

**UNITED STATES**

**Arkansas**  
600 S. German Lane, Building 2  
Conway, Arkansas 72034  
Phone: 501 327 2700  
Fax: 501 327 2706

**California**  
7300 Downing Avenue  
Bakersfield, California 93308  
Phone: 800 725 4977  
Phone: 661 588 8503  
Fax: 661 588 8506

9711 Holland Street, Suite 2  
Bakersfield, California 93312  
Phone: 661 615 6456  
Fax: 661 615 6457

430 Douglas Lane  
Woodland, California 95776  
Phone: 530 666 6475  
Fax: 530 666 4726

**Colorado**  
1538 Welton Street, Suite 300  
Denver, Colorado 80202  
Phone: 303 592 9250  
Fax: 303 825 1578

1936 CR 319  
Rifle, Colorado 81650  
Phone: 970 625 1201  
Fax: 970 625 1302

**Louisiana**  
4175 Trailer Town Road  
Jennings, Louisiana 70546  
Phone: 800 359 5951  
Phone: 337 774 5951  
Fax: 337 774 2347

201 Energy Parkway, Suite 310  
Lafayette, Louisiana 70508  
Phone: 337 235 5325  
Fax: 337 235 3739

618 N. Hangar Drive  
New Iberia, Louisiana 70560  
Phone: 800 359 5935  
Phone: 337 235 5935  
Fax: 337 235 0375

1515 Poydras Street, Suite 1850  
New Orleans, Louisiana 70112  
Phone: 504 636 3660  
Fax: 504 636 3670

**North Dakota**  
4965 2nd Street SW  
Dickinson, North Dakota 58601  
Phone: 800 584 3065  
Phone: 701 227 8608  
Fax: 701 227 8612

**Oklahoma**  
3214 Highway 270  
East Wiburton, Oklahoma 74578  
Phone: 940 683 6286  
Phone: 918 448 8488  
Fax: 918 465 5633

919 S. 17th Street  
Yukon, Oklahoma 73099  
Phone: 800 725 4986  
Phone: 405 350 7077  
Fax: 405 354 6749

14 Highway 6  
Eck City, Oklahoma 73644  
Phone: 580 225 0590  
Fax: 580 225 8410

**Texas**  
5764 Highway 380  
Bridgeport, Texas 78426  
Phone: 940 683 6286  
Fax: 940 683 6236

426 Flato Road  
Corpus Christi, Texas 78405  
Phone: 800 725 4974  
Phone: 361 289 7794  
Fax: 361 289 9058

2902 N. Mechanic Street  
El Campo, Texas 77437  
Phone: 800 725 4974  
Phone: 979 578 9076  
Fax: 979 578 9098

4710 Andrews Highway  
Odessa, Texas 79762  
Phone: 888 563 0663  
Phone: 432 550 6802  
Fax: 432 550 3190

8472 N. Highway 79  
Palestine, Texas 75801  
Phone: 800 725 4974  
Fax: 903 584 0265

1305 E. San Benito Street  
Rio Grande City, Texas 78582  
Phone: 956 716 6561  
Fax: 956 716 6561

**Wyoming**  
521 Winkelman Avenue  
Marbleton, Wyoming 83113  
Phone: 307 276 4405  
Fax: 307 276 4407

**INTERNATIONAL**

**Algeria**  
Zone Industrielle No. 2  
Hassi Messaoud BP561  
Algeria  
Phone: 21329731592  
Fax: 21329731592

**Angola**  
AES Facility  
Soni's Base  
Luanda  
Angola  
Phone: 244 222 311 115  
Fax: 244 222 311 058

**Argentina**  
Corrientes 330, Sto. Piso Oficina  
516  
Buenos Aires  
Argentina C1043AAQ  
Phone: 54 114 394 9399  
Fax: 54 114 394 4499

Parque Industrial Este  
Lote 3, Sector Este  
Neuquén Capital  
Provincia de Neuquén  
Argentina CP 8300  
Phone: 54 299 441 3123  
Phone: 54 299 441 3185  
Fax: 54 299 441 3207

**Azerbaijan**  
Kermur Plaza  
Basli Bagirova Street  
Baku  
Azerbaijan AZ1065  
Phone: 994 12 4367712  
Fax: 994 12 4367712

**Australia**  
160 Welshpool Road  
Welshpool, Perth WA 6106  
Australia  
Phone: 61 8 9358 0599  
Fax: 61 8 9358 0577

**Bolivia**  
KM. 6.5 Doble vía a la Guardia  
Casilla de Correo 3813  
Santa Cruz de la Sierra  
Bolivia  
Phone: 591 3 3553500  
Fax: 591 3 3553501

KM 1 Carretera a Santa Cruz  
Yacuiba - Tarija  
Bolivia  
Phone: 591 4 6825981  
Fax: 591 4 6825981

**Brazil**  
Rua Paulo Henrique Machado  
Pimentel No. 02  
Bairro Ignacio Barbosa - DIA  
Aracaju, Sergipe  
Brazil  
CEP: 49 040.000  
Phone: 55 79 3249 3510  
Fax: 55 79 3249 1988

Av. Amarel Peixoto S/N KM 164.5  
Bairro Imboassica  
Macaé, Rio de Janeiro  
Brazil  
CEP: 27 925.290  
Phone: 55 22 2773 0600  
Fax: 55 22 2773 0606

**Canada**  
Bay 2, 5402 - 55th Avenue  
Bonnyville, Alberta T9N 2K6  
Canada  
Phone: 780 826 2263  
Fax: 780 826 2296

11453 - 97th Avenue  
Grande Prairie, Alberta T8V 5R8  
Canada  
Phone: 780 538 1615  
Fax: 780 538 1896

6621 - 45th Street  
Leduc, Alberta T9E 7E3  
Canada  
Phone: 780 986 6063  
Fax: 780 986 6362

Bay 6, 4800 - 46th Avenue  
Fort Nelson, British Columbia  
V0C 1R0  
Canada  
Phone: 250 775 6995  
Fax: 250 775 6996

77 Escana Street  
Estevan, Saskatchewan S4A 2L7  
Canada  
Phone: 306 634 3351  
Fax: 306 634 1299

**China**  
Suite 1603-1606, Air China Plaza  
No. 36 Xiaoyun Road  
Chaoyang District  
Beijing 100027  
People's Republic of China  
Phone: 86 10 8447 5109  
Fax: 86 10 8447 5888

**Colombia**  
Carrera 9A No. 97A-53  
4to. Piso, Edificio Siracusa Oficina 403  
Bogota, D.C.  
Colombia  
Phone: 57 1 644 4510  
Fax: 57 1 623 4455

**Denmark**  
Nederbyvej 12  
5800 Nyborg  
Denmark  
Phone: 45 62 251358  
Fax: 45 62 251818

**Ecuador**  
Ave. Amazonas No. 3655 y  
Juan Pablo Sanz  
Edificio Antisanal, 1, Piso 3  
Quito  
Ecuador  
Phone: 593 2 224 3224  
Fax: 593 2 224 4880

**Egypt**  
23 Road  
265 Maadi  
Cairo  
Egypt  
Phone: 202 516 6160  
Fax: 202 754 4051

**Germany**  
Lanterstrabe 34C  
46539 Dinslaken  
Germany  
Phone: 49 206 482 6358  
Fax: 49 206 482 6358

**India**  
413-416, 4th Floor  
Solaris 1 C Wing Opposite L&T  
Gate #6, Sakir Vihar Road  
Powai Andheri (East)  
Mumbai 400 072  
India  
Phone: 91 22 4005 8100  
Fax: 91 22 4005 8102

**Indonesia**  
Jl. M.T. Haryono No. 119  
RT. 33A/RW 11 Ring Road  
Baliapapan 76114  
Indonesia  
Phone: 62 0542 871 769  
Fax: 62 0542 871 756

Annex Building, 1st Floor  
Jl. Ampera Raya 9-10  
Cilandak  
Jakarta Selatan 12550  
Indonesia  
Phone: 62 21 7827383  
Fax: 62 21 7827384

**Kazakhstan**  
74A, Azatyk Avenue  
Alytau 060005  
Kazakhstan  
Phone: 0073122457190  
Fax: 0073122457346

**Malaysia**  
9-20-7 Megan Philco Avenue  
12 Jalan Yap Kwan Seng  
50450 Kuala Lumpur  
Malaysia  
Phone: 603 21666 022  
Fax: 603 21666 077

No. 15 Jalan Utarid US/16  
Mah Seng Integrated Industrial Park  
Section US  
40150 Kuala Lumpur  
Malaysia  
Phone: 603 7845 9783  
Fax: 603 7845 9738

IR 10/10 Lusu Warehouse  
Jalan Patau - Patau  
87000 Labuan F.T.  
Malaysia  
Phone: 60 087 423 886  
Fax: 60 087 423 885

WH 8 Door No. 2  
Kemaman Supply Base  
Terengganu Darul Iman  
Malaysia  
Phone: 60 087 423 886  
Fax: 60 087 423 885

**Mexico**  
Lote 4, Manzana 1  
Parque Industrial Delt  
Fancherita Anacleto Canabal  
Villahermosa, Tabasco  
Mexico 86500  
Phone: 52993 310 3100  
Fax: 52993 310 3109

**The Netherlands**  
De Hultweg 3b  
7714 LE Coevorden  
The Netherlands  
Phone: 31 524 582718  
Fax: 31 524 534814

**Nigeria**  
Delta Environmental Facility  
Oil and Gas Free Zone  
Federal Lighter Terminal  
Onne, Rivers State  
Nigeria  
Phone: 234 084 236240  
Fax: 234 084 236714

**Norway**  
Myklabergveien 4  
4314 Sandnes  
Norway  
Phone: 47 51 20 52 00  
Fax: 47 51 20 52 01

**Oman**  
PO Box 1376  
PC 133 Al Khuwair  
Muscat  
Sultanate of Oman  
Phone: 00968 24 484070  
Phone: 00968 24 483703  
Phone: 00968 24 478122  
Fax: 00968 24 487655

**Peru**  
Mariano de los Santos 183 of 402  
San Isidro  
Lima 27  
Peru  
Phone: 51 1 221 1813  
Fax: 51 1 222 2474

**Russia**  
Ularsky Lane 5, 3rd Floor  
Moscow 101000  
Russia  
Phone: 7 495 775 2540  
Fax: 7 495 981 3470

**Qatar**  
PO Box 4455  
Doha  
Qatar  
Phone: 9744621243  
Fax: 9744622235

**Saudi Arabia**  
PO Box 31849  
Al Khobar 31952  
Kingdom of Saudi Arabia  
Phone: 966 3 882 6300  
Fax: 966 3 882 9595

**Thailand**  
No. 18 SCB Park Plaza West  
Building 2, 15th Floor, Room 215A  
Ratchadapisek Road  
Kwang Chatuchak, Khet Chatuchak  
Bangkok 10900  
Thailand  
Phone: 66 2 937 5657  
Fax: 66 2 937 5660

**Trinidad**  
Building 5A  
Edo's Industrial Complex  
South Trunk Road  
La Romain, Trinidad  
Trinidad  
Phone: 868 652 3707  
Fax: 868 657 9771

**Venezuela**  
Apartado 128  
Carretera Negra Al Lado Campo  
Las Palmas  
Anaco, Estado Anzoategui  
Venezuela  
Phone: 58 282 4222808  
Fax: 58 282 4222473

Av. 58 No. 140-315  
Zona Industrial, 1era. Etapa  
Maracabo, Estado Zulia  
Venezuela  
Phone: 58 261 7379619  
Fax: 58 261 7379624

**Downhole Solutions**

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**HOT OIL THERMAL DESORPTION**

Hot Oil Thermal Desorption



# Hot Oil Thermal Desorption



## Oil-Based Drill Cuttings Treatment



An increase in the global awareness of the need for environmental preservation has led the drilling industry to adapt to changes in environmental policies. National environmental laws are now being strictly enforced and companies must adapt their policies to abide by these regulations. The treatment of drill cuttings with thermal desorption provides an excellent option for meeting these standards. NOV Brandt, a subsidiary of National Oilwell Varco, has more than 20 years of experience in the thermal treatment of drill cuttings.

### Benefits

NOV Brandt's hot oil thermal desorption cuttings treatment provides users with the following:

- Total waste management system for the treatment of oil-based mud (OBM) drill cuttings
- Recovery of oil for reuse in OBM
- Recovery of water
- Recovery of solids with an oil residue of less than 0.5%
  - Meets the strictest legislation in the world
- Complete waste management site layout
- Handling and distribution systems for cuttings originating offshore
  - Rig to waste management site

- Complete QHSE system for control of the process
- Complete process energy balance of 50% and below
  - The process recovers more than double the accumulated energy consumed in the procedure

### Waste Management Site

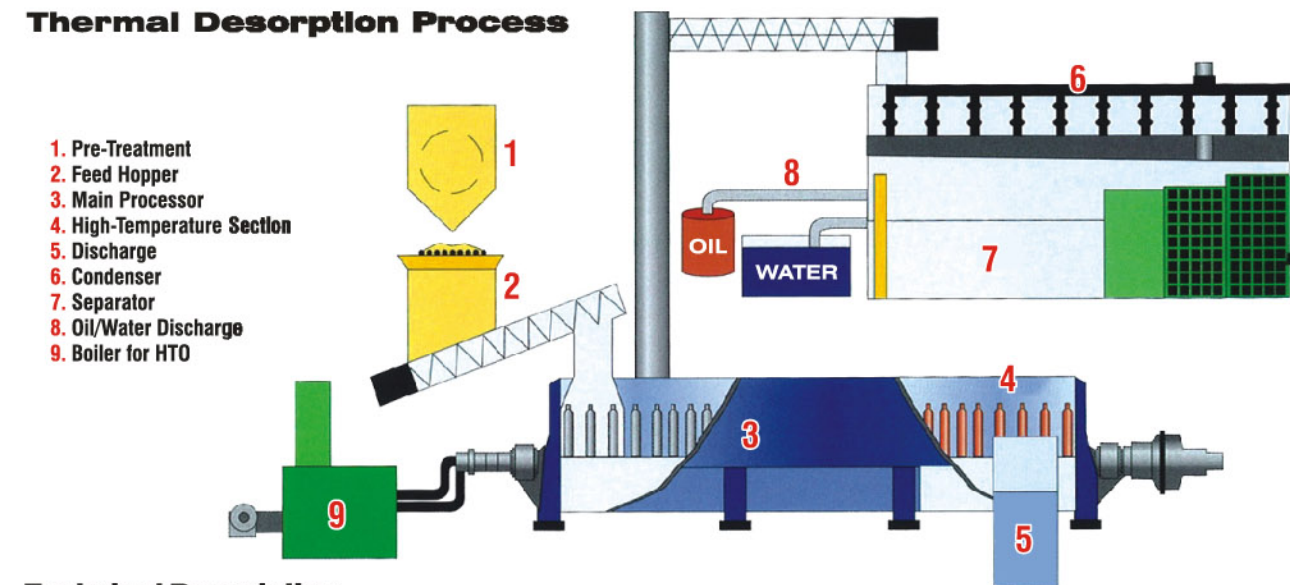
A typical waste management center designed by NOV Brandt (shown above) contains locations for:

- In-weighing of received waste
- Discharge systems for waste containers (skips)
- Wash bay for skips
- Pits for cuttings
- Tank farm for recovered oil and water
- Tanks for water treatment
- Thermal desorption unit(s) (TDU)
- Storage and inspection area for full or empty skips
- Control center and laboratory
  - Compliant with the strictest international standards
- Complete oil spill response systems and equipment

Typically, the waste management site operates 24 hours a day, 7 days a week, with a total staff of 10-15 people. Depending on the requirements of the application, the site can be designed for the treatment of drill cuttings anywhere from 6,000 to 48,000 tons per annum.

Erection of the site, including civil work, normally begins 6 months from the reception of the final treatment license. This license is typically issued by the operating country's national environmental agency. Upon arrival, the erection and commissioning of the processing equipment within the waste management site usually takes around 14 days. Additionally, the control center within the waste management site produces production records for customers.

## Thermal Desorption Process



### Technical Description

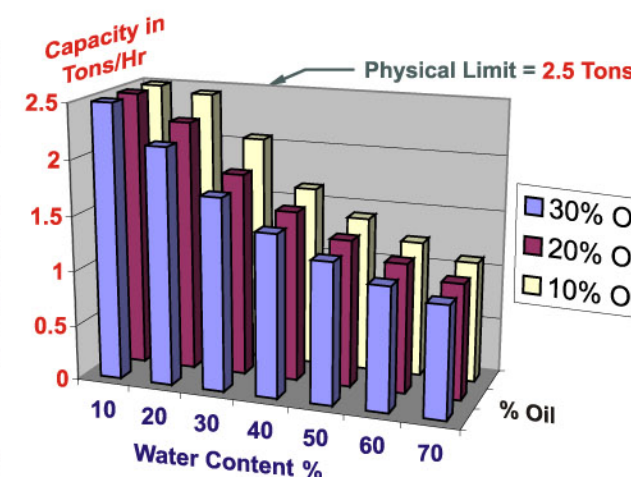
Drill cuttings are fed into the processing chamber of the TDU, where the rotating heat exchanger (rotor) heats up the cuttings via indirect heat. Indirect heating is accomplished through the circulation of heated oil, as well as by the use of electrical heating elements. This design avoids the possibility of direct fire exposure to the equipment.

The first section of the rotor evaporates water from the cuttings, while the subsequent section evaporates oil from the cuttings at temperatures up to 500°C. A condenser liquidizes the evaporated water and oil, which then flow into the water/oil separator. The solids are discharged at the end of the process, where they are then cooled and mixed with recovered water to avoid dust emissions when fed into solids containers (skips, etc.).

### Base Oil Reuse

In addition to drilling waste treatment, the waste management site provides a high-quality commodity: recovered oil for reuse in base mud and in the TDU's heating process. The TDU processes the oil in a manner that does not significantly alter the chemical composition of the base oil. As an option, odor treatment of the oil is also available.

Gas Chromatography and Mass Spectroscopy (GC/MS) scans are shown below. GC/MS scans routinely performed on base oil treated by the hot oil TDU demonstrate very little change in the oil's chemical composition. Frequently, the oil has been used to make-up new OBM. Recovered base oil from the TDU typically displays a clear yellow color.



**Capacities Chart:** The hot oil TDU is available in a variety of configurations to best suit the specific needs of the application. The capacity of the processor is dependent upon the total water and oil content of the cuttings. The chart above illustrates the relationship between the water content of the cuttings and the capacity of the unit. As the water content of the cuttings increases, the capacity of the unit decreases. It is very important to remove as much water as possible from the cuttings before they enter the TDU.

