

I. B. IN SITU CONVERSION; WELLS

I.THERMAL EXPLOITATION BY FLUID INJECTION OR COMBUSTION

This profile includes in-the-earth conversion of solid carbonaceous material to liquid or gaseous hydrocarbons utilizing earth bores, including thermal exploitation by combustion or injection of heated fluids, such as steam, hot water or hot hydrocarbon solvents.

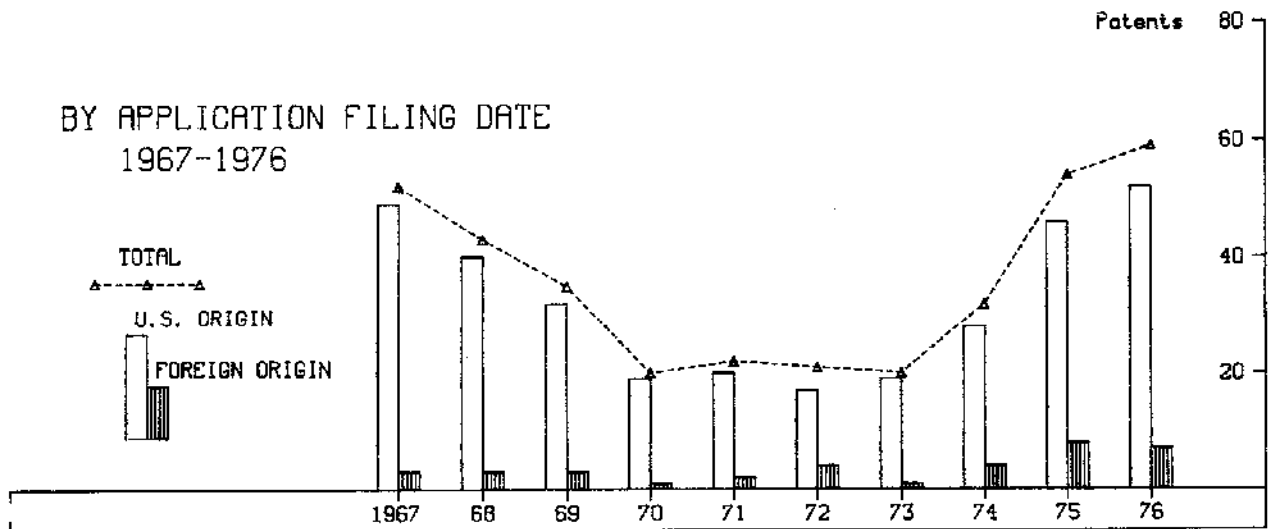
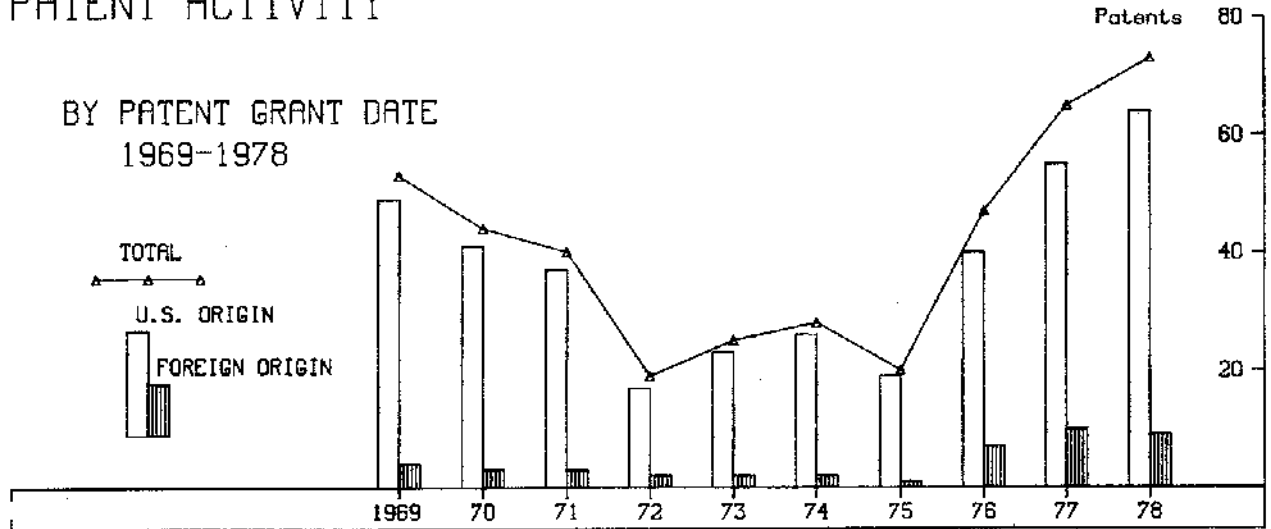
INCLUDED IN THIS PROFILE ARE ALL OF THE PATENTS FROM:

Class 48, Dig. 6  
Class 166, Subclasses 256-262, 271, 272, 303

ACTIVITY INDICES (1976-1978)

GROWTH	44.7%
FOREIGN SHARE	14.0%
CORPORATE OWNED	77.3%
GOVERNMENT OWNED	4.9%
U.S. OWNED OF FOREIGN	11.5%

PATENT ACTIVITY



SYNTHETIC FUELS I B 1- IN SITU - WELLS - FLUID INJECTION OR COMBUSTION

PATENT ACTIVITY (1963-1978) BY DATE OF PATENT GRANT

PAGE A 2

	63-64	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	83	48	45	51	66	53	44	40	19	25	28	20	47	95	73	707
U.S. ORIGIN	82	47	41	45	61	49	41	37	17	23	26	19	40	55	64	647
FOREIGN ORIGIN	1	1	4	6	5	4	3	3	2	2	2	1	7	10	9	60
CANADA			1		2	2	1	1			2		5	4	8	26
GERMANY			2	3	1	2			1	2		1	1	3		16
NETHERLANDS	1		1	1					1					1		5
U.S.S.R.													1			4
VENEZUELA				1	2			1					1	2	1	4
FRANCE		1						1								4
IRAN				1				1								2
UNITED KINGDOM							1									1
TRINIDAD/TOBAGO							1									1
U.S. ORIGIN	82	47	41	45	61	49	41	37	17	23	26	19	40	55	64	647
U.S. CORP. OWNED	76	43	37	41	59	48	34	34	12	22	20	19	33	39	54	571
U.S. GOVT. OWNED											1		2	3	4	10
U.S. INDIV. OWNED	6	4	4	4	2	1	7	3	5	1	5		5	12	5	64
FOREIGN OWNED														1	1	2
FOREIGN ORIGIN	1	1	4	6	5	4	3	3	2	2	2	1	7	10	9	60
U.S. OWNED	1	1	2	3	4	2	1	3	2	2	2	1	7	10	2	20
FOREIGN OWNED			2	3	1	2	2		2	2	2	1	7	9	7	40
FOREIGN CORP.			2	3	1	2	1		1	2	1		4	5	3	25
FOREIGN GOVT.																
FOREIGN INDIV.							1		1		1	1	3	4	4	15

SYNTHETIC FUELS I B 1- IN SITU - WELLS - FLUID INJECTION OR COMBUSTION

PATENT ACTIVITY (PATENTS GRANTED 1/67-12/78) BY DATE OF PATENT APPLICATION

PAGE A 4

	PRE 65	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	TOTAL
TOTAL	26	41	57	52	43	35	20	22	21	20	32	54	59	49		531
U.S. ORIGIN	25	35	52	49	40	32	19	20	17	19	28	46	52	43		477
FOREIGN ORIGIN	1	6	5	3	3	3	1	2	4	1	4	8	7	6		54
CANADA			3		2	1			2	1	3	4	3	6		25
GERMANY		3	1	2			1	1	2		1	1	2			14
NETHERLANDS		1						1					1			3
U.S.S.R.												3				4
VENEZUELA	1	1	1			1										4
FRANCE						1										4
IRAN		1														1
UNITED KINGDOM																1
TRINIDAD/TOBAGO				1												1
U.S. ORIGIN	25	35	52	49	40	32	19	20	17	19	28	46	52	43		477
U.S. CORP. OWNED	24	32	50	44	37	28	15	18	16	15	24	36	40	36		415
U.S. GOVT. OWNED									1		1	1	3	4		10
U.S. INDIV. OWNED	1	3	2	5	3	4	4	2		4	3	9	7	3		50
FOREIGN OWNED													2			2
FOREIGN ORIGIN	1	6	5	3	3	3	1	2	4	1	4	8	7	6		54
U.S. OWNED	1	3	4	2	2	3							1	2		16
FOREIGN OWNED		3	1	3	1	1	1	2	4	1	4	8	6	4		38
FOREIGN CORP.		3	1	2	1		1	1	2	1	4	2	2	3		23
FOREIGN GOVT.																
FOREIGN INDIV.				1				1	2			6	4	1		15

I.B. IN SITU CONVERSION - WELLS  
1. THERMAL EXPLOITATION BY FLUID INJECTION OR COMBUSTION

ASSIGNEES WITH 2 OR MORE PATENTS (1/69-12/78)

TEXACO INC.	56
SHELL OIL COMPANY	44
PHILLIPS PETROLEUM COMPANY	37
OCCIDENTAL OIL SHALE, INC.	22
MOBIL OIL CORPORATION	16
IN SITU TECHNOLOGY, INC	16
EXXON PRODUCTION RESEARCH COMPANY	13
CONTINENTAL OIL COMPANY	12
CITIES SERVICE COMPANY	12
OCCIDENTAL PETROLEUM CORPORATION	10
UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY	9*
PAN AMERICAN PETROLEUM CORPORATION	8
TEXACO EXPLORATION CANADA LTD.	8
MARATHON OIL COMPANY	8
DEUTSCHE TEXACO AKTIENGESELLSCHAFT	7
CHEVRON RESEARCH COMPANY	7
ATLANTIC RICHFIELD COMPANY	5
SUN OIL COMPANY OF PENNSYLVANIA	5
TENNECO OIL COMPANY	5*
STANDARD OIL COMPANY (INDIANA)	4
WORLD ENERGY SYSTEMS	3
TRW INC.	3
DOW CHEMICAL COMPANY	3
GULF RESEARCH + DEVELOPMENT COMPANY	3
CARMEL ENERGY, INC.	2
HALLIBURTON COMPANY	2
DEUTSCHE ERDOL-AKTIENGESELLSCHAFT	2

\*Composite total, see Appendix A.

SYNTHETIC FUELS I B 1- IN SITU - WELLS - FLUID INJECTION OR COMBUSTION  
 ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

## AIRCO INC.

3422892 - SUPPLY OF HIGH-PRESSURE COMBUSTION- SUPPORTING GAS TO WELLS

## AMERICAN OIL SHALE CORPORATION

3465818 - UNDERCUTTING OF NUCLEARLY DETONATED FORMATIONS BY SUBSEQUENT NUCLEAR DETONATIONS AT GREATER DEPTH AND USES THEREOF IN THE RECOVERY OF VARIOUS MINERALS

## AMOCO PRODUCTION COMPANY

3964547 - RECOVERY OF HEAVY HYDROCARBONS FROM UNDERGROUND FORMATIONS

## ATLANTIC RICHFIELD COMPANY

3586377 - METHOD OF RETORTING OIL SHALE IN-SITU  
 3603996 - METHOD FOR INCREASING SUBTERRANEAN FORMATION PERMEABILITY  
 3616856 - METHOD OF PLUGGING A WATER-PRODUCING FORMATION  
 3627044 - METHOD OF PRODUCING TAR SANDS WITH LATERALLY CRATERED NUCLEAR EXPLOSIONS  
 3986557 - PRODUCTION OF BITUMEN FROM TAR SANDS

## AZS CORPORATION

4063780 - METHOD OF RECOVERING LIQUID AND GASEOUS PRODUCTS OF OIL SHALE

## BAISCH J. CARROLL

4007791 - METHOD FOR RECOVERY OF CRUDE OIL FROM OIL WELLS

## CARNEL ENERGY, INC.

3948323 - THERMAL INJECTION PROCESS FOR RECOVERY OF HEAVY VISCOUS PETROLEUM  
 3993135 - THERMAL PROCESS FOR RECOVERING VISCOUS PETROLEUM

## CHEVRON RESEARCH COMPANY

3463231 - GENERATION AND USE OF FOAMED WELL CIRCULATION FLUIDS  
 3583488 - METHOD OF IMPROVING STEAM-ASSISTED OIL RECOVERY  
 3603389 - WELL LINER  
 3605890 - HYDROGEN PRODUCTION FROM A KEROGEN-DEPLETED SHALE FORMATION  
 3721707 - ORGANIC SULFONIC ACID OLIGOMERS AND PRODUCTION PROCESS  
 3892270 - PRODUCTION OF HYDROCARBONS FROM UNDERGROUND FORMATIONS  
 3994341 - RECOVERING VISCOUS PETROLEUM FROM THICK TAR SAND

## CITIES SERVICE COMPANY

3601193 - IN SITU RETORTING OF OIL SHALE  
 3628929 - METHOD FOR RECOVERY OF COAL ENERGY  
 3672450 - METHOD FOR IN SITU COMBUSTION IGNITION OF OIL SHALE  
 3692110 - IN SITU RETORTING AND HYDROGENATION OF OIL SHALE  
 3720263 - GAS WELL STIMULATION  
 3734180 - IN-SITU GASIFICATION OF COAL UTILIZING NON-HYPERSENSITIVE EXPLOSIVES  
 3734184 - METHOD OF IN SITU COAL GASIFICATION  
 3770398 - IN SITU COAL GASIFICATION PROCESS  
 3775073 - IN SITU GASIFICATION OF COAL BY GAS FRACTURING  
 3845196 - FIREFLOOD POLLUTION PREVENTION  
 3978920 - IN SITU COMBUSTION PROCESS FOR MULTI-STRATUM RESERVOIRS  
 3999606 - OIL RECOVERY RATE BY THROTTLING PRODUCTION WELLS DURING COMBUSTION DRIVE

SYNTHETIC FUELS I B 1- IN SITU - WELLS - FLUID INJECTION OR COMBUSTION

PAGE C 2

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING  
CITIES SERVICE RESEARCH AND DEVELOPMENT COMPANY

3882941 - IN SITU PRODUCTION OF BITUMEN FROM OIL SHALE

CLARK, FORRESTER A.

3675715 - PROCESSES FOR SECONDARILY RECOVERING OIL

CONTINENTAL OIL COMPANY

3422891 - RAPID BREAKTHROUGH IN SITU COMBUSTION PROCESS

3480081 - PRESSURE PULSING OIL PRODUCTION PROCESS

3480082 - IN SITU RETORING OF OIL SHALE USING CO/2\ CARRIER

3511282 - PRESTRESSED CONDUIT FOR HEATED FLUIDS

3765722 - METHOD FOR RECOVERING PETROLEUM PRODUCTS OR THE LIKE FROM SUBTERRANEAN MINERAL DEPOSITS

3809159 - PROCESS FOR SIMULTANEOUSLY INCREASING RECOVERY AND UPGRADING OIL IN A RESERVOIR

3823775 - METHOD FOR UPGRADING COAL GASIFICATION PRODUCTS

3856084 - BLEND BOREHOLE BACK-REAMING METHOD

3899026 - USE OF THERMAL INSULATING FLUIDS IN WELLS

4043395 - METHOD FOR REMOVING METHANE FROM COAL

4062405 - METHOD OF TREATING OIL-BEARING FORMATION USING MOLTEN SULFUR INSULATING

4109719 - METHOD FOR CREATING A PERMEABLE FRAGMENTED ZONE WITHIN A SUBTERRANEAN CARBONACEOUS DEPOSIT FOR IN SITU COAL GASIFICATION

DEUTSCHE ERDOL-AKTIENGESSELLSCHAFT

3456730 - PROCESS AND APPARATUS FOR THE PRODUCTION OF BITUMENS FROM UNDERGROUND DEPOSITS HAVING VERTICAL BURNING FRONT

3473610 - PROCESS FOR OBTAINING BITUMENS FROM UNDERGROUND DEPOSITS

DEUTSCHE TEXACO AKTIENGESSELLSCHAFT

3700035 - METHOD FOR CONTROLLABLE IN-SITU COMBUSTION

3772881 - APPARATUS FOR CONTROLLABLE IN-SITU COMBUSTION

3777816 - METHOD FOR THE IGNITION OF IN-SITU COMBUSTION FOR THE RECOVERY OF PETROLEUM

3941191 - METHOD OF CONSOLIDATING UNCONSOLIDATED OR INSUFFICIENTLY CONSOLIDATED FORMATIONS

4014721 - IGNITION MIXTURE FOR INITIATING UNDERGROUND IN-SITU COMBUSTION

4042026 - METHOD FOR INITIATING AN IN-SITU RECOVERY PROCESS BY THE INTRODUCTION OF OXYGEN

4057107 - METHOD OF INITIATING UNDERGROUND IN-SITU COMBUSTION

DOW CHEMICAL COMPANY

3606485 - METHOD OF RECOVERING MINERAL VALVES FROM AN UNDERGROUND FORMATION

3734188 - WELL CEMENTING AND STIMULATION METHOD

4022277 - IN SITU SOLVENT FRACTIONATION OF BITUMENS CONTAINED IN TAR SANDS

ELECTROFLOOD COMPANY

4037855 - METHOD FOR SECONDARY RECOVERY OF OIL

ELECTROTHERMIC CO.

3614986 - METHOD FOR INJECTING HEATED FLUIDS INTO MINERAL BEARING FORMATION

ESORCO CORPORATION

3964545 - PROCESSES FOR SECONDARILY RECOVERING OIL

EXXON PRODUCTION RESEARCH COMPANY

3525399 - TECHNIQUE FOR INSULATING A WELLBORE WITH SILICATE FOAM

3559738 - TECHNIQUE FOR STEAM INJECTION

3664424 - METHOD FOR INSULATING A WELL

3664425 - WELL INSULATION METHOD

3714985 - STEAM OIL RECOVERY PROCESS

## SYNTHETIC FUELS I B 1- IN SITU - WELLS - FLUID INJECTION OR COMBUSTION

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING  
(CONTINUED)

## EXXON PRODUCTION RESEARCH COMPANY

3739852 - THERMAL PROCESS FOR RECOVERING OIL  
3782470 - THERMAL OIL RECOVERY TECHNIQUE  
3861469 - TECHNIQUE FOR INSULATING A WELLBORE WITH SILICATE FOAM  
3946809 - OIL RECOVERY BY COMBINATING STEAM STIMULATION AND ELECTRICAL HEATING  
4024919 - TECHNIQUE FOR INSULATING A WELLBORE WITH SILICATE FOAM  
4065803 - METHOD FOR OIL RECOVERY USING A HORIZONTAL WELL WITH INDIRECT HEATING  
4091869 - IN SITU PROCESS FOR RECOVERY OF CARBONACEOUS MATERIALS FROM SUBTERRANEAN DEPOSITS  
4116275 - RECOVERY OF HYDROCARBONS BY IN SITU THERMAL EXTRACTION

## EXXON RESEARCH + ENGINEERING CO.

3999607 - RECOVERY OF HYDROCARBONS FROM COAL

## GCDE CORPORATION

3980137 - STEAM INJECTOR APPARATUS FOR WELLS

## GEOKINETICS, INC.

3980339 - PROCESS FOR RECOVERY OF CARBONACEOUS MATERIALS FROM SUBTERRANEAN DEPOSITS

## GETTY OIL COMPANY

3924883 - METHOD FOR ENHANCING THE RECOVERY OF OIL USING STEAM STIMULATION PROCESS

## GULF RESEARCH + DEVELOPMENT COMPANY

3422893 - CONDUCTION HEATING OF FORMATIONS  
3465826 - HIGH-TEMPERATURE  
4015864 - SHALE OIL RECOVERY PROCESS

## HALLIBURTON COMPANY

3502148 - METHOD OF IMPROVING BOND STRENGTH  
3842906 - WELL BORE CLEANER CONSTRUCTION

## IN SITU TECHNOLOGY, INC.

3924680 - METHOD OF PYROLYSIS OF COAL IN SITU  
3948320 - METHOD OF IN SITU GASIFICATION, COOLING AND LIQUEFACTION OF A SUBSURFACE COAL FORMATION  
3952802 - METHOD AND APPARATUS FOR IN SITU GASIFICATION OF COAL AND THE COMMERCIAL PRODUCTS DERIVED THEREFROM  
4010800 - PRODUCING THIN SEAMS OF COAL IN SITU  
4018481 - GASIFICATION OF COAL IN SITU  
4031956 - METHOD OF RECOVERING ENERGY FROM SUBSURFACE PETROLEUM RESERVOIRS  
4059451 - METHODS OF FLUIDIZED PRODUCTION OF COAL IN SITU  
4069868 - METHODS OF FLUIDIZED PRODUCTION OF COAL IN SITU  
4089372 - METHODS OF FLUIDIZED PRODUCTION OF COAL IN SITU  
4089374 - PRODUCING METHANE FROM COAL IN SITU  
4092052 - CONVERTING UNDERGROUND COAL FIRES INTO COMMERCIAL PRODUCTS  
4093025 - METHODS OF FLUIDIZED PRODUCTION OF COAL IN SITU  
4089567 - GENERATING MEDIUM BTU GAS FROM COAL IN SITU  
4102397 - SEALING AN UNDERGROUND COAL DEPOSIT FOR IN SITU PRODUCTION  
4113313 - RECOVERING URANIUM FROM COAL IN SITU  
4114688 - MINIMIZING ENVIRONMENTAL EFFECTS IN PRODUCTION AND USE OF COAL

## INTERNATIONAL SALT COMPANY

3858397 - CARRYING OUT HEAT-PROMOTABLE CHEMICAL REACTIONS IN SODIUM CHLORIDE FORMATION CAVERN

JUSTHEIM PETROLEUM COMPANY  
3766982 - METHOD FOR THE IN-SITU TREATMENT OF HYDROCARBONACEOUS MATERIALS

KOPPERS COMPANY INC.  
3990513 - METHOD OF SOLUTION MINING OF COAL  
MARATHON OIL COMPANY  
3470955 - LOW API GRAVITY CRUDE OIL RECOVERY PROCESS BY IN SITU COMBUSTION  
3482630 - IN SITU STEAM GENERATION AND COMBUSTION RECOVERY  
3498381 - METHOD FOR INJECTION OF HOT FLUIDS INTO AN UNDERGROUND FORMATION  
3604508 - USE OF OIL-EXTERNAL MICELLAR DISPERSIONS AS PLUGGING AGENTS IN SUBTERRANEAN FORMATIONS  
3620302 - SEALING PERMEABLE ZONES IN SUBTERRANEAN FORMATIONS WITH HEAT SENSITIVE SOLUTIONS  
3730270 - SHALE OIL RECOVERY FROM FRACTURED OIL SHALE  
3929193 - RECOVERY OF ORGANIC MATTER FROM ORGANIC MINERAL-CONTAINING DEPOSITS  
4084640 - COMBINED COMBUSTION FOR IN-SITU RETORTING OF OIL SHALES

MCDONNELL DOUGLAS CORPORATION  
3596993 - METHOD OF EXTRACTING OIL AND BY-PRODUCTS FROM OIL SHALE

MOBIL OIL CORPORATION  
3421583 - RECOVERING OIL BY CYCLIC STEAM INJECTION COMBINED WITH HOT WATER DRIVE  
3430696 - SHUT-OFF CONTROL FOR AN IN-SITU COMBUSTION PRODUCTION WELL  
3434541 - IN SITU COMBUSTION PROCESS  
3454095 - OIL RECOVERY METHOD USING STEAM STIMULATION OF SUBTERRANEAN FORMATION  
3467189 - METHOD FOR DETERMINING THE APPROACH OF A COMBUSTION FRONT ADJACENT A PRODUCTION WELL  
3468376 - THERMAL CONVERSION OF OIL SHALE INTO RECOVERABLE HYDROCARBONS  
3542131 - METHOD OF RECOVERING HYDROCARBONS FROM OIL SHALE  
3620301 - METHOD OF IN  
3637013 - IN-SITU COMBUSTION PROCESS USING TIME-DEPENDENT SHEAR-THINNING LIQUID BARRIER  
3710863 - TREATMENT OF FORMATIONS CONTAINING FRESH-WATER SWELLING CLAYS  
3794113 - COMBINATION IN SITU COMBUSTION DISPLACEMENT AND STEAM STIMULATION OF PRODUCING WELLS  
3823776 - OIL RECOVERY METHOD BY OXIDATION AND FORMING SURFACTANTS IN SITU  
3880337 - PREVENTION OF SCALE IN PETROLEUM PRODUCTION BY ALKALINE FLOODS  
3950029 - IN SITU RETORTING OF OIL SHALE  
4015663 - METHOD OF SUBTERRANEAN STEAM GENERATION BY IN SITU COMBUSTION OF COAL  
4019577 - THERMAL ENERGY PRODUCTION BY IN SITU COMBUSTION OF COAL

MOTCO, INC.  
3833059 - HOT GAS APPARATUS FOR RECOVERY OF OIL VALUES

NEW MEXICO TECH RESEARCH FOUNDATION  
3973628 - IN SITU SOLUTION MINING OF COAL

OCCIDENTAL OIL SHALE, INC.  
4029360 - METHOD OF RECOVERING OIL AND WATER FROM IN SITU OIL SHALE RETORT FLUE GAS  
4036299 - ENRICHING OFF GAS FROM OIL SHALE RETORT  
4043895 - IN SITU RECOVERY OF SHALE OIL  
4043597 - MULTIPLE LEVEL PREPARATION OF OIL SHALE RETORT  
4043598 - MULTIPLE ZONE PREPARATION OF OIL SHALE RETORT  
4047760 - IN SITU RECOVERY OF SHALE OIL  
4072350 - MULTI-STAGE METHOD OF OPERATING AN IN SITU OIL SHALE RETORT  
4076312 - METHOD AND APPARATUS FOR RETORTING OIL SHALE AT SUBATMOSPHERIC PRESSURE



## SYNTHETIC FUELS I B 1- IN SITU - WELLS - FLUID INJECTION OR COMBUSTION

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING  
(CONTINUED)

OCCIDENTAL OIL SHALE, INC.  
 4082146 - LOW TEMPERATURE OXIDATION OF HYDROGEN SULFIDE IN THE PRESENCE OF OIL SHALE  
 4088962 - DECREASING HYDROGEN SULFIDE CONCENTRATION OF A GAS  
 4086963 - METHOD OF OXIDIZING HYDROGEN SULFIDE  
 4089375 - IN SITU RETORTING WITH WATER VAPORIZED IN SITU  
 4093026 - REMOVAL OF SULFUR DIOXIDE FROM PROCESS GAS USING TREATED OIL SHALE AND WATER  
 4105072 - PROCESS FOR RECOVERING CARBONACEOUS VALUES FROM POST IN SITU OIL SHALE RETORTING  
 4109718 - METHOD OF BREAKING SHALE OIL-WATER EMULSION  
 4109964 - METHOD FOR PRECONDITIONING OIL SHALE PRELIMINARY TO EXPLOSIVE EXPANSION AND IN SITU RETORTING THEREOF  
 4119070 - SUBTERRANEAN IN SITU OIL SHALE RETORT AND METHOD FOR MAKING AND OPERATING SAME  
 4118071 - IN SITU OIL SHALE RETORT WITH A HORIZONTAL SILL PILLAR  
 4119345 - IN SITU OIL SHALE RETORTING PROCESS USING INTRODUCTION OF GAS AT AN INTERMEDIATE LOCATION  
 4121663 - REMOVING HYDROGEN SULFIDE FROM A GAS  
 4125157 - REMOVING SULFUR DIOXIDE FROM GAS STREAMS WITH RETORTED OIL SHALE  
 4126180 - METHOD OF ENHANCING YIELD FROM AN IN SITU OIL SHALE RETORT

## OCCIDENTAL PETROLEUM CORPORATION

3915498 - OIL SHALE RETORT FLUE GAS COOLING AND CLEANING  
 3951456 - PROCESS FOR EFFECTING EVEN RETORT WORKING FLUID FLOW THROUGHOUT AN IN SITU RETORT CONTAINING CARBONACEOUS DEPOSITS  
 3952801 - METHOD FOR IGNITING OIL SHALE RETORT  
 3994343 - PROCESS FOR IN SITU OIL SHALE RETORTING WITH OFF GAS RECYCLING  
 4005752 - METHOD OF IGNITING IN SITU OIL SHALE RETORT WITH FUEL RICH FLUE GAS  
 4007963 - OIL COLLECTION AND RECOVERY SYSTEM FOR IN SITU OIL SHALE RETORT  
 4014575 - SYSTEM FOR FUEL AND PRODUCTS OF OIL SHALE RETORT  
 4022511 - RECOVERY OF LIQUID AND GASEOUS PRODUCTS FROM AN IN SITU OIL SHALE RETORT  
 4027917 - METHOD FOR IGNITING THE TOP SURFACE OF OIL SHALE IN AN IN SITU RETORT  
 4087130 - PROCESS FOR THE GASIFICATION OF COAL IN SITU

## OTISCA INDUSTRIES LTD.

4027731 - METHODS OF AND APPARATUS FOR HYDROCARBON RECOVERY

## PAN AMERICAN PETROLEUM CORPORATION

RECOVERY OF PETROLEUM BY THERMAL METHODS INVOLVING TRANSFER OF HEAT FROM ONE SECTION OF AN OIL-BEARING FORMATION TO ANOTHER  
 3430700 - HER  
 3434544 - METHOD FOR CONDUCTING CYCLIC STEAM INJECTION IN RECOVERY OF HYDROCARBONS  
 3460621 - CYCLIC STEAM INJECTION AND GAS DRIVE  
 3464431 - OIL RECOVERY FROM FORMATIONS CONTAINING CHANNELS  
 3481399 - RECOVERY OF OIL BY FLASHING OF HEATED CONDENSATE WATER  
 3504745 - USE OF SANDS DURING IN-SITU COMBUSTION  
 3547195 - PYROLYTIC PLUGGING OF OIL-BEARING FORMATIONS BY UNDERGROUND COMBUSTION  
 3566987 - THERMAL PLUGGING WITH SILICATE SOLUTIONS

## PARSONS, RALPH M., COMPANY

3881950 - IN SITU RECOVERY OF HYDROCARBONS FROM TAR SANDS

## PETRO-CANADA EXPLORATION INC.

4084637 - METHOD OF PRODUCING VISCOUS MATERIALS FROM SUBTERRANEAN FORMATIONS

## PETROFINA CANADA LTD.

3825066 - PROCESS FOR DEVELOPING INTERWELL COMMUNICATION IN A TAR SAND

SYNTHETIC FUELS I B.1- IN SITU - WELLS - FLUID INJECTION OR COMBUSTION  
 ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING  
 PETROLITE CORPORATION  
 3782472 - STEAM INJECTION OF OIL FORMATIONS

PHILLIPS PETROLEUM COMPANY  
 3420298 - AVOIDING CASING DAMAGE DURING DIRECT STEAM DRIVE OIL PRODUCTION  
 3451479 - INSULATING A CASING AND TUBING STRING IN AN OIL WELL FOR A HOT FLUID DRIVE  
 3454958 - PRODUCING OIL FROM NUCLEAR-PRODUCED CHIMNEYS IN OIL SHALE  
 3455384 - METHOD OF CONTROLLING STEAM INJECTION INTO A RESERVOIR IN THE PRODUCTION OF HYDROCARBONS  
 3456731 - IN-SITU PRODUCTION OF OIL FROM STRATA OF LOW PERMEABILITY  
 3456734 - PROTECTION OF WELL CASING FROM THERMAL OVERSTRESSING  
 3457995 - IGNITING AN UNDERGROUND FORMATION  
 3457996 - THERMAL OIL RECOVERY PROCESS UTILIZING DECOMPOSITION OF CO  
 3460520 - RECOVERING OIL FROM NUCLEAR CHIMNEYS IN OIL-YIELDING SOLIDS  
 3465822 - THERMAL OIL STIMULATION PROCESS  
 3490529 - PRODUCTION OF OIL FROM A NUCLEAR CHIMNEY IN AN OIL SHALE BY IN SITU COMBUSTION  
 3490530 - INITIATING IN AUTOIGNITIBLE COMPOSITION  
 3490531 - THERMAL OIL STIMULATION PROCESS  
 3499489 - PRODUCING OIL FROM NUCLEAR-PRODUCED CHIMNEYS IN OIL SHALE  
 3499490 - METHOD FOR PRODUCING OXYGENATED PRODUCTS FROM OIL SHALE  
 3521709 - PRODUCING OIL FROM OIL SHALE BY HEATING WITH HOT GASES  
 3538472 - PROTECTING THE CASING OF A HOT FLUID INJECTION WELL WITH VAPORIZABLE LIQUID  
 3545544 - RECOVERY OF HYDROCARBONS BY IN SITU COMBUSTION  
 3548938 - IN SITU METHOD OF PRODUCING OIL FROM OIL SHALE  
 3550685 - SHALE OIL PRODUCTION  
 3554285 - PRODUCTION AND UPGRADING OF HEAVY VISCOUS OILS  
 3565174 - METHOD OF IN SITU COMBUSTION WITH INTERMITTENT INJECTION OF VOLATILE LIQUID  
 3580336 - PRODUCTION OF OIL FROM A PUMPING WELL AND A FLOWING WELL  
 3581822 - METHOD OF PREVENTING CASING AND/OR TUBING DAMAGE IN STEAM INJECTION WELL  
 3583484 - PROCESS FOR IGNITING HYDROCARBON MATERIALS WITHIN A SUBTERRANEAN FORMATION  
 3587738 - IN SITU COMBUSTION PRODUCTION METHOD  
 3587739 - METHOD OF REMOVING PERMEABILITY BLOCKS  
 3604507 - SINGLE WELL BACKFLOW IN SITU COMBUSTION PROCESS  
 3608637 - IN SITU COMBUSTION PRODUCTION METHOD  
 3618663 - SHALE OIL PRODUCTION  
 3680634 - AIDING AUTO-IGNITION IN TAR SAND FORMATION  
 3782467 - METHOD FOR REDUCING GAS PRODUCTION  
 3872924 - GAS CAP STIMULATION FOR OIL RECOVERY  
 3994345 - METHOD OF RECOVERING OIL USING STEAM  
 4072191 - FIRE FLOOR PROCESS  
 4085800 - PLUGGING EARTH STRATA  
 4113017 - HOT EFFLUENT FROM PARTIAL OXIDATION OF NATURAL GAS INJECTED IN OIL RECOVERY PROCESS

RADON DEVELOPMENT CORPORATION  
 3837402 - PROCESS FOR REMOVING OIL FROM AROUND A WELLBORE

SENNECO OIL COMPANY  
 3602310 - METHOD OF INCREASING THE PERMEABILITY OF A SUBTERRANEAN HYDROCARBON BEARING FORMATION

SHELL CANADA LIMITED  
 4064942 - AQUIFER-PLUGGING STEAM SOAK FOR LAYERED RESERVOIR

## SYNTHETIC FUELS I B 1- IN SITU - WELLS - FLUID INJECTION OR COMBUSTION

ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

SHELL OIL COMPANY  
 3422890 - TREATMENT OF SUBSURFACE OIL-BEARING FORMATIONS WITH OIL-WETTING CATIONIC EMULSIONS  
 3424249 - CLEANING STEAM INJECTION WELL TUBING STRING IN SITU  
 3438442 - LOW-TEMPERATURE PACKER  
 3438443 - SILICA-DISSOLUTION PREVENTION IN OIL RECOVERY  
 3439742 - METHOD OF PRODUCING HYDROCARBONS FROM AN UNDERGROUND FORMATION  
 3448B07 - PROCESS FOR THE THERMAL RECOVERY OF HYDROCARBONS FROM AN UNDERGROUND FORMATION  
 3455391 - PROCESS FOR HORIZONTALLY FRACTURING SUBTERRANEAN EARTH FORMATIONS  
 3455392 - THERMOAUGMENTATION OF OIL PRODUCTION SUBTERRANEAN RESERVOIRS  
 3474862 - REVERSE COMBUSTION METHOD OF RECOVERING OIL FROM STEEPLY DIPPING RESERVOIR INTERVAL  
 3478825 - METHOD OF INCREASING THE VOLUME OF A PERMEABLE ZONE WITHIN AN OIL SHALE FORMATION  
 3481398 - PERMEABILIZING BY ACIDIZING OIL SHALE TUFFACEOUS STREAKS IN AND OIL RECOVERY THEREFROM  
 3500913 - METHOD OF RECOVERING LIQUEFIABLE COMPONENTS FROM A SUBTERRANEAN EARTH FORMATION  
 3501201 - METHOD OF PRODUCING SHALE OIL FROM A SUBTERRANEAN OIL SHALE FORMATION  
 3502372 - PROCESS OF OIL  
 3513913 - OIL RECOVERY FROM OIL SHALES BY TRANSVERSE COMBUSTION  
 3513914 - METHOD FOR PRODUCING SHALE OIL FROM AN OIL SHALE FORMATION  
 3515213 - SHALE OIL RECOVERY PROCESS USING HEATED OIL - MISCIBLE FLUIDS  
 3527303 - THERMAL SECONDARY RECOVERY  
 3537528 - METHOD FOR PRODUCING SHALE OIL FROM AN EXFOLIATED OIL SHALE FORMATION  
 3537529 - METHOD OF INTERCONNECTING A PAIR OF WELLS EXTENDING INTO A SUBTERRANEAN OIL SHALE FORMATION  
 3563312 - METHOD OF RECOVERING HYDROCARBONS FROM AN UNDERGROUND HYDROCARBON CONTAINING FORMATION  
 3565171 - METHOD FOR PRODUCING SHALE OIL FROM A SUBTERRANEAN OIL SHALE FORMATION  
 3572838 - RECOVERY OF ALUMINUM COMPOUNDS AND OIL FROM OIL SHALE FORMATIONS  
 3578080 - METHOD OF PRODUCING SHALE OIL FROM AN OIL SHALE FORMATION  
 3593789 - METHOD FOR PRODUCING SHALE OIL FROM AN OIL SHALE FORMATION  
 3593790 - METHOD FOR PRODUCING SHALE OIL FROM AN OIL SHALE FORMATION  
 3650327 - THERMAL INSULATION OF WELLS  
 3669188 - HEAT-GUIDED HYDROXIDE PLUGGING  
 3682244 - CONTROL OF A STEAM ZONE  
 3682246 - FRACTURING TO INTERCONNECT WELLS  
 3695354 - HALOGENATING EXTRACTION OF OIL FROM OIL SHALE  
 3700280 - METHOD OF PRODUCING OIL FROM AN OIL SHALE FORMATION CONTAINING NAHCOLITE AND DAWSONITE  
 3707193 - GAS-STRENGTHENED STEAM FOAM WELL CLEANING  
 3727686 - OIL RECOVERY BY OVERLYING COMBUSTION AND HOT WATER DRIVES  
 3759328 - LATERALLY EXPANDING OIL SHALE PERMEABILIZATION  
 3779602 - PROCESS FOR SOLUTION MINING NAHCOLITE  
 3804172 - METHOD FOR THE RECOVERY OF OIL FROM OIL SHALE  
 3880238 - SOLVENT/NON-SOLVENT PYROLYSIS OF SUBTERRANEAN OIL SHALE  
 3894769 - RECOVERING OIL FROM A SUBTERRANEAN CARBONACEOUS FORMATION  
 3945679 - SUBTERRANEAN OIL SHALE PYROLYSIS WITH PERMEATING AND CONSOLIDATING STEPS  
 3977469 - CONSERVATION OF WATER FOR CORE FLOW  
 3987851 - SERIALY BURNING AND PYROLYZING TO PRODUCE SHALE OIL FROM A SUBTERRANEAN OIL SHALE  
 4026360 - HYDROTHERMALLY FORMING A FLOW BARRIER IN A LEACHED SUBTERRANEAN OIL SHALE FORMATION  
 4040483 - RECOVERY OF OIL BY CIRCULATING HOT FLUID THROUGH A GAS-FILLED PORTION OF A NETWORK INTERCONNECTED FRACTURES

SHUFFMAN, EXECUTRIX ROSE  
 4010803 - METHOD FOR CRYOTHERMAL FRACTURING OF ROCK FORMATIONS

SHUFFMAN, OSCAR  
 3759329 - CRYO-THERMAL PROCESS FOR FRACTURING ROCK FORMATIONS

SYNTHETIC FUELS I B I- IN SITU - WELLS - FLUID INJECTION OR COMBUSTION  
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SINCLAIR RESEARCH INC.

3420300 - METHOD AND APPARATUS FOR HEATING A SUBSURFACE FORMATION

STANDARD OIL COMPANY (INDIANA)

4074767 - METHOD USING LIGNOSULFONATES FOR HIGH-TEMPERATURE PLUGGING  
4105251 - DISPERSION OF CATALYSTS WITH EXPLOSIVES FOR IN SITU MINING OF CARBONACEOUS MINERALS  
4117886 - OIL SHALE RETORTING AND OFF-GAS PURIFICATION  
4120355 - METHOD FOR PROVIDING FLUID COMMUNICATION FOR IN SITU SHALE RETORT

STANDARD OIL COMPANY

3948755 - PROCESS FOR RECOVERING AND UPGRADING HYDROCARBONS FROM OIL SHALE AND TAR SANDS

ST. JOE MINERALS CORPORATION

3563606 - METHOD FOR IN-SITU UTILIZATION OF FUELS BY COMBUSTION

SUN OIL COMPANY OF PENNSYLVANIA

3452816 - IN SITU COMBUSTION METHOD  
3680633 - SITU COMBUSTION INITIATION PROCESS  
3712375 - METHOD FOR CATALYTICALLY HEATING WELLBORES  
3812913 - METHOD OF FORMATION CONSOLIDATION  
3905953 - MIST INJECTION METHOD AND SYSTEM

SYRACUSE UNIVERSITY RESEARCH CORPORATION

4130164 - PROCESS FOR COAL GASIFICATION

T. D. WILLIAMSON, INC.

3576043 - PIPELINE PIG WITH SPRING-MOUNTED SCRAPERS

TECHNOLOGY APPLICATION SERVICES CORPORATION

4067390 - APPARATUS AND METHOD FOR THE RECOVERY OF FUEL PRODUCTS FROM SUBTERRANEAN DEPOSITS OF CARBONACEOUS MATTER USING A PLASMA ARC

TENNECO OIL COMPANY

3441083 - METHOD OF SUBTERRANEAN FORMATION  
3500915 - METHOD OF PRODUCING AN OIL BEARING STRATUM OF A SUBTERRANEAN FORMATION IN A STEEPLY DIPPING RESERVOIR  
3500931 - METHOD FOR HEATING AN OIL RESERVOIR BY INJECTING ALTERNATE SLUDGE OF STEAM AND HIGHER SPECIFIC HEAT MATERIAL  
3524502 - STEAM INJECTION METHOD FOR PRODUCING OIL

TERRY; R. C.

4010801 - METHOD OF AND APPARATUS FOR IN SITU GASIFICATION OF COAL AND THE CAPTURE OF RESULTANT GENERATED HEAT

TEXACO EXPLORATION CANADA LTD.

3951457 - HYDRAULIC MINING TECHNIQUE FOR RECOVERING BITUMEN FROM TAR SAND DEPOSIT  
3978925 - METHOD FOR RECOVERY OF BITUMENS FROM TAR SANDS  
3993132 - THERMAL RECOVERY OF HYDROCARBONS FROM TAR SANDS  
4006778 - THERMAL RECOVERY OF HYDROCARBONS FROM TAR SANDS  
4026357 - IN SITU GASIFICATION OF SOLID HYDROCARBON MATERIALS IN A SUBTERRANEAN FORMATION  
4099566 - VISCOUS OIL RECOVERY METHOD  
4114690 - LOW-TEMPERATURE OXIDATION METHOD FOR THE RECOVERY OF HEAVY OILS AND BITUMEN  
4127172 - VISCIOUS OIL RECOVERY METHOD

SYNTHETIC FUELS I B 1- IN SITU - WELLS - FLUID INJECTION OR COMBUSTION  
 ASSIGNED PATENTING(1/69 - 12/78) - - ALPHA LISTING

TEXACO INC.  
 3444931 - METHOD OF TREATING CLAY-CONTAINING FORMATIONS WITH GUANIDINE SALT SOLUTION  
 3472318 - HYDROCARBON PRODUCTION BY SECONDARY RECOVERY  
 3476182 - METHOD OF HYDROCARBON PRODUCTION BY SECONDARY RECOVERY USING A MODIFIED INVERTED 9-SPOT WELL PATTERN  
 3499488 - SECONDARY OIL RECOVERY PROCESS USING STEAM  
 3515212 - OIL RECOVERY BY STEAM STIMULATION AND IN SITU COMBUSTION  
 3517744 - HYDROCARBON PRODUCTION BY IN-SITU COMBUSTION AND NATURAL WATER DRIVE  
 3520364 - METHOD AND APPARATUS FOR INITIATING IN SITU COMBUSTION  
 3524504 - WELL STIMULATION WITH VAPORIZATION OF FORMATION WATER  
 3542129 - OIL RECOVERY OF HIGH GRAVITY CRUDES  
 3543858 - STABILIZATION UNDERGROUND FORMATION  
 3638727 - METHOD OF TREATING A SUBTERRANEAN HYDROCARBON-BEARING FORMATION  
 3685581 - SECONDARY RECOVERY OF OIL  
 3732926 - METHOD FOR RECOVERY OF HYDROCARBONS UTILIZING STEAM INJECTION  
 3768558 - OIL RECOVERY PROCESS UTILIZING SUPERHEATED STEAM  
 3768559 - OIL RECOVERY PROCESS UTILIZING SUPERHEATED GASEOUS MIXTURES  
 3774682 - METHOD FOR INITIATING IN-SITU COMBUSTION  
 3774684 - HOT FLUID INJECTION INTO HYDROCARBON RESERVOIRS  
 3807500 - METHOD OF TREATING SUBTERRANEAN FORMATIONS TO IMPROVE PERMEABILITY  
 3814186 - SECONDARY RECOVERY FOR STEEPLY DIPPING RESERVOIRS COMBINED CELLAR AND ATTIC FLOODING  
 3822749 - METHOD OF TREATING SUBTERRANEAN FORMATIONS TO IMPROVE PERMEABILITY  
 3830300 - IN SITU COMBUSTION OIL RECOVERY METHOD  
 3845823 - METHOD FOR PREVENTING BOTTOM WATER CONING IN OIL WELLS  
 3847222 - TREATMENT OF AN UNDERGROUND FORMATION CONTAINING WATER-SENSITIVE CLAYS  
 3858654 - HYDRAULIC MINING TECHNIQUE FOR RECOVERING BITUMEN FROM SUBSURFACE TAR SAND DEPOSITS  
 3874452 - RECOVERY OF VISCOUS PETROLEUM FROM ASPHALTIC PETROLEUM CONTAINING FORMATIONS SUCH AS TAR SAND DEPOSITS  
 3905422 - METHOD FOR RECOVERING VISCOUS PETROLEUM  
 3946808 - PROCESS FOR RECOVERING HYDROCARBONS FROM A SUBTERRANEAN RESERVOIR BY IN SITU COMBUSTION  
 3964546 - THERMAL RECOVERY OF VISCOUS OIL  
 3965986 - METHOD FOR OIL RECOVERY IMPROVEMENT  
 3981362 - IN-SITU COMBUSTION METHOD FOR THE RECOVERY OF HYDROCARBONS  
 3987853 - METHOD FOR INCREASING THE OIL RECOVERY FROM ACTIVE WATER DRIVE RESERVOIRS  
 3991828 - THERMAL RECOVERY METHOD  
 3997004 - METHOD FOR RECOVERING VISCOUS PETROLEUM  
 4004636 - COMBINED MULTIPLE SOLVENT AND THERMAL HEAVY OIL RECOVERY  
 4007786 - SECONDARY RECOVERY OF OIL BY STEAM STIMULATION PLUS THE PRODUCTION OF ELECTRICAL ENERGY AND MECHANICAL POWER  
 4016932 - SURFACTANT OIL RECOVERY METHOD FOR USE IN HIGH TEMPERATURE FORMATIONS CONTAINING WATER HAVING HIGH SALINITY AND HARDNESS  
 4024915 - RECOVERY OF VISCOUS OIL BY UNHEATED AIR INJECTION, FOLLOWED BY IN SITU COMBUSTION  
 4026358 - METHOD OF IN SITU RECOVERY OF VISCOUS OILS AND BITUMENS  
 4034812 - METHOD FOR RECOVERING VISCOUS PETROLEUM FROM UNCONSOLIDATED MINERAL FORMATIONS  
 4042027 - RECOVERY OF PETROLEUM FROM VISCOUS ASPHALTIC PETROLEUM CONTAINING FORMATIONS INCLUDING TAR SAND DEPOSITS  
 4048078 - OIL RECOVERY PROCESS UTILIZING AIR AND SUPERHEATED STEAM  
 4059152 - THERMAL RECOVERY METHOD  
 4066127 - PROCESSES FOR PRODUCING BITUMEN FROM TAR SANDS AND METHODS FOR FORMING A GRAVEL PACK IN TAR SANDS  
 4068715 - METHOD FOR RECOVERING VISCOUS PETROLEUM  
 4079784 - METHOD FOR IN SITU COMBUSTION FOR ENHANCED THERMAL RECOVERY OF HYDROCARBONS FROM A WELL AND IGNITION SYSTEM THEREFOR  
 4083404 - OIL RECOVERY PROCESS UTILIZING AIR AND SUPERHEATED STEAM  
 4088188 - HIGH VERTICAL CONFORMANCE STEAM INJECTION PETROLEUM RECOVERY METHOD  
 4098336 - OIL RECOVERY PROCESS UTILIZING AIR AND SUPERHEATED STEAM  
 4109722 - THERMAL OIL RECOVERY METHOD  
 4109723 - THERMAL OIL RECOVERY METHOD  
 4114687 - SYSTEMS FOR PRODUCING BITUMEN FROM TAR SANDS

SYNTHETIC FUELS I B 1- IN SITU - WELLS - FLUID INJECTION OR COMBUSTION

TEXACO INC.  
4114691 - METHOD FOR CONTROLLING SAND IN THERMAL RECOVERY OF OIL FROM TAR SANDS (CONTINUED)  
4119566 - PRODUCTION OF NITROGEN-RICH GAS MIXTURES  
4124071 - HIGH VERTICAL AND HORIZONTAL CONFORMANCE VISCOUS OIL RECOVERY METHOD  
4127171 - METHOD FOR RECOVERING HYDROCARBONS  
4129183 - USE OF ORGANIC ACID CHROME COMPLEXES TO TREAT CLAY CONTAINING FORMATIONS

TEXACO TRINIDAD, INC.  
3530939 - METHOD OF TREATING ASPHALTIC TYPE RESIDUES

TRW INC.  
4059308 - PRESSURE SWING RECOVERY SYSTEM FOR OIL SHALE DEPOSITS  
4065183 - RECOVERY SYSTEM FOR OIL SHALE DEPOSITS  
4083604 - THERMOMECHANICAL FRACTURE FOR RECOVERY SYSTEM IN OIL SHALE DEPOSITS

TUBIN; E. SAM  
4127169 - SECONDARY OIL RECOVERY METHOD AND SYSTEM

UNION OIL COMPANY OF CALIFORNIA  
4046199 - STEAM INJECTION APPARATUS AND METHOD

UNITED STATES OF AMERICA, ATOMIC ENERGY COMMISSION  
3794116 - SITU COAL BED GASIFICATION

UNITED STATES OF AMERICA, DEPARTMENT OF ENERGY  
3933447 - UNDERGROUND GASIFICATION OF COAL  
3997005 - METHOD FOR CONTROL OF SUBSURFACE COAL GASIFICATION  
4026356 - METHOD FOR IN SITU GASIFICATION OF A SUBTERRANEAN COAL BED  
4062404 - METHOD FOR IN SITU COMBUSTION  
4069867 - CYCLIC FLOW UNDERGROUND COAL GASIFICATION PROCESS  
4095650 - METHOD FOR INCREASING THE CALORIFIC VALUE OF GAS PRODUCED BY THE IN SITU COMBUSTION OF COAL  
4096942 - METHODS FOR MINIMIZING PLASTIC FLOW OF OIL SHALE DURING IN SITU RETORTING  
4122897 - IN SITU GASIFICATION PROCESS FOR PRODUCING PRODUCT GAS ENRICHED IN CARBON MONOXIDE AND HYDROGEN

UNITED STATES OF AMERICA, NATIONAL AERONAUTICS AND SPACE ADM  
4081190 - IN-SITU LASER RETORTING OF OIL SHALE

WATASE KINICHI  
3864208 - GEOTHERMAL-NUCLEAR WASTE DISPOSAL AND CONVERSION SYSTEM

WORLD ENERGY SYSTEMS  
3982592 - IN SITU HYDROGENATION OF HYDROCARBONS IN UNDERGROUND FORMATIONS  
4050915 - INSITU HYDROGENATION OF HYDROCARBONS IN UNDERGROUND FORMATIONS  
4078613 - DOWNHOLE RECOVERY SYSTEM

W. R. GRACE + CO.  
3603397 - INTRINSIC MOBILITY CONTROL IN PETROLEUM RECOVERY

INVENTOR NAME	INVENTOR ADDRESS	CITY	ST	ZIP/CNTRY
ALEXANDER	HARVEY C. DOMHOLE VALVE FOR PARAFFIN CONTROL	ODESSA	TX	79762
ANTONOVA	ROZA IVANOVA	MOSCOW	SU	91406
BODINE	3990514 - METHOD OF CONNECTION OF WELLS	VAN NUYS	CA	91406
CLINGMAN	4083402 - METHOD OF UNDERGROUND GASIFICATION OF A COAL BED	OKLAHOMA CITY	OK	73120
COOPER	39952800 - SONIC TECHNIQUE FOR AUGMENTING THE FLOW OF OIL FROM OIL BEARING FORMATIONS	OKMULGEE	OK	74447
DEWELL	4057106 - HOT WATER FLOOD	LIBERTY	MO	64068
DISNEY	4063416 - STEAM GENERATOR	TULSA	OK	74103
DRIVER	4067391 - IN-SITU EXTRACTION OF ASPHALTIC SANDS BY COUNTER-CURRENT HYDROCARBON VAPORS	ARNOLD	MD	21012
DUFOR	4018279 - IN SITU COAL COMBUSTION HEAT RECOVERY METHOD	VERDUN, QUEBEC	CA	91711
FEDOROV	4089373 - SITU COAL COMBUSTION HEAT RECOVERY METHOD	MOSCOW	SU	91711
FISHER	4022279 - FORMATION CONDITIONING PROCESS AND SYSTEM	MONTREAL, QUEBEC	CA	91711
FISHER	3986558 - PETROLEUM EXTRACTION METHOD AND ASSEMBLY	MONTREAL, QUEBEC	CA	91711
FISHER	3990514 - METHOD OF CONNECTION OF WELLS	MONTREAL, QUEBEC	CA	91711
FISHER	3972372 - EXTRACTION OF HYDROCARBONS IN SITU FROM UNDERGROUND HYDROCARBON DEPOSITS	MONTREAL, QUEBEC	CA	91711
FISHER	4008762 - EXTRACTION OF HYDROCARBONS IN SITU FROM UNDERGROUND HYDROCARBON DEPOSITS	MONTREAL, QUEBEC	CA	91711
FISHER	4043393 - EXTRACTION FROM UNDERGROUND COAL DEPOSITS	MONTREAL, QUEBEC	CA	91711
FISHER	4116273 - INDUCTION HEATING OF COAL IN SITU	MONTREAL, QUEBEC	CA	91711
FISHER	4116273 - INDUCTION HEATING OF COAL IN SITU	MONTREAL, QUEBEC	CA	91711
FISHER	3972372 - EXTRACTION OF HYDROCARBONS IN SITU FROM UNDERGROUND HYDROCARBON DEPOSITS	MONTREAL, QUEBEC	CA	91711
FISHER	4008762 - EXTRACTION OF HYDROCARBONS IN SITU FROM UNDERGROUND HYDROCARBON DEPOSITS	MONTREAL, QUEBEC	CA	91711
FISHER	4043393 - EXTRACTION FROM UNDERGROUND COAL DEPOSITS	MONTREAL, QUEBEC	CA	91711
GARRETT	4057293 - PROCESS FOR IN SITU CONVERSION OF COAL OR THE LIKE INTO OIL AND GAS	CLAREMONT	CA	91711
GARTE	3941423 - METHOD OF AND APPARATUS FOR EXTRACTING OIL FROM OIL SHALE	SCITUATE	MA	02066

## SYNTHETIC FUELS

INVENTOR NAME	INVENTOR NAME	STREET	CITY	ST	ZIP/CNTRY	PAGE D
4033411 - GAINS	ELFRICA GERSHEVNA	3301 NASSAU DRIVE	MOSCOW	TX	77586	2
4086960 - HAYNES	METHOD OF CONNECTION OF WELLS	2301 NASSAU DRIVE	SEABROOK	TX	77586	
3986556 - HAYNES	METHOD OF CONNECTION OF WELLS	3308 TIPPS DR.	NEDERLAND	TX	77627	
4079585 - HELLEUR	METHOD OF CONNECTION OF WELLS	3308 TIPPS DRIVE	NEDERLAND	TX	77627	
4011906 - HUDSON	METHOD OF CONNECTION OF WELLS	221 MORTLAKE AVENUE	ST. LAMBERT, QUEBEC	TX	CA	
4121662 - KILBURN	DOWNHOLE VALVE FOR PARAFFIN CONTROL	2422 BEECHWOOD	ODESSA	TX	79761	
4036298 - KREININ	WATER PURIFICATION WITH FRAGMENTED OIL SHALE	3060 B-1/2 RD.	GRAND JUNCTION	CO	81501	
3990514 - KREININ	METHOD OF CONNECTION OF WELLS	STARVE KUZMINKI 127A KVARTAL,	MOSCOW	CO	SU	
4024914 - KREININ	METHOD OF CONNECTION OF WELLS	STARVE KUZMINKI, 127A KVARTAL,	MOSCOW	CO	SU	
4083402 - LEKAS	METHOD OF CONNECTION OF WELLS	ULITSA CHUGUNNYE VORDTA, 21, K	MOSCOW	CO	SU	
4037657 - NEBOLSTINE	PROCESS FOR RECOVERY OF CARBONACEOUS MATERIALS FROM SUBTERRANEAN DEPOSITS BY IN SITU PROCESSING	1015 BERMUDA DRIVE	CONCORD	CA	94518	
3945436 - REYNOLDS	METHOD AND APPARATUS FOR CLEANSING WELL LINER AND ADJACENT FORMATIONS	64 E. 86TH ST.	NEW YORK	NY	10028	
4089373 - REYNOLDS	SITU COAL COMBUSTION HEAT RECOVERY METHOD	6111 E. SKELLY DR.	TULSA	OK	74135	
4018279 - STODDARD	IN SITU COAL COMBUSTION HEAT RECOVERY METHOD	6111 E. SKELLY DRIVE	TULSA	OK	74135	
4058164 - TERRY	HEATING MINE WATER FOR RECOVERY OF IMMOBILE HYDROCARBONS	2617 W. 27TH AVE.	DENVER	CO	80212	
3987852 - TERRY	METHOD OF AND APPARATUS FOR IN SITU GASIFICATION OF COAL AND THE CAPTURE OF RESULTANT GENERATED HEAT	1330 GAYLORD	DENVER	CO	80206	
4058164 - VANDERGRIFT	HEATING MINE WATER FOR RECOVERY OF IMMOBILE HYDROCARBONS	3090 S. HIGH ST.	DENVER	CO	80210	
4099570 - VOLK	OIL PRODUCTION PROCESSES AND APPARATUS	264 SILVERBROOK WAY N.W.	CALGARY ALBERTA	CO	CA	
3990514 - VON HIPPEL	METHOD OF CONNECTION OF WELLS	ULITSA KROPOTKINSKAYA, 40, KV.	MOSCOW	CO	SU	
3865186 - VON HIPPEL	METHOD OF AND SYSTEM FOR GASIFYING UNDERGROUND DEPOSITS OF COAL	LATE OF P. O. OBERSTENWEILER	OBERSTENWEILER	CO	DT	
3865186 - ZVYAGINTSEV	METHOD OF AND SYSTEM FOR GASIFYING UNDERGROUND DEPOSITS OF COAL	ULITSA DOLGORUDNAYA, 13A, KV.	OBERSTENWEILER	CO	DT	
4036298 - ZVYAGINTSEV	METHOD OF CONNECTION OF WELLS BY IN-SITU COMBUSTION	ULITSA DOLGORUDNAYA, 13A, KV.	MOSCOW	CO	SU	



SYNTHETIC FUELS 1 B 1- IN SITU - WELLS - FLUID INJECTION OR COMBUSTION

PATENTS (1/63-12/78) WITH NEITHER ASSIGNMENT NOR INVENTOR INFORMATION IN DATABASE

3420302	- OIL PROCESSING SYSTEM						3074483	3076505
3437146	- METHOD OF REMOVING PARAFFIN FROM A WELL WITH HEATED SOLVENT						3100528	3101499
3480079	- WELL TREATING METHODS USING TEMPERATURE SURVEYS						3115928	3115929
3497335	- UNDERGROUND GASIFICATION OF COAL						3126955	3126957
3503968	- METHOD OF EXTRACTING AND CONVERTING PETROLEUM FROM OIL SHALE						3136324	3138202
3522842	- APPARATUS FOR OIL PRODUCTION AMPLIFICATION BY SPONTANEOUS EMISSION OF RADIATION						3150715	3153448
3522843	- APPARATUS FOR PRODUCTION AMPLIFICATION BY STIMULATED EMISSION OF RADIATION						3163216	3165154
3522846	- METHOD AND APPARATUS FOR PRODUCTION AMPLIFICATION BY SPONTANEOUS EMISSION OF RADIATION						3172475	3174544
3522847	- APPARATUS FOR CLEANING HEAT AMPLIFICATION BY STIMULATED EMISSION OF RADIATION						3193009	3195632
3522848	- APPARATUS FOR PRODUCTION AMPLIFICATION BY STIMULATED EMISSION OF RADIATION						3208527	3209822
3595316	- AGGREGATE PROCESS FOR PETROLEUM PRODUCTION						3223166	3225827
3599714	- METHOD OF RECOVERING HYDROCARBONS BY IN-SITU COMBUSTION						3240270	3244231
3620571	- SINGLE WELL HEATED GAS MINING AND RETURNING SYSTEM						3270813	3272261
3679264	- GEOTHERMAL IN SITU MINING AND RETURNING SYSTEM						3285335	3285336
3796265	- METHOD FOR PRODUCING HIGH HYDROGEN SULFIDE CONTENT GAS WELLS						3298439	3310109
3822747	- METHOD OF FRACTURING AND REPRESSURING SUBSURFACE GEOLOGICAL FORMATIONS EMPLOYING LIQUIFIED GAS						3323359	3324946
3837401	- HOT FLUID INJECTION INTO HYDROCARBON RESERVOIRS						3334687	3339634
3842908	- OPEN FLOW PRODUCTION SYSTEM AND METHOD FOR RECOVERY OF SHALLOW OIL RESERVOIRS						3349845	3349846
3852923	- MATERIAL REMOVING BIT						3358762	3360041
3853759	- DYNAMIC HYDRAULIC COLUMN ACTIVATION METHOD						3372750	3373805
3072184	3072185	3072186	3072187	3072188	3072189	3072190	3072191	3072196
3076506	3078487	3080919	3084919	3087540	3087541	3093191	3095325	3097690
3102588	3108639	3109491	3109492	3110345	3111986	3111987	3111987	3119619
3116792	3120264	3120271	3121462	3124198	3125072	3126954	3126955	3126956
3126960	3126961	3127935	3129757	3130781	3131761	3132692	3133591	3134435
3138203	3139928	3141502	3141504	3143169	3145772	3147804	3147805	3149670
3154143	3155160	3156299	3156299	3159215	3159216	3159217	3160208	3163215
3167117	3167121	3169580	3170915	3171479	3171482	3172467	3172468	3172470
3179167	3179169	3180411	3180412	3180414	3182721	3182722	3191679	3193008
3196945	3198249	3202219	3205943	3205944	3205947	3208514	3208519	3208520
3216498	3216499	3217800	3219108	3219110	3221811	3221812	3223158	3223165
3228468	3228471	3232345	3233658	3233671	3234879	3237692	3237696	3239405
3250327	3253652	3254711	3254716	3255820	3258073	3259185	3263750	3266572
3273640	3275076	3279538	3279540	3280910	3282344	3282348	3283814	3284281
3288216	3289416	3289763	3291215	3292699	3292701	3292702	3294167	3298434
3312284	3312285	3314476	3314477	3316020	3316962	3322194	3322195	3323590
3324948	3327782	3330353	3331438	3332480	3332482	3332488	3332489	3333637
3342257	3342258	3342260	3342261	3343598	3343608	3344856	3346044	3349843
3349848	3349849	3349850	3353593	3353602	3354958	3357487	3358754	3358759
3361202	3363686	3363687	3366176	3367417	3368622	3369601	3369604	3371713
3373813	3373814	3375870	3375871	3376928	3376929	3379248	3379249	3379254
3383359	3383360	3385362	3385363	3385366	3386504	3386507	3386508	3386512
3388744	3390725	3392783	3393732	3393733	3394759	3395756	3396791	3396792
3399722	3400760	3400762	3400763	3405761	3406755	3406756	3409077	3410345
3411575	3411578	3412793	3412794	3417818				

I.B. IN SITU CONVERSION: WELLS  
L. THERMAL EXPLOITATION BY FLUID INJECTION OR COMBUSTION

PATENTING UPDATE (1/79-8/79)

<u>Patent No.</u>	<u>Assignee &amp; Title</u>
4,133,380	<u>Occidental Oil Shale, Inc.:</u> Establishing A Combustion Zone Below A Sill Pillar In An In Situ Oil Shale Retort
4,133,381	<u>Occidental Oil Shale, Inc.:</u> Contacting Treated Oil Shale With Carbon Dioxide To Inhibit Leaching
4,133,382	<u>Texaco Canada Inc.:</u> Recovery Of Petroleum From Viscous Petroleum-Containing Formations Including Tar Sands
4,133,384	<u>Texaco Inc.:</u> Steam Flooding Hydrocarbon Recovery Process
4,136,737	<u>Texaco Inc.:</u> Method For Automatically Initiating In Situ Combustion For Enhanced Thermal Recovery Of Hydrocarbons From A Well
4,140,179	<u>Raytheon Company:</u> In Situ Radio Frequency Selective Heating Process
4,140,180	<u>IIT Research Institute:</u> Method For In Situ Heat Processing of Hydrocarbonaceous Formations
4,140,181	<u>Occidental Oil Shale, Inc.:</u> Two-stage Removal Of Sulfur Dioxide From Process Gas Using Treated Oil Shale
4,140,182	<u>Joseph A. Vriend, P.O. Box 505, Squamish, Canada:</u> Method Of Extracting Oil
4,140,184	<u>Ira C. Bechtold, 1987 Skyline Vista Dr., La Habre, CA 90631; H. Randall Emmerson, 47 Rockview Dr., Irvine, CA 92715:</u> Method For Producing Hydrocarbons From Igneous Sources
4,141,415	<u>Texaco Inc.:</u> Method Of Recovering Hydrocarbons By Improving The Vertical Conformance In Heavy Oil Formations
4,143,715	<u>The Dow Chemical Company:</u> Method For Bringing A Well Under Control
4,144,935	<u>IIT Research Institute:</u> Apparatus And Method For In Situ Heat Processing Of Hydrocarbonaceous Formations
4,146,272	<u>Occidental Oil Shale, Inc.:</u> Explosive Placement For Explosive Expansion Toward Spaced Apart Voids

- 4,147,213      Standard Oil Company:    Combustion Air Injection Well
- 4,147,388      Occidental Oil Shale, Inc.:    Method For In Situ Recovery  
Of Liquid And Gaseous Products From Oil Shale Deposits
- 4,147,389      Occidental Oil Shale, Inc.:    Method For Establishing A  
Combustion Zone In An In Situ Oil Shale Retort
- 4,148,358      Occidental Research Corporation:    Oxidizing Hydrocarbons,  
Hydrogen, And Carbon Monoxide
- 4,148,359      Shell Oil Company:    Pressure-Balanced Oil Recovery  
Process For Water Productive Oil Shale
- 4,149,595      Occidental Oil Shale, Inc.:    In Situ Oil Shale Retort With  
Variations In Surface Area Corresponding To Kerogen  
Content of Formation Within Retort Site
- 4,149,597      Texaco Exploration Canada Ltd.:    Method For Generating  
Steam
- 4,149,752      Occidental Oil Shale, Inc.:    Operation Of An In Situ Oil  
Shale Retort
- 4,150,722      Occidental Oil Shale, Inc.:    Determining The Locus Of A  
Retorting Zone In An Oil Shale Retort By Rate Of Shale  
Oil Production
- 4,151,877      Occidental Oil Shale, Inc.:    Determining The Locus Of A  
Processing Zone In A Retort Through Channels
- 4,153,110      Occidental Oil Shale, Inc.:    Ignition Of Fragmented Oil  
Shale Below A Sill Pillar In An In Situ Oil Shale Retort
- 4,153,298      Occidental Oil Shale, Inc.:    Removal Of Pillars From A  
Void For Explosive Expansion Toward The Void
- 4,156,421      Carmel Energy, Inc.:    Method And Apparatus For  
Producing Thermal Vapor Steam
- 4,156,461      Occidental Oil Shale, Inc.:    Decreasing Hydrocarbon,  
Hydrogen And Carbon Monoxide Concentration Of A Gas
- 4,156,462      Texaco, Inc.:    Hydrocarbon Recovery Process
- 4,156,463      Texaco, Inc.:    Viscous Oil Recovery Method
- 4,156,545      Freeport Minerals Company:    Process For Heating And  
Chemically Treating An Aqueous Process Fluid
- 4,158,467      Gulf Oil Corporation:    Process For Recovering Shale Oil
- 4,158,638      Gulf Research & Development Company:    Recovery Of Oil  
From Oil Shale

- 4,160,479 Reginald D. Richardson, 53 Vale Crest Dr., & Robert H. Shannon, 59 Valecrest Dr., both of Islington, Ontario, Canada M9A 4P5: Heavy Oil Recovery Process
- 4,160,481 The HOP Corporation: Method For Recovering Subsurface Earth Substances
- 4,161,217 Shell Oil Company: Hot Water Foam Oil Production Process
- 4,161,981 Texaco Development Corporation: Method For Recovering Hydrocarbons
- 4,162,706 Occidental Oil Shale, Inc.: Determining The Locus of A Processing Zone In An Oil Shale Retort By Monitoring Pressure Drop Across The Retort
- 4,162,707 Mobil Oil Corporation: Method of Treating Formation To Remove Ammonium Ions
- 4,162,808 Gulf Oil Corporation: In-Situ Retorting of Carbonaceous Deposits
- 4,163,475 Occidental Oil Shale, Inc.: Determining The Locus of A Processing Zone In An In Situ Oil Shale Retort
- 4,163,476 Texaco, Inc.: Secondary Recovery Process Utilizing An Acrylamido Alkanesulfonic Acid Polymer
- 4,164,979 Texaco, Inc.: Reservoir Stabilization By Treating Water Sensitive Clays