shigemichi; Naritomi, Takaaki
Corporate Source: Shimizu Corp, Tokyo, Jpn
Source: Journal of Fermentation and Bioengineering v 71 n 4 1991 p 270-274
Publication Year: 1991
CODEN: JFBIEX ISSN: 0922-338X
Language: English
Document Type: JA; (Journal Article) Treatment: X; (Experimental)
Journal Announcement: 9109

Abstract: A pilot-scale study of the thermophilic anaerobic digestion of high-strength wastewater (evaporator condensate, EC) discharged from a kraft pulp production process was performed. The system consisted of a micro-filtration (MF) membrane module for oily substances removal, a stripping system using evolved gas from the digester for sulfur compounds removal, an anaerobic fixed-bed bioreactor for methane fermentation, and an ultrafiltration (UF) membrane module for retention

<DIALOG File 6: (COPR. 1992 NTIS)> Literature 22
473570 NTIS Accession Number: AD-A016 384/0
Separation of Oil Bilge Water by Semipermeable Membrane
Stahl, Gerald M. ; Meyer, Daniel H. ; Rankin, Bruce H.
Naval Academy Annapolis Md Div of Engineering and Weapons
Corp. Source Codes: 406923
Report No.: EW-72-7
Aug 72 36p
Journal Announcement: GRAI7526
NTIS Prices: PC A03/MF A01
Three different membranes were tested to determine their ability to filter oil from bilgewater. Separation was excellent, but oil coated the membranes so that thruput decreased with time. One membrane, when backflushed, returned to its original effectiveness.
Descriptors: *Oil pollution; *Separators; *Membranes; Performance tests; Bilges
Identifiers: *Bilge water; *Oil pollution control; *Oil water separators; NTISDODN
Section Headings: 13B (Mechanical, Industrial, Civil, and Marine Engineering--Civil Engineering); 7D (Chemistry--Physical Chemistry)

CN 88A0099228, C88072073
TI 汚染された逆浸透膜の回復についてのパイロット経験
ET Pilot experiences on the recovery of polluted reverse osmosis membranes.
AU FARINAS M (Pridesa, Bilbao, ESP); GRANDA J M, GURTUBAI L, VILLAGRA M J (Labein, Bilbao, ESP)
JN B0934A (DSLNA) (0011-9164) Desalination
VN VOL. 66 PAGE. 385-402 1987
CI (A) (b2) (EN) (NLD) (写図10, 表11, 参5)
AB 本研究は主に2つの目的をもって行なった。すなわち逆浸透膜の劣化の原因を決定する方法を確立することと汚染された膜を回復するための経済的手法を見出すことである。パイロットプラントとしては最大生産水量6．8m3／hrのものを用い，装置の型としては中空繊維型，スパイラル型，管型などを用いた。その結果DuPont社の中空繊維型についてはカルシウムとマグネシウムの除去はEDTA1%，pH10の液で簡単に行えた。鉄は蓚酸ソーダ1～2%，pH3．2～3．8でかなりよく除去される。[illegible]
CC XD021207 (96/07:532.71)
KW [illegible]

<DIALOG File 103: >
02895062 NEDO-90-910047; EDB-90-112304
Title: Microbial degradation of crude oil on the sea surface by adding nutrient microcapsules
Original Title: Eiyo ennaiho microcapsule no tenka ni yoru kaimen deno genyu no biseibutsu bunkai
Author(s): Yamane, Akiko; Okada, Mitsumasa; Murakami, Akihiko (Tokyo Univ. of Agriculture and Tech., Tokyo (Japan))
Source: Suishitsu Odaku Kenkyu (Japan) v 13:1. Coden: SOKED ISSN: 0387-2025
Publication Date: 10 Jan 1990 p 48-53
Document Type: Journal Article
Language: In Japanese
Journal Announcement: EDB9015
Subfile: ETD (Energy Technology Data Exchange). NEDO (Japan (sent to DOE from))
US DOE Project/NonDOE Project: NP
Country of Origin: Japan
Country of Publication: Japan
Abstract: Microbial degradation of spilled crude oil on the sea surface has been studied. It was found that the concentration of nutrient was a large rate-determining factor in microbial degradation of oil, consequently microbial degradation can be enhanced by adding nutrient. While, a nutrient microcapsule was developed so as to keep a certain concentration of nutrient on the sea surface, and the biodegradation capacity and the dosing condition were investigated through experiments. In the up-and-down shaking apparats modeled on sea surface, crude oils were degraded by a marine bacteria. The percentages of total oil removal were 18-22% in the sea water, on the other hand, by dose of the nutrient microcapsules they were enhanced to 43-56%. On the biodegradation of 5g of crude oil, the oil removal was amounted roughly to maximum when 116mg of the microcapsule per vessel (11.6% to crude oil) was added 5 times every 4 days, and the dosage effect was not increased even if more nutrient microcapsules were added. 9 refs., 7 figs.
Major Descriptors: *NUTRIENTS -- CAPSULES; *PETROLEUM -- ALKANES; *PETROLEUM -- AROMATICS; *PETROLEUM -- BIODEGRADATION; *PETROLEUM -- REMOVAL; *PETROLEUM -- WATER POLLUTION ABATEMENT; *SEAS -- MICROORGANISMS; *SEAS -- SURFACES
Descriptors: CHROMATOGRAPHY
Broader Terms: CHEMICAL REACTIONS; CONTAINERS; DECOMPOSITION; ENERGY SOURCES; FOSSIL FUELS; FUELS; HYDROCARBONS; ORGANIC COMPOUNDS; POLLUTION ABATEMENT; SEPARATION PROCESSES; SURFACE WATERS
Subject Categories: 540320* -- Environment, Aquatic -- Chemicals Monitoring & Transport -- (1990-)

<DIALOG File 103: >
01101517 EDB-83-001517
Title: American Petroleum Institute's work on oil spill prevention, containment and cleanup
Author(s): Haxby, L.P.
Affiliation: Shell Oil co.
Conference Title: Offshore technology conference
Conference Location: Houston, TX, USA Conference Date: 30 Apr 1973
Source: Offshore Technol. Conf. (United States) v 1:OTC-1749. Coden: OSTCB
Publication Date: 1973 p 1.258-1.260
Report Number(s): CONF-7304108-
Document Type: Journal Article; Conference literature
Language: English
Journal Announcement: EDB8010
Country of Origin: United States
Abstract: Since 1968, API has supported an extensive research program directed toward improving the industry's capability of preventing oil spills and improving response and capability of oil-spill cleanup should a spill occur. These efforts have ranged from studies that determined industry's current oil-spill response capability to new equipment demonstrations and basic research on fate and effect of spilled oil. Emphasis also has been placed upon the generation of harbor cooperatives to provide first-line defense capability and implementation of studies and organization of insurance plans to provide coverage for the expensive costs involved in an oil-spill disaster. More recently, API's efforts have concentrated on improvement of oil-spill recovery in high sea conditions. Full-scale sea trails have been conducted on several systems, concentrating most heavily on new concept methods for oil-spill recovery under these adverse conditions. The study provides a report of the most recent trails of this type of equipment. ;
Major Descriptors: *OIL POLLUTION CONTAINMENT; *OIL SPILLS -- CLEANING; *OIL SPILLS -- RESEARCH PROGRAMS
Descriptors: COST; PETROLEUM INDUSTRY; RECOVERY; SKIMMERS; WATER POLLUTION CONTROL
Broader Terms: CONTAINMENT; CONTROL; EQUIPMENT; INDUSTRY; POLLUTION CONTROL; POLLUTION CONTROL EQUIPMENT
Subject Categories: 020900* -- Petroleum -- Environmental Aspects
520200 -- Environment, Aquatic -- Chemicals Monitoring & Transport -- (-1989)

<DIALOG File 103: >
03208178 NEDO-91-950434; EDB-91-135614 Literature 26
Title: Influence of oil spillage on marine environment
Original Title: Abura ryushutsu to kaiyo kankyo eno eikyo
Author(s): Iwamoto, K. (Environment Agency, Tokyo (Japan))
Source: JETI (Japan Energy and Technology Intelligence) (Japan) v 39:5. Coden: J ETIE ISSN: 0289-4343
Publication Date: 1 May 1991 p 156-160
Document Type: Journal Article
Language: In Japanese
Journal Announcement: EDB9120
Subfile: ETD (Energy Technology Data Exchange). NEDO (Japan (sent to DOE from))
US DOE Project/NonDOE Project: NP
Country of Origin: Japan
Country of Publication: Japan
Abstract: This report investigates the influence of oil spillage on marine environment. As for the oil behavior in the ocean, the oil starts to change physico-chemically and ecologically by natural conditions just after spilled in the sea, evaporation of its light component is promoted by waves in a short period of time, and residual oil becomes mousse type emulsifying oil mixed with sea water. Then, the emulsifying oil disperses, dissolves, settles, oxidizes photochemically, or decomposes with microorganisms. Since crude oil and petroleum products consist of various kinds of hydrocarbon and settle, dissolve, or float on the sea after spillage, their influences on marine organisms become physically and chemically complex. Once the oil spills into the ocean, its impact on marine environment is greater as the site is closer to the shore where a lot of flora and fauna live. It takes a long time to restore the ocean after the spillage oil is controlled, disposed, or extinguished naturally. Continuous survey is used to judge when the ocean is recovered. 1 fig., 3 tabs.
Major Descriptors: *BIOLOGICAL VARIABILITY -- CHEMISTRY; *BIOLOGICAL VARIABILITY -- PHYSICS; *OIL SPILLS -- EMULSIONS; *OIL SPILLS -- PETROLEUM; *OIL SPILLS -- SEAS; *SEAS -- ENVIRONMENT
Descriptors: AQUATIC ORGANISMS; MICROORGANISMS
Broader Terms: COLLOIDS; DISPERSIONS; ENERGY SOURCES; FOSSIL FUELS; FUELS; SURFACE WATERS
Subject Categories: 540300* -- Environment, Aquatic -- (1990-)

<DIALOG File 8: >
Literature 27

01540678 E.I. Monthly No: EI8407073065 E.I. Yearly No: EI84135785

Title: CONCENTRATION POLARIZATION, MEMBRANE FOULING AND CLEANING IN ULTRAFILTRATION OF SOLUBLE OIL.

Author: Lee, Soobok; Aurelle, Yves; Roques, Henry

Corporate Source: INSA, Lab de Chimie et Genie de l'Environnement, Toulouse, Fr

Source: Journal of Membrane Science v 19 n 1 Apr 1984 p 23-38

Publication Year: 1984

CODEN: JMESDO ISSN: 0376-7388

Language: ENGLISH

Journal Announcement: 8407

Abstract: Concentration polarization in ultrafiltration of soluble oil was investigated, and the characteristics of the gel obtained at the end of the experiments were analyzed. It was found that the oil content of the gel was approximately 40 vol. % and was almost independent of pressure. The gel was a concentrated oil/water emulsion. Membrane fouling was also analyzed in terms of critical surface tension, wettability of the membrane and capillary pressure. Fouling was mainly due to adsorption of oil on the membrane structure, which modified the critical surface tension and the wettability, as well as the effective pore diameter, resulting in reduced membrane permeability. 13 refs.

Descriptors: *WATER POLLUTION; MEMBRANES; INDUSTRIAL WASTES--Treatment

Identifiers: SOLUBLE OIL

Classification Codes: 453 .(Water Pollution); 631 .(Fluid Flow & Hydrodynamics) 45 .(POLLUTION & SANITARY ENGINEERING); 63 .(FLUID DYNAMICS & VACUUM TECHNOLOGY)

<DIALOG File 8: >

00797645 E.I. Monthly No: EI7903017945 E.I. Yearly No: EI79051246

Title: EVALUATION OF DISPERSANCY BY ANALYTICAL METHODS.

Author: Badiali, F. L.; Berti, F.; Cassiani Ingoni, A. A.; Pusateri, G.

Corporate Source: Assoreni, Pet Prod Dep, Milan, Italy

Source: SAE Preprints n 780932 for Meet Nov 13-16 1978 13 p

Publication Year: 1978

CODEN: SEPPA8 ISSN: 0560-6160

Language: ENGLISH

Journal Announcement: 7903

Abstract: Test severity, inhibition and oil discrepancy: these are factors which influence the formation of sludge and the extent of its settling in the engine. By appropriate used-oil analyses it is possible to calculate indices of the oil's performance which are largely independent of the type of engine used and the test procedure followed. The ASTM D 893 test procedure is inapplicable to a large number of modern motor oils. An alternative method based on the filtration of used oils over membrane filters has been of great help in recent years. However, a newly developed photometric method seems promising in overcoming most present analytical difficulties. The indices obtained from used-oil analyses can become the only feasible test method in the development of long drain oils. 5 refs.

Descriptors: *LUBRICATING OILS--*Analysis; PARTICLE SIZE ANALYSIS--Applications; AUTOMOBILE ENGINES--Lubricating Oils

Identifiers: DISPERSANCY INDEX

Classification Codes: 607 .(Lubricants & Lubrication); 421 .(Materials

<DIALOG File 8: >
Literature 28

00644088 E.I. Monthly No: EI7708062079 E.I. Yearly No: EI77092100

Title: CONCENTRATIONS OF OIL IN SEA WATER RESULTING FROM NATURAL AND CHEMICALLY INDUCED DISPERSION OF OIL SLICKS.

Author: Cormack, D.; Nichols, J. A.

Corporate Source: Warren Spring Lab, Stevenage, Hertfordshire, Engl

Source: Oil Spill Conf, Proc, New Orleans, La, Mar 8-10 1977 Publ by API (Publ n 4284), Washington, DC, 1977 p 381-385

Publication Year: 1977

Language: ENGLISH

Journal Announcement: 7708

Abstract: Results are presented on the factors relating to the dissipation of oil spills at sea, including evaporation, emulsion formation, spreading, and natural dispersion into the water column. For Ekofisk oil, 20% evaporates in about 7. 5 hours and, while emulsion formation is as rapid as for Kuwait crude, the resulting viscosity is low and insufficient to allow interference with the natural spreading and dispersion rates. No significant deleterious effects were found to result from the dispersion of oil slicks at sea using low toxicity dispersant chemicals; also it was noted that, in any case, substantial quantities of oil can be expected to enter the sea before oil recovery operations can be mounted. 5 refs.

Descriptors: *WATER POLLUTION--*Oil Spills; ENVIRONMENTAL IMPACT

Identifiers: OIL CLEANUP TECHNIQUES

Classification Codes: 453 .(Water Pollution); 901 .(Engineering Profession) 45 .(POLLUTION & SANITARY ENGINEERING); 90 .(GENERAL ENGINEERING)