

LIST OF EQUIPMENT

No.	Description	Specification	Country/ Year of manufacture	Notes
1. Containment Boom				
1.1	RO-BOOM 2000 System	Total height: 2m Length: 450m	Denmark/1995	
1.2	Vikoma Hi-Sprint Boom System	Total height: 2m Length: 500m	UK/1999	
1.3	RO-BOOM 1000 System	Total height: 1m Length: 250m	Denmark/2002	
1.4	Crucial Fast Response Boom System	Total height: 0.75m Length: 800m	USA/1999	
1.5	Elastec Maximax I Solid Foam Filled Boom System	Total height: 0.75m Length: 400m	USA/1999	
2. Skimming System				
2.1	Foilex TSD 250 Skimmer	Pump Capacity: 140 m ³ /hr Driven by 30Kw Isolated Power-pack	Sweden/1999	
2.2	Crucial ORD 50 Disc Skimmer	Pump Capacity: 50 m ³ /hr Driven by 20Kw Isolated Power-pack	USA/1999	
2.3	Sea-Mop 4090 Skimmer	Pump Capacity: 35 m ³ /hr Four oil sticky ropes Driven by 25Kw Isolated Power-pack	Denmark/1995	
2.4	Ro-Skim 2000 Skimmer	Pump Capacity: 100 m ³ /hr Debris handling function Driven by 35Kw Isolated Power-pack	Denmark/1995	
2.5	4300-SH Skim-Pak Skimmer	Pump Capacity: 15T/hr Max Suction Lift: 26ft Max discharge head: 25ft	USA/1999	

No.	Description	Specification	Country/Year of manufacture	Notes
2.6	Ro-Mop Skimmer	Pump Capacity: 12 m ³ /hr Single oil sticky rope	PV Drilling/1999	
2.7	Disc Skimmer	Pump Capacity: 20 m ³ /hr Driven by 7.5Kw Isolated Diesel Hydraulic Power-pack	PV Drilling/2002	
3. Temporary Storage Tank				
3.1	Vikoma Floating storage Tank	Capacity: 25 (m ³) 02 units	UK/1999	
3.2	Ro-clean Floating storage Tank	Capacity: 25 (m ³) 02 units	Denmark/1995	
3.3	Ro-clean Floating storage Tank	Capacity: 10 (m ³) 01 unit	Denmark/2002	
3.4	Elastec Towable Blader Tank	Capacity: 5 (m ³) 02 units	USA/1999	
3.5	Ro-clean Open-top Tank	Capacity: 4 (m ³) 01 unit	Denmark/2002	
4. Dispersant Spraying Set				
4.1	TC3 (lifted by a helicopter)	Capacity: 910littres 01 unit	UK/1999	
4.2	Dispersant Spray Set (deployed from a vessel)	90 litter/min Side width rigged: 6m 02 units	PV Drilling/2001	
5. Oil Dispersant				
5.1	Superdispersant 25	Quantity: 40drums*200liters	UK/2001	
6. Waste Treating Equipment				
6.1	Incinerator Type 399	Max. recommended temperature 1450 ⁰ C Capacity: 500kg/time	Denmark/2002	
7. Shoreline Clean-up Equipment				
7.1	Aquila High Pressure Cleaner TD302	Working pressure: 30-300 Pa Water temprature: 99 ⁰ C	Denmark/2002	

		D: 275*160*160cm		
8. Sorbent				
8.1	Oil Sorbent Boom	Dimension: 8'' * 10' 600 units	Netherlands/2002	
8.2	Oil Sorbent Pad	Dimension: 17*19*3/8'' 10,000 units	Netherlands/2002	
8.3	Chemical Sorbent Boom	Dimension: 8'' * 10' 300 units	Netherlands/2002	
8.4	Chemical Sorbent Pad	Dimension: 17*19*3/8'' 3,000 units	Netherlands/2002	

Investment in 2003

Total capital: \$US 3-400,000.00

Offshore boom: 300m

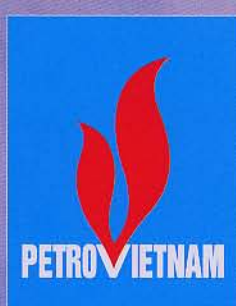
Inshore/ River boom: 300m

Skimming systems: 02 units

Fast boat 01 unit

Absorbent

Dispersant



RDCPSE

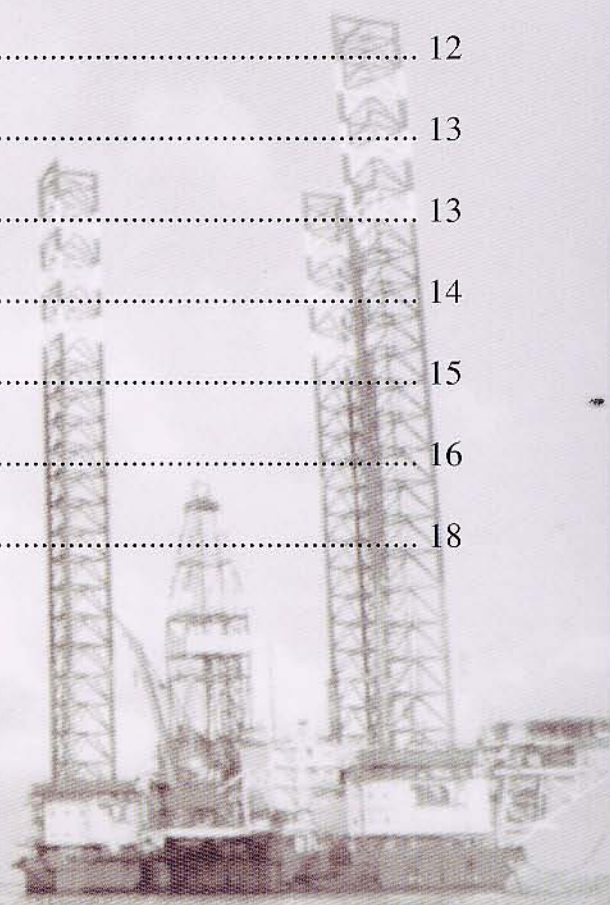
**TRUNG TÂM NGHIÊN CỨU, PHÁT TRIỂN VÀ DỊCH VỤ
VỀ AN TOÀN VÀ BẢO VỆ MÔI TRƯỜNG DẦU KHÍ**



**RESEARCH AND DEVELOPMENT CENTRE FOR
PETROLEUM SAFETY AND ENVIRONMENT (RDCPSE)**

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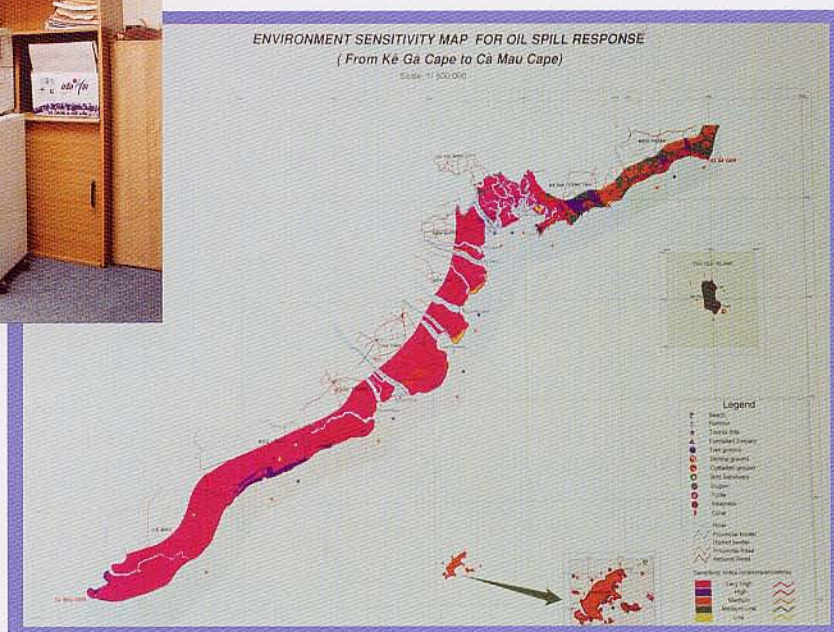
TỔNG CÔNG TY DẦU KHÍ VIỆT NAM
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VỀ AN TOÀN VÀ BẢO VỆ MÔI TRƯỜNG DẦU KHÍ
(TTAT & MTDK)

- Chứng nhận đăng ký hoạt động Khoa học Công nghệ số 256 do Bộ Khoa học, Công nghệ và Môi trường cấp ngày 16-3-1994.
- Chứng chỉ Hành nghề Tư vấn Xây dựng số 150 do Bộ Xây dựng cấp ngày 13-7-1998.
- Chứng nhận Hệ thống Quản lý Chất lượng theo Tiêu chuẩn ISO 9002 do AFAQ-ASCERT International cấp ngày 02-7-1999.
- Chứng nhận công nhận Phòng Thí nghiệm Kiểm tra Không phá hủy số 157/00CN02 và 157/00CN03, mã số: VR LAB.08, do Cục Đăng kiểm Việt Nam cấp ngày 04-12-2000.

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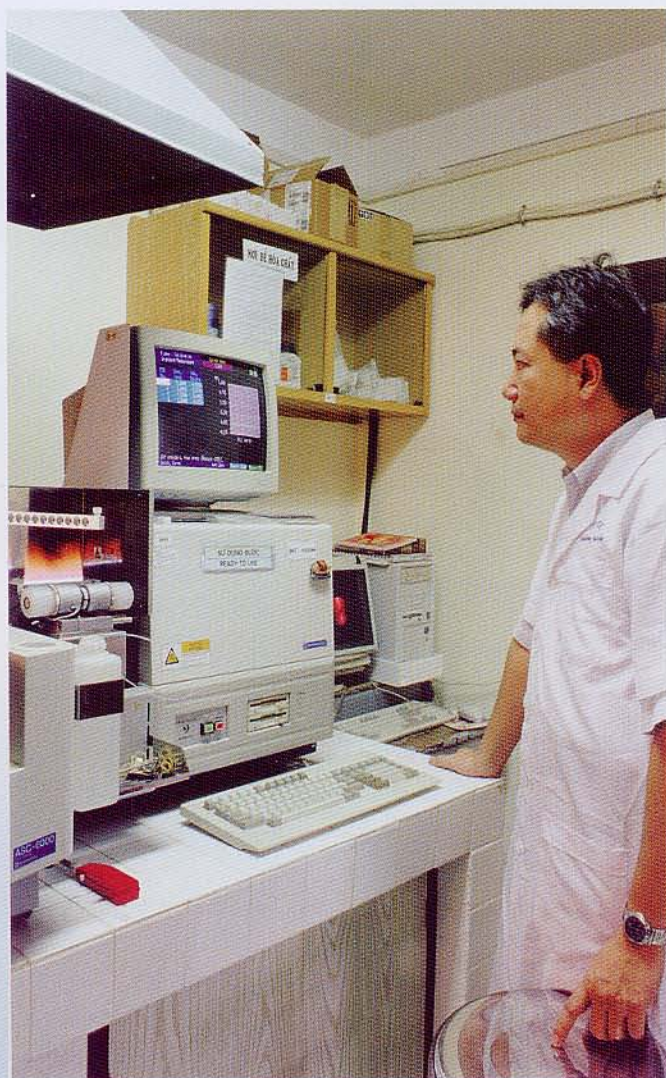
- License No. 256 for registration of the scientific and technological activities issued by Ministry of Science, Technology and Environment, dated March 16, 1994.
- License No. 150 for practice of consultancy in construction issued by Ministry of Construction, dated July 13, 1998.
- ISO 9002 Certificate of Quality Management System issued by AFAQ-ASCERT International, dated July 2, 1999.
- Accreditation Certificate of NDT Laboratory No. 157/00CN02 and 157/00CN03, number of Laboratory: VR LAB.08, issued by Vietnam Register Bureau, dated December 04, 2000.

ENVIRONMENT



- Surveying, assessing existing environment and setting up environmental database;
- Establishing Environmental Sensitivity Map;
- Preparing Environmental Impact Assessment reports for onshore/offshore petroleum exploration, appraisal and production activities; sea port; works of construction and installation for oil and gas pipelines, terminals; petroleum processing plant; refineries; petrochemical plant; and other industrial projects such as power-urea/chemicals plants;
- Establishing Oil Spill Response Plan for petroleum operations, port facilities, and coastal provinces;
- Carrying out services concerning environmental management and protection:
 - * Participating in supervision of implementing Law on Environmental Protection in petroleum activities and other industries;
 - * Assessing impacts and treatment of oil pollution resulted from oil spill incidents;
 - * Participating in the compilation of Regulation, Standard and Guideline concerning environmental protection;
 - * Consulting environmental aspects and establishing environmental management plan for the projects;
 - * Using Oil Spill, Air Emission, Wastewater Dispersion, Mud and Cutting Discharged Models to predict range and pollution levels of air, water and sediment.

LABORATORY



- Performance of onshore and offshore monitoring-surveys for the petroleum, chemical, construction, transportation, and agriculture projects; marine and riverine oil pollution events;
- To carry out monitoring-surveys and sampling of ambient atmospheres, stationary source emissions, examination of air pollutants such as SO_x, NO_x, CO, O₃, H₂S, hydrocarbons, particulate lead and lead compounds, dust...;
- Analytical performance of oil and grease, hydrocarbons, metals, pesticides residuals, phenols, organic matters, organic carbon, nitrogen, phosphorous, particle size... on samples of water, soils, pool, lake, riverine and marine sediments;
- Identifying pollution oil origin using gas-chromatography, gas-chromatography-mass, and fluorescence spectrometry;
- Oil weathering test in order to supply necessary data for plans of preventing and overcoming the consequence of oil-polluted incidents;
- Testing bioaccumulation of toxic agents in organisms tissues;
- Other analysis services;
- Activities of the RDCPSE laboratory are conducted in accordance with the quality management system of ISO 9002.

BIOLOGY



- The analysis and test procedures are qualitatively managed in accordance with the standard of ISO 9002;
- Ecotoxicological tests for environmental impact assessment of chemicals or products used in petroleum industry and others, including toxicity tests on marine and fresh water organisms; biodegradation tests (aerobic and anaerobic); and bioaccumulation tests;
- Environmental hazard assessment and risk management for toxic chemicals used and discharged offshore, using CHARM model;
- Biological analysis including microbiological and biochemical items for water samples such as E. coli, coliform, fecal coliform, total bacteria, sulphate reducing bacteria, BOD, COD,... classifying marine and fresh-water benthic fauna;
- Establishing Atlas of benthic fauna in Vietnam Southeastern Sea.

SAFETY

SAFETY

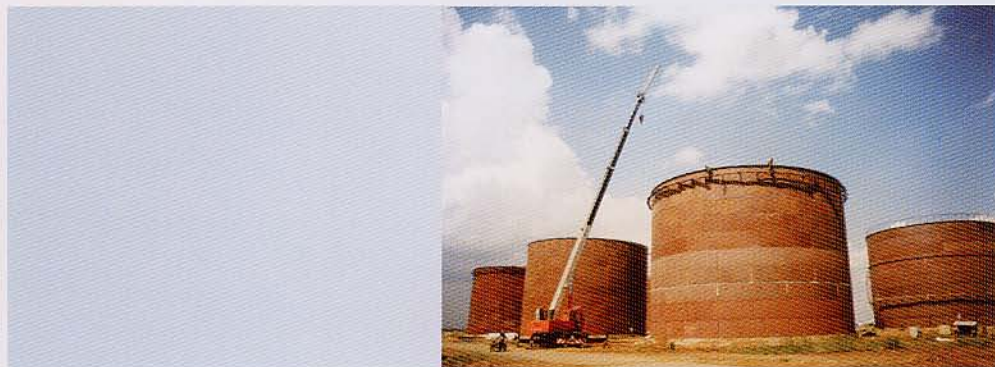
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SAFETY



It is RDCPSE's pride to be the leading unit of Vietnam oil and gas industry and of the nation in general to apprehend the new methodology of risk management methodology and its application in petroleum process system. Main activities comprise of:

- Carrying out technical services concerning Risk Assessment and Reliability of industrial equipment, such as:
 - * HAZOP study and other hazard identification methods for onshore and offshore process installations;
 - * Event tree analysis;
 - * Consequence analysis: jet fires, pool fires, BLEVEs, ball fires, vapor cloud explosions, dispersion of toxic releases ...;
 - * Quantitative Risk Assessment for onshore and offshore process installations;
 - * Emergency Response Plan for onshore and offshore process installations;
 - * Risk based inspection planning and services.
- Studying risk management, risk analysis and safety for process installations;
- Participating in establishment and development of modern safety management regulations, guidelines and standards;
- Consultancy in development and implementation of safety management system, safety system audit.

TECHNICAL INSPECTION

- Non-Destructive Testing for equipment in the industries of petroleum, electricity, chemical, metallic structures, metallurgy, ... in accordance with standards of TCVN, ASME, ANSI, AWS, API, BS, AS, JIS;
- Technical inspection and verification for metallic structures, pipelines, tanks, vessels and other equipment in accordance with national and international standards;
- RDCPSE technical staff is of:
 - * Much experiences and abilities for conducting inspection services
 - * More than 8 years of work experiences for the national and international projects
 - * Adequately obtained certificates in accordance to ISO 9712, DIN EN 473, ASNT-TC-1A;



- Being equipped with modern devices, technical inspection services carried out by RDCPSE conduce to the results of high quality and special reliability, typically by the following methods:
 - * Radiographic Testing (RT)
 - * Ultrasonic Testing (UT)
 - * Magnetic Particles Testing (MT)
 - * Liquid Penetrant Testing (PT)
 - * Electromagnetic Testing (ET)
 - * Leak Testing (LT)
 - * Hardness Testing (HT)
 - * Visual Testing (VT)
- The high quality of RDCPSE NDT services have been recognized by clients and international certifying agents such as Lloyd's Register, Brown & Root, DNV, EVN...

MÔI TRƯỜNG LAO ĐỘNG

- Đạt Chứng chỉ huấn luyện nghiệp vụ về Kỹ thuật An toàn - Bảo hộ lao động, Vệ sinh lao động, Sức khỏe và Bệnh nghề nghiệp do Sở Lao động, Thương binh và Xã hội T/p. Hồ Chí Minh, Viện vệ sinh y tế công cộng, Bộ y tế và các Tổ chức quốc tế chuyên ngành cấp;
- Triển khai các hoạt động đo đạc, khảo sát, giám sát và phân tích đánh giá về an toàn lao động và vệ sinh lao động;
- Triển khai các nghiên cứu khoa học về môi trường lao động, bảo hộ lao động, sức khỏe và bệnh nghề nghiệp;
- Tham gia soạn thảo các quy định, tiêu chuẩn, các hướng dẫn về quản lý an toàn lao động và vệ sinh lao động.

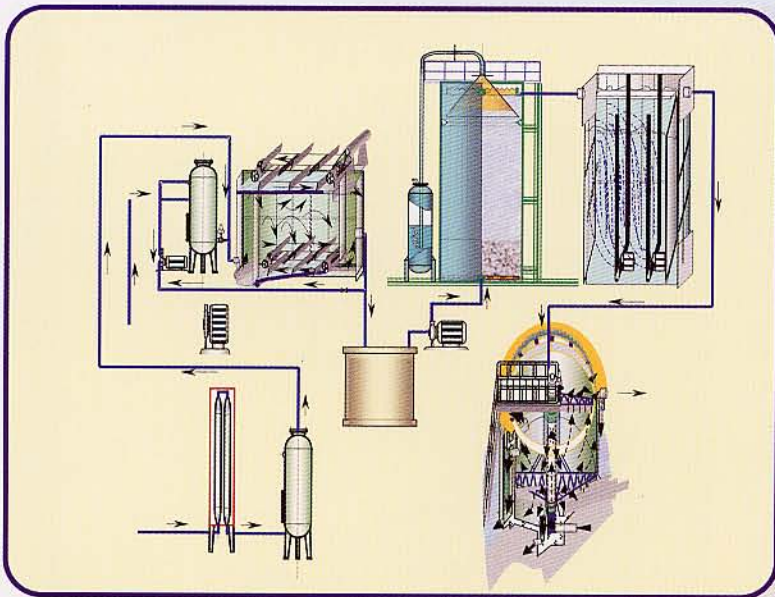


WORKING ENVIRONMENT

- Certificates of Professional Qualification on Safety Techniques, Labor Safety and Hygiene, Health and Occupational Disease issued by Labor, War Invalids and Social Affairs Service of Hochiminh City, Public Health & Hygiene Institute, Ministry of Public Health, and other international organizations;
- Developing operations of measurement, survey, supervision, analysis and assessment of occupational health and safety;
- Developing scientific researchs on working environment, labor protection and occupational health;
- Participating in compilation of Regulations, Standards, and Instructions on management of labor protection and occupational hygiene.

XỬ LÝ CHẤT THẢI

- Nghiên cứu về quản lý và xử lý chất thải phát sinh từ hoạt động của các ngành công nghiệp, đặc biệt là công nghiệp dầu khí;
- Tham gia các dự án hợp tác nghiên cứu về quản lý và xử lý chất thải với các Tổ chức môi trường nước ngoài;
- Tư vấn, thiết kế và lắp đặt các hệ thống thiết bị xử lý khí thải (bụi, khí độc), nước thải và chất thải rắn phát sinh từ các ngành công nghiệp: dầu khí, sơn, giấy, phân bón, hóa chất; luyện kim, sản xuất vật liệu xây dựng, chế biến gỗ, thực phẩm, thức ăn gia súc, sản xuất rượu, bia, mía đường, dệt ...;
- Tư vấn, thiết kế và lắp đặt các hệ thống xử lý nước cấp.



WASTE TREATMENT

- Researching on waste management and treatment arising from industrial activities, especially in petroleum industry;
- Along with international environment organizations, participating in co-operation projects for waste management and treatment;
- Advising, designing & engineering and installing the treatment systems of gas emissions (dust, toxic gas), wastewater and solid waste in the following industries: petroleum, paint, pulp, fertilizer, chemicals, metallurgy, texture, production of building materials, processing of timber, food, feed, alcohol, beer, and sugar-cane ...;
- Advising, designing & engineering and installing supply water treatment system.

INTERNATIONAL CO-OPERATION

- **TEXACO:** Environmental Sensitivity Mapping Project;
- **NORAD:** Development of management systems on safety and working environment & pollution control in the Vietnam petroleum industry;
- **LLOYD'S REGISTER:** Long-term basis to promote and develop the field of safety and environment in relation to the oil and gas industry in Vietnam;
- **APAVE:** Long-term technology transfer, service and training on safety in oil and gas industry;



- **WORLD BANK:** Environmental impacts and safety aspects of the development of downstream gas industry in Vietnam;
- **DNV:** HAZOP studies and Risk Assessments;
- **SEC:** Collection and compilation of data relating to oil activities and associated pollutants and marine resources of the Southeast Vietnam Sea;
- **NMRTC:** Study on safety and productivity improvement of the White Tiger oil field.



SOME MAJOR ACHIEVEMENTS

- Hundreds of Environmental Impact Assessment and Oil Spill Response Plan reports have been prepared for petroleum industry and others, such as: offshore exploration and production operations, onshore projects: Gas pipeline and processing stations (White Tiger - Ba Ria, Lan Tay - Phu My); Shell bitumen (Vinh); Fuel terminal (Quang Ninh, Ba Ria - Vung Tau), Shell Codamo lubricant blending plant (Dong Nai); LPG plant (Hai Phong); Phu My integrated power/ urea project; Diem Dien port (Thai Binh), the first refinery of Dung Quat...;
- Hundreds of offshore and onshore environmental surveys have been carried out for petroleum operations of VSP, JVPC, BP, Unocal, Petronas; Petroleum midstream and downstream works and others such as Gas pipelines, LPG & Condensate plants, Dung Quat refinery, Phu My power plant, Ca Mau gas-power-urea plant, and Sea/river ports;
- Surveying and evaluating consequences from oil spills occurred on river and coastal sea, such as the cases of ASIA, PRINCESS, NEPTUNE ARIES, FORMOSA ONE and ship incidents in Quang Ngai, Tra Vinh, Ben Tre, and the Lan Tay field;
- Studying weathering and natural degradation processes of Vietnam crude oil; toxicity and bio-accumulation of new drilling muds used in Vietnam;
- Studying environmental long-term impact on Vietnam sea in using of oil based mud and synthetic based mud;
- Establishing analytical methods and procedures for evaluation of environmental quality, toxicity of chemicals, substandard products, wastes... to marine organisms;
- Investigating Vietnam marine environmental data, establishing environmental database and setting up an environmental sensitivity map from Ke Ga cape to Ca Mau cape, and from Ca Mau cape to Cambodian border;
- Establishing the methodology and procedures on risk quantitative analysis for offshore installations in accordance with the conditions of Vietnam continental shelf and its applications to the MSP-1, MSP-3, MSP-5, MSP-9, RP-1 and RC-2 of VSP, and to carry out quantitative risk assessment for gas, condensate, LPG pipelines as well as gas processing station of White Tiger field, Dinh Co LPG plant;
- Investigating and evaluating incidents/ accidents in petroleum industry; surveying, measuring, and assessing working environment for onshore and offshore installations of VSP, JVPC, PETRONAS, PV Gas and other subsidiaries of PETROVIETNAM;





- Testing quality, dust content of petroleum gas for the White Tiger - Phu My gas pipeline and others;
- Taking part in university education on the subjects of petroleum safety and environmental protection; regularly organizing seminars, professional training courses and knowledge update programs for employees of RDCPSE;
- Carrying out the non-destructive tests for the projects: 3 million cubic meter of gas/day, Pipeline and storage of Ba Ria-Vung Tau LPG plants; Dinh Co - Thi Vai LPG pipeline, Long Thanh Mobil terminal, Thi Vai LPG terminal; Tri An sugar plant, Aeronautic complex of Tan Son Nhat airport, and Hai Phong LPG plant; Phu My power plant; Ba Ria power plants, Petechim Terminal...;
- Technically inspecting for the Thu Duc power plant; Dinh Co LPG plant; Phu My and Ba Ria gas terminals;
- Establishing the Atlas of benthic crustacean in the Vietnam Southeastern Sea;
- Compiling Regulations, Guidelines on environmental monitoring, safety management, risk assessment, working environment for petroleum activities.

BẢN ĐỒ TỔNG THỂ CÁC HOẠT ĐỘNG DẦU KHÍ TẠI VIỆT NAM

Map of petroleum activities in Vietnam

