



OLF Workshop Kjemikalieksposering i en oljevernaksjon 23. mai 2011

Halvor Erikstein

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organisasjonssekretær

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<http://blogs.sacbee.com/photos/2010/06/oil-spill-hits-60th-day.html>

Noen begreper
Administrative normer
takverdier
anmerkninger

Standardiserte løsemiddelår - et begrep uten rot i virkeligheten

Antakeligvis eksponert for organiske løsemiddel lik eller over administrativ norm under arbeid inni trykkammer. Antall standardiserte organiske løsemiddelår blir 1 år.



Arbeidstilsynet

Kontroll og veiledning om arbeidsmiljø

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Veiledning om administrative normer for forurensning i arbeidsatmosfære – fulltekst

Bruk innholdsfortegnelsen for å finne fram i veiledningen. For å søke i listen over administrative normer anbefaler vi at du bruker søkefunksjonen i nettleseren din.

- ① [Endringer siden siste trykte utgave i 2009](#)
- ① [Normenes betydning](#)
- ① [Hvordan listen bør brukes](#)
- ① [CAS-nummer](#)
- ① [Konsentrasjonsangivelser](#)
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- ① [Hudopptak](#)
- ① [Kreftfremkallende stoffer](#)

Se også

- ▶ [Grunnlagsdokumenter for fastsettelse av administrative normer for forurensning i arbeidsatmosfære – 2010](#)

VEILEDNING

Er fulltekst-versjon av

- ▶ [Administrative normer for forurensning i arbeidsatmosfære](#)

VEILEDNING

<http://www.arbeidstilsynet.no/artikkel.html?tid=78880>

Hva er administrativ norm?

- Normene for forurensninger i arbeidsatmosfære er administrative normer som er satt for bruk ved vurdering av arbeidsmiljøstandarden på arbeidsplasser der luften er forurenset av kjemiske stoffer. Normene er satt ut fra tekniske, økonomiske og medisinske vurderinger. Selv om normene overholdes er man derfor ikke sikret at helsemessige skader og ubehag ikke kan oppstå.

Hvordan listen bør brukes

- Normene brukes i vurderinger av om det foreligger helsefarlige forhold i arbeidsatmosfæren. Normene må ikke oppfattes som skarpe grenser mellom ufarlige og farlige konsentrasjoner. Slike skarpe grenser finnes ikke. Det skyldes bl.a. de biologiske forskjeller som finnes mellom mennesker. To personer kan reagere forskjellig selv om de blir utsatt for den samme påvirkningen av et kjemisk stoff.

Gjennomsnittsverdier

- Vanligvis angir normene for luftforurensninger høyest akseptable gjennomsnittskonsentrasjoner over et 8-timersskift.
- Det betyr at kortvarige overskridelser av normen kan forekomme hvis konsentrasjonen for øvrig holdes så lav at gjennomsnittskonsentrasjonen for hele 8-timersperioden ligger under normen. Hvor store og hvor langvarige overskridelser som kan aksepteres, må vurderes i forhold til de andre arbeidsmiljøfaktorene på arbeidsplassen (støy, varme osv.).
- Som en tommelfingerregel for hvor store overskridelser som kan aksepteres i perioder på opptil 15 minutter, legger Arbeidstilsynet følgende overskridelsesfaktorer til grunn (det forutsettes at gjennomsnittskonsentrasjonen for 8-timers skiftet holdes under normen):

Gjennomsnittsverdier

Område	Kan overskrides med
For normer mindre eller lik 1	200 prosent av normen
For normer over 1 til og med 10	100 prosent av normen
For normer over 10 til og med 100	50 prosent av normen
For normer over 100 til og med 1000	25 prosent av normen

Se også kapitlet «Takverdier».

Ved beregning av den akseptable overskridelsen etter tabellen ovenfor brukes enheten ppm for gasser og damper og enheten mg/m³ for partikulære forurensninger og aerosoler.

Takverdier

- For en del stoffer med fare for akutt forgiftning eller med irriterende ubehagelig virkning er det angitt en maksimalkonsentrasjon *som ikke må overskrides*. **For disse stoffene kan en følgelig ikke bruke overskridelsesfaktorene.** Normen for stoffer av denne kategorien er merket med T (takverdi). Av måletekniske grunner kan det være nødvendig å måle over en viss periode.

Hudopptak

- En del av stoffene kan i stor grad trenge gjennom huden selv om den er uskadet, og således tas opp i kroppen. Spesielt gjelder dette væsker og konsentrerte gasser, men også enkelte faste stoffer kan gi et betydelig hudopptak. Stoffer som kan tas opp gjennom huden, er merket med H.

Opptaket gjennom huden er avhengig av mange faktorer, f.eks. hudens tilstand (våt, tørr, sår osv.) eller tilstedeværelsen av andre stoffer.

En del stoffer skader huden ved direkte kontakt, men tas ikke opp gjennom huden (eks. lut, syrer osv.). Disse stoffene *er ikke* merket med H.

Kombinasjonspåvirkning

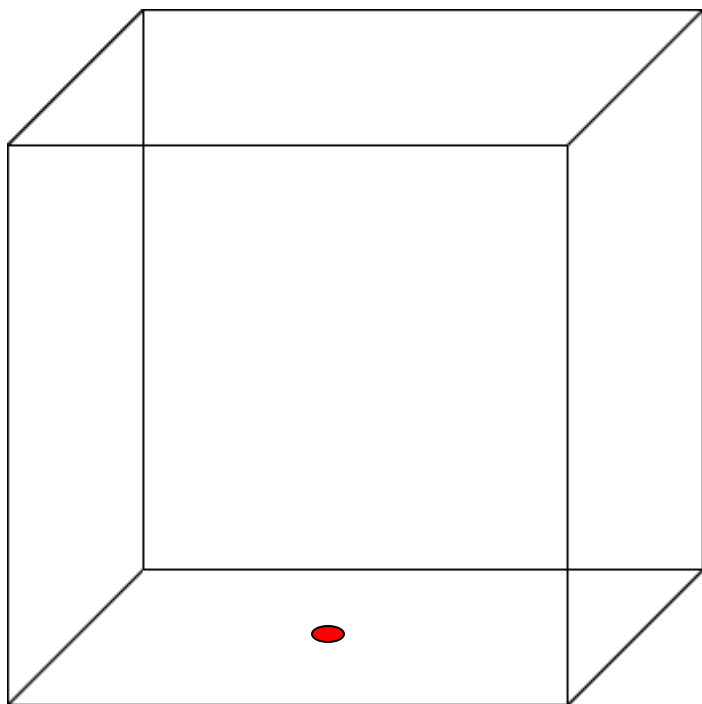
- Når flere forskjellige kjemiske stoffer forekommer i blanding, må en være oppmerksom på at de kan ha en større virkning sammen enn «summen» av virkningene de har hver for seg (synergistisk effekt). De kan også i enkelte tilfeller gi en tilsvarende mindre virkning (antagonistisk effekt). Slike vurderinger er vanskelige og bør skje i samråd med fagfolk på området. I de tilfeller der det ikke foreligger en slik forsterkende eller svekkende virkning, kan den sammenlagte virkning av flere stoffer vurderes ut fra *summasjonsformelen*. **Dette gjelder bare stoffer som har en lik virkning på organismen (additiv effekt).**

Anmerkninger

- I tillegg til en tallverdi har enkelte stoff fått en anmerkning. Anmerkningene er ikke basert på et stoffs klassifisering gitt i «Forskrift om klassifisering, merking m.v. av farlige kjemikalier», men stoffet er gitt en anmerkning fordi det foreligger vitenskapelige data som gir holdepunkter for en slik egenskap.

Volumprosent – parts pr. million (ppm)

$1 \text{ m}^3 = 1000 \text{ liter}$



Administrativ norm oppgis i (ppm) parts pr million

1 ppm er en gassboble på
 1 cm^3 (1 milliliter) tynnet ut i 1 m^3 .

$1 \text{ volum\%} = 10000 \text{ ppm}$

Vekten angis i milligram pr. kubikkmeter
(mg/m^3)

Prosent% - parts pr. milliom (ppm)

Brann og eksplosjon

100deler

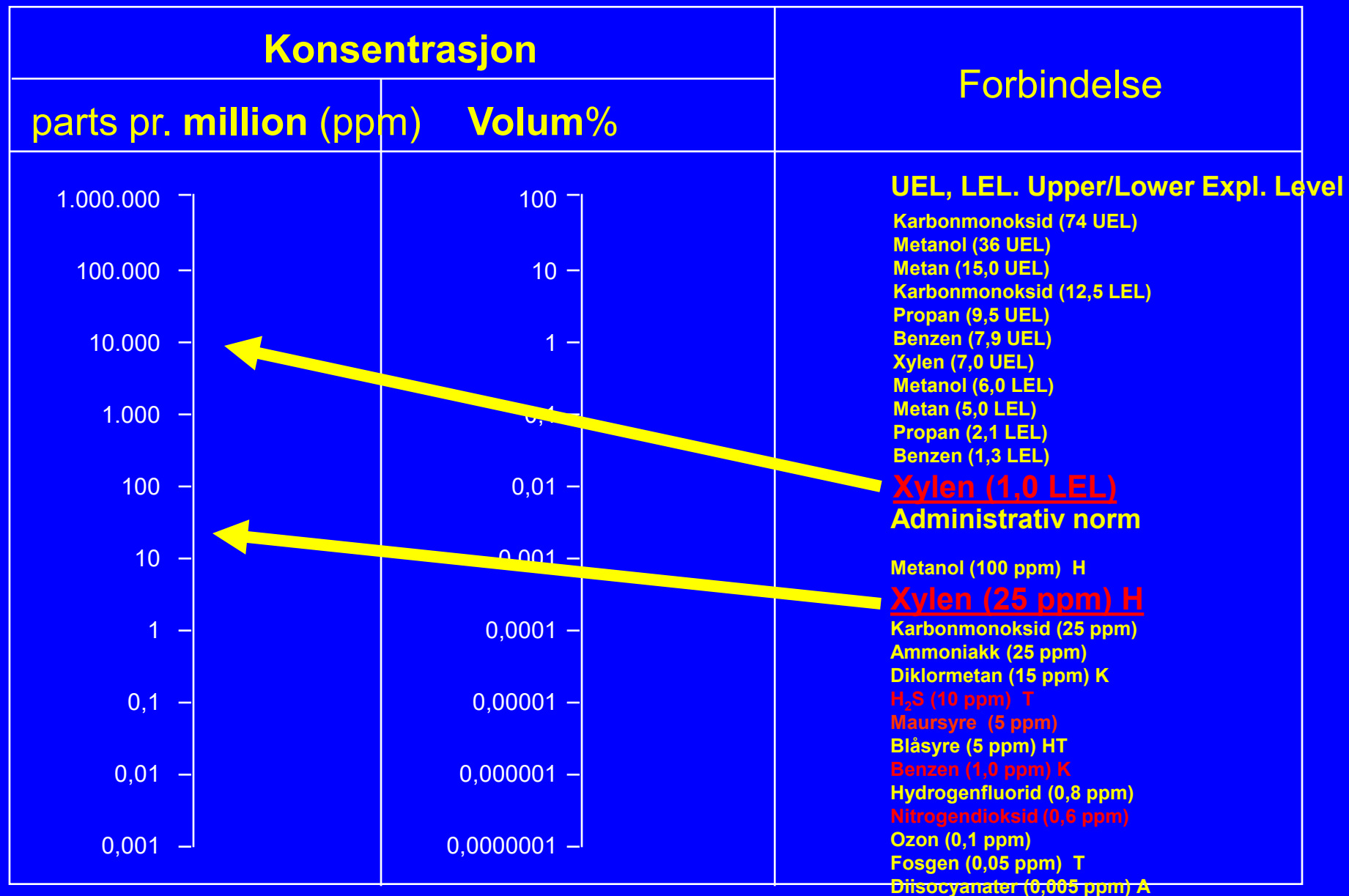
(% - prosent)

Helserisiko –

1000000deler

(parts pr million - ppm)

Risikotrappen



Gassmåling – nok oksygen, men hva med forurensningen?



Måler du 20,0% O₂ har du 0,9% (9000 ppm) av noe annet.

Kan vi være sikre på at dette annet ikke er helsefarlig?

11 døde, men hva med de som overlevde?

– Lærdom å trekke?

- Eksponering for brannrøyk og branngasser?
- Katastrofeoppfølging?
- Traumebehandling?
- Langtidsoppfølging?
- Kortvarig høy eksponering



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Gulf Oil Spill

Furious Growth and Cost Cuts Led To BP Accidents Past and Present

by Abraham Lustgarten

ProPublica, Oct. 26, 11:32 a.m.

A ProPublica and PBS FRONTLINE investigation. "[The Spill](#)," a PBS FRONTLINE documentary drawn from this reporting aired Oct. 26. [Watch it here](#).

Jeanne Pascal turned on her TV April 21 to see a towering spindle of black smoke slithering into the sky from an oil platform on the oceanic expanse of the Gulf of Mexico. For hours she sat, transfixed on an overstuffed couch in her Seattle home, her feelings shifting from shock to anger.



(AP Photo/Gerald Herbert)

Pascal, a career Environmental Protection Agency attorney only seven weeks into her

<http://www.propublica.org/topic/gulf-oil-spill>

BP Claims Tracker

Total Damage Claims from Gulf Oil Spill Paid By BP

\$1,767,988,3

\$



PRO PUBLICA

Have you filed a BP

Speak with a **ProP**

reporter.

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Anonymous Tipline

If you work for BP or a contractor on a the Gulf, or anywhere else, we'd like to

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The National Institute of Environmental Health Sciences

Your Environment. Your Health.

The mission of the NIEHS is to reduce the burden of human illness and disability by understanding how the environment influences the development and progression of human disease.



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- **Succimer Found Ineffective for Removing Mercury** - October 22, 2010
- **Five NIH Leaders Elected to the Institute of Medicine** - October 18, 2010
- **University of Louisville to Host Community Forum on Social and Environmental Determinants of Health** - October 8, 2010

Features

- **NIEHS Advances Predictive Genomics** - NIEHS intramural researchers featured in latest issue of *The NIH Catalyst*
- **NIH Factsheets** - telling the stories of research discovery, current treatment status, and future expectations for the prevention and treatment of diseases and conditions affecting the nation's health. See specifically: *Asthma*; *From Genes to Personalized Medicines*; *Gene Toxicity and Cancer*; *Genes, Behavior, the Environment, and Health*; and *Health Effects of Climate Change*

Events

- **United Nations Climate Change Conference: CO.NX Webcast of "Climate Change and Health"** - Cancun, Mexico, November 29, December 10, 2010
- **Meeting** - November 30- December 1, 2010
- **Work with Dr. Joel Scheraga** - November 30, 2010



Oil Spill Response



NTP
NTP Board of Scientific Counselors
Live Webcast



Recovery Act Successes

<http://www.niehs.nih.gov/index.cfm>

About NIEHS

Office of the Director

Programs & Initiatives

Climate Change & Human Health

Global Alliance for Clean Cookstoves

Global Environmental Health

Gulf Oil Spill Response Efforts

Gulf Consortium

Gulf Study

National Children's Study

Gulf Oil Spill Response Efforts

Programs & Initiatives

▼ Research and Analysis on Health Effects

▼ Gulf Study Key Points

▼ Coordination with Institute of Medicine

▼ Worker Education and Training Efforts

▼ Informing Congress and Other Stakeholders

▼ NIEHS Newsletter Articles

Staff from throughout NIEHS are working closely with federal, state and local government partners, as well as community organizations, to prevent injuries, illnesses and exposure to hazardous substances, to train responders, to support research on the public health impact of the oil spill, and to develop and disseminate information.

Research and Analysis on Health Effects

- NIEHS is leading an National Institutes of Health (NIH) long term study looking at the potential health effects of the oil spill in various responder populations. On June 15, NIH Director Francis Collins, M.D., Ph.D., announced an investment of \$10 million to support the NIEHS' launch of this important research. The [NIEHS Epidemiology Branch](#) is designing the study. NIEHS will work with other HHS agencies, federal partners, as well as local communities and universities to both assess and implement its research plan.
- On August 19, 2010, NIH hosted an interagency meeting with several U.S. Federal Government agencies to gain a fuller understanding of efforts to respond to potential health effects of the Deepwater Horizon (DWH) disaster, including HHS design of a longitudinal follow-up study of oil spill clean-up workers.
 - [Agenda - Interagency Meeting – Gulf Oil Spill Workers' Study](#)  (122KB)
 - [Meeting Summary - Interagency Meeting – Gulf Oil Spill Workers' Study](#)  (204KB)
 - Presentations
 - [CAPT Margaret M. Kitt, M.D., M.P.H., USPS, Deputy Director for Program, Office of the Director, National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, Department of Health and Human Services](#)  (1.4MB)
 - [RADM Scott Deitchman, M.D., M.P.H., USPHS, Associate Director for Terrorism Preparedness & Emergency Response, National Center for Environmental Health, Agency for Toxic Substances and Disease Registry, Centers for Disease Control and Prevention, Department of Health and Human Services](#)  (511KB)
 - [Terry Adirim, M.D., M.P.H., Director, Office of Special Health Affairs, Health Resources and](#)

RELATED LINKS

- >> [Applying Superfund expertise to the Gulf oil spill](#)
- >> [Grantees Host Sebelius During Gulf Visit](#)
- >> [Gulf Oil Spill 2010: Information for Parents](#) 
- >> [NIH to Launch Gulf Oil Spill Health Study](#)
- >> [Restore the Gulf](#) 
- >> [Whitehouse Deepwater BP Oil Spill](#) 
- >> [BP Gulf Oil Spill - HHS Health Response](#) 
- >> [CDC 2010 Gulf of Mexico Oil Spill](#) 
- >> [Food Safety and the Gulf of Mexico Oil Spill](#) 



The National Institute of Environmental Health Sciences

Your Environment. Your Health.

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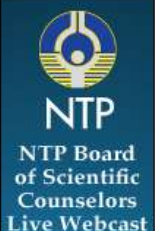
- United Nations Climate Change Conference: CO.NX Webcast of "Climate Change and Health"** - Cancun, Mexico - November 29- December 10, 2010
- NTP Board of Scientific Counselors Meeting** - November 30- December 1, 2010
- What Climate Adaptation Means for Our Work with Dr. Joel Scheraga** - November 30, 2010

New Grants

- Deepwater Horizon Disaster Research Consortia: Health Impacts and Community Resiliency (U19)(RFA-ES-11-006)** - Application Due Date: January 21, 2011
- Superfund Hazardous Substance Research and Training Program (P42)(RFA-ES-10-010)** - Application Due Date: April 15, 2011



Oil Spill Response



NTP Board of Scientific Counselors Live Webcast



Recovery Act Successes

<http://grants.nih.gov/grants/guide/rfa-files/RFA-ES-11-006.html>



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If you have symptoms or questions, and want to report them to OSHA, contact 1-800-321-OSHA (6742) TTY: 877-889-5627

OSHA Response By the Numbers

4/26 thru	10/1/10
Site visits by OSHA personnel*	4,266
Exposure Assessments	7,439
OSHA personnel:	
Permanently assigned to Gulf	146

OSHA's Efforts to Protect Workers

Every day OSHA has over 146 professionals protecting workers throughout the Gulf. From April 26th through October 1st, between 20-40 were assigned solely to the Oil Spill Response. OSHA personnel have been deployed to all staging areas in Louisiana, Mississippi, Alabama, and Florida. OSHA staff were on the ground and on boats to make sure BP was protecting cleanup workers from health and safety hazards.

OSHA worked as part of the coordinated federal response which included the U.S. Coast Guard and other government agencies that deal with health and the environment to evaluate BP's efforts and make sure BP put in place all of the precautions needed to protect workers from the hazards associated with cleanup work. When OSHA found problems or learned about them from workers, we immediately brought them to the attention of BP and monitored the situation until they were corrected. OSHA also raised its concerns throughout the Unified Command so they could be addressed across the entire response area. See [OSHA's Activity Fact Sheet](#) for more information.

Exposure to Toxic Chemicals. To determine whether or not workers are exposed to

[RestoreTh](#)
Official Fe
Deepwater
and Recov

[CareerOneS](#)
[Response](#) si
range of em
for individua
in the Gulf o
(1-866-487-



Workplace Safety & Health Topics

Workplace Safety and Health Topics

► Deepwater Horizon Response

Interim Guidance for Protecting Deepwater Horizon Response Workers and Volunteers

Medical Pre-Placement Evaluation

Chemical Exposure Assessment

Tips for Deepwater Horizon Response Workers

Respiratory Protection Recommendations

Summary of Potential Hazards

Key Safety and Health Topics

Protecting Workers and Volunteers Responding On-Shore to Hurricanes

Reducing Exposures while Working with

[NIOSH](#) > [Workplace Safety and Health Topics](#)

DEEPWATER HORIZON RESPONSE Gulf of Mexico Oil Cleanup

Updates

- [NIOSH Ongoing Health Hazard Evaluation: Deepwater Horizon Response](#) **Updated October 27**
- [Voluntary Roster of Deepwater Horizon Response Workers](#) **Updated October 14**

NIOSH Efforts to Protect Oil Cleanup Workers

NIOSH is protecting oil cleanup workers with the following ongoing efforts:

- Partnering with the Occupational Safety and Health Administration (OSHA) and National Institute of Environmental Health Sciences (NIEHS) to provide other federal and state partners, BP, and workers with [guidance and educational materials](#) for protecting response workers.
- Conducting [health hazard evaluations](#) and surveillance of reported illnesses among workers involved in the Gulf response.
- Developing a [voluntary roster of workers](#) to obtain a record of those who have participated and a mechanism to contact



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- [NIOSH Efforts to Protect Oil Cleanup Workers](#)



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Contact Us:

Centers for Disease Control and Prevention

National Institute of Occupational Safety and Health

800-CDC-232-4631
232-6341
Hours/Evening

cdcinfo@cdc.gov

Lærdom fra andre katastrofer?

- Amoco Cadiz
- Exxon Valdez
- Piper Alpha
- Alexander Kielland
- Scandinavian Star
 - Norske hendelser (forskjellige oljeaksjoner på norskekysten)

Amoco Cadiz



Exxon Valdez



Scandinavian Star





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Health Effects After Exxon Valdez Went Unstudied

by [Marian Wang](#)

ProPublica, June 30, 2010, 10:41 a.m.

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In a report on Tuesday, McClatchy Newspapers pointed out that [neither industry nor the government](#) seems to have studied the health of Exxon Valdez cleanup workers after the 1989 spill.

Since oil started pouring from BP's well into the Gulf of Mexico, there have been promises all around: promises from oil executives "[to learn new lessons](#)," promises from the EPA [to remedy the dearth of science](#) about dispersants -- promises addressing the same concerns that could have been studied decades ago after spills like Exxon's.



Tugboats tow the Exxon Valdez in this April 5, 1989, file photo (Chris Wilkins Getty Images/AFP)

Here's what Exxon told McClatchy:

Exxon has consistently maintained that there's no evidence spill workers experienced any adverse health effects as a result of the cleanup. Spokeswoman Cynthia

Latest Posts on this Topic

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[Read Justice Dept.'s Letter Criticizing Gulf Spill Czar's Final Claims Guidelines](#)

[Read the Latest Reports on Gulf Spill, Slamming Industry and Regulators](#)

[BP Probation Officer Asks Judge to Revoke Probation, Citing 'Criminal Negligence'](#)

[Some Gulf Spill Claimants Waiting for Months: Feinberg Blames Tricky Policy Decisions](#)



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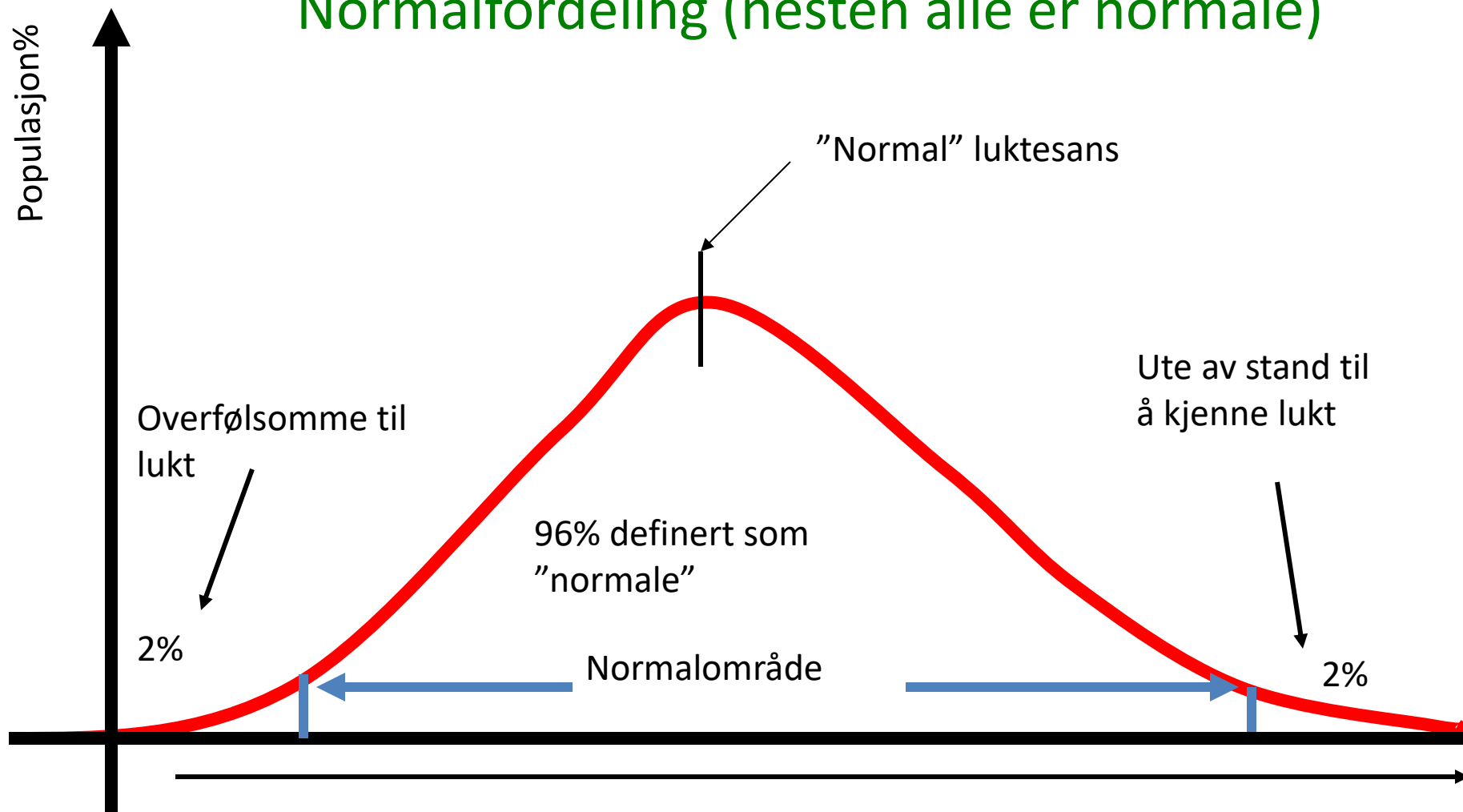
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Luktesansen

Normalfordeling (nesten alle er normale)



Eksempler på luktdata

Kjemikalie (Adm.norm ppm)	Nedre grense	Øvre grense	Geometrisk middelerverdi
Diklormetan (15)	1,2	440	160 d
Styren (25)	0,017	1,9	0,14 d
Hydrogensulfid (H ₂ S) 10	0,001	0,13	0,0094 d
Xylen (25)	0,06	40	20d
Saltsyre (5)	0,256	10,1	Ikke godkjent
<u>Maursyre (5)</u>	1,6	340	Ikke godkjent
Toluen (25)	0,16	37	1,6
Ammoniakk (25)	0,04	53	17 d
Aceton (125)	3,6	653	62 d
Toluendiisocyanat TDI (0,005ppm)			0,2-0,4*
Benzen (1)	34	119	61 d

Lukttrøtthet (odor fatigue)

**3 minutter i lukten fører til at
en persons oppfatning av lukt
redusere med omkring 75%**

Kortvarig høy eksponering

kan gi varig skade

Vurdering av helserisiko ved kortvarig høy eksponering

- National Institute of Occupational Safety and Health (NIOSH) har utviklet en parameter (IDLH) til bruk ved risikovurdering av akutt kjemisk eksponering.
- Immediately Dangerous to Life or Health (IDLH): Acute respiratory exposure that poses an immediate threat of loss of life, immediate or delayed irreversible adverse effects on health, or acute eye exposure that would prevent escape from a hazardous atmosphere. *NIOSH Definition*
- Immediately Dangerous to Life or Health (IDLH): An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere. *OSHA Definition*

Øyeblikkelig fare for liv og helse

Bruk av

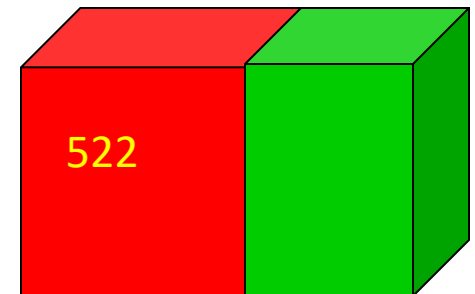
Immediately Dangerous to Life and Health (IDLH)

I opphold i soner hvor det kan oppstå
IDLH nivåer, er kun maksimal
beskyttelse tilstrekkelig
(friskluftsutstyr med overtrykk).

■ <http://www.cdc.gov/niosh/idlh/intridl4.html>

Hvor store fortynningsvolum til IDLH (1 kg toluen)?

- IDLH for toluen er 500 ppm
- $500 \text{ ppm} \times 3,83 = 1915 \text{ mg}$
- $1000000 \text{ mg} / 1915 \text{ mg/m}^3 = \mathbf{522 \text{ m}^3}$



Brann kan betraktes som ukontrollerte kjemikalieutslipp

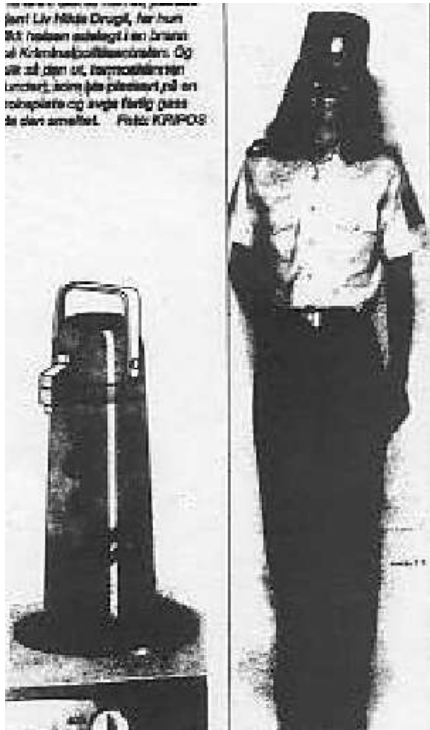


- Den kjemiske sammensetningen av røyk og gass er avhengig av det som brenner.
- Kjemiske forbindelser fra termisk dekomponering av polymere materialer - sannsynligvis en av de største helsetruslene i arbeidsmiljøet

Kortvarig høy eksponering kan gi varig skade

- Brannrøyk og branngass
- Kortvarig høy eksponering for kjemikalier
 - Maling, sveising, kjemikalieuhelluhell, søl, hudkontakt, ulykker..... unormale driftsforhold, feil verneutstyr

jent Liv Hilde Drugli, for hun ble høyt eksponert i en brann på Kriminallaboratoriet. Og det var det ut, høyesteblomsten i landet, som ble på plass på en rokepiste og avgav fargig gass da den smeltet. Foto: KRIPOS



Får 1,7 millioner i erstatning etter røykforgiftning

– En stor lettelse, sier tidligere Kriminallaborant Liv Hilde Drugli. Staten må betale henne 1,7 millioner i erstatning etter at hun ble røykforgiftet på jobben.

KARIN BØHM-FREDERSEN

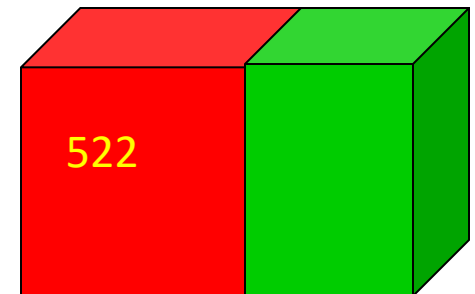
Oslo byrett har også pålagt staten å dekke deler av Druglis økonomiske tap med 117 000 kroner. Byrettsdommer Laila Røbbestad kritiserer både arbeidsgiveren, Kriminallaboratoriet, og staten for at det er gjort så lite for å få klarhet i om det er sammenheng mellom brannen for åtte år siden og de alvorlige helseplagene Liv Hilde Drugli fortsatt



VANT FREM: Liv Hilde Drugli. Foto: Kåre M. Hansen

Hvor store fortynningsvolum til IDLH (1 kg toluen)?

- IDLH for toluen er 500 ppm
- $500 \text{ ppm} \times 3,83 = 1915 \text{ mg}$
- $1000000 \text{ mg} / 1915 \text{ mg/m}^3 = \mathbf{522 \text{ m}^3}$



Sammenlikning mellom IDLH, Adm.norm, UEL og LEL

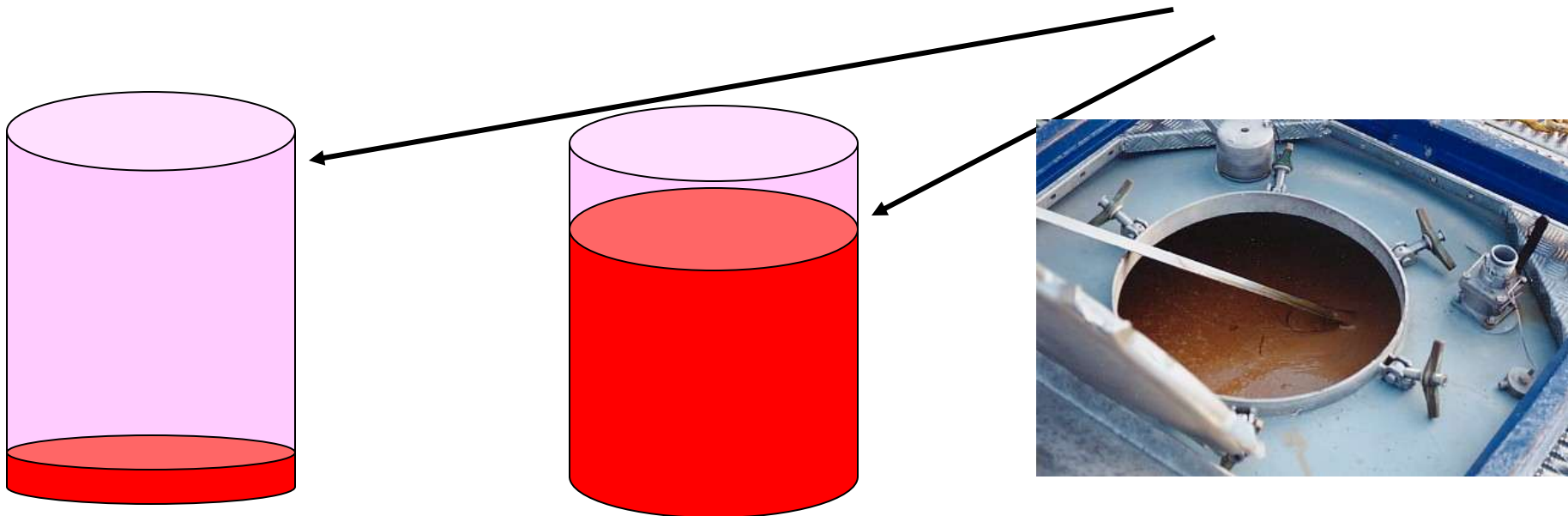
Immediately Dangerous to Life And Health (IDLH) ppm	Administrativ norm ppm	Eksplosjonsgrenser UEL/LEL Vol%
6.000 Metanol 900 <u>Xylen 900 pm</u> 500 Benzen TOLUEN 100 Hydrogensulfid (100) 50 Hydrogencyanid (50) 30 Hydrogenklorid (50) 20 <u>MAURSYRE (30)</u> 10 Nitrogendioksid (20) Formaldehyd (20) Ozon (5) 3 Metylisocyanat (3) 2 Toluendiisocyanat (2,5) Fosgen (2)	Metanol (100 ppm) H 100 50 30 <u>Xylen (25 ppm) H</u> Karbonmonoksid (25 ppm) Ammoniakk (25 ppm) H₂S (10 ppm) T 15 Saltsyre (5 ppm) T <u>Maursyre (5 ppm)</u> 10 Blåsyre (5 ppm) HT 5 Benzen (1 ppm) K2 Hydrogenfluorid (0,8 ppm) Nitrogendioksid (0,6 ppm) Ozon (0,1 ppm) Fosgen (0,05 ppm) T Isocyanater (0,005 ppm) A	Karbonmonoksid (74 UEL) Metanol (36 UEL) Metan (15,0 UEL) Karbonmonoksid (12,5 LEL) Propan (9,5 UEL) Benzen (7,9 UEL) Xylen (7,0 UEL) Metanol (6,0 LEL) Metan (5,0 LEL) Propan (2,1 LEL) Benzen (1,3 LEL) <u>Xylen (1,0% - LEL)</u>

1300 regelen

Enkel tommelfingerregel for bruk av damptrykk til å finne konsentrasjon over en væskeflate

Toluen har et damptrykk på 20 mmHg. Hvor stor vil toluekonsentrasjonen bli i ppm inne i en tank?

Eksempel: $20 \text{ mmHg} \times 1300 = 26000 \text{ ppm}$



Håndtering av kjemisk eksponering

- Hva trenger vi av måleutstyr?
- Hvilket verneutstyr er nødvendig?
- Hvordan håndtere hudeksponering?
- Hvor kan vi hente kunnskap?
- Hva slags erfaring kan være nyttig fra andre katastrofer?

Toxic Effects of Chemical Mixtures

- **ABSTRACT.** Exposures to chemical mixtures have reportedly produced unexpected effects. Examination of new case studies, as well as those previously reported, shows that when the of chemicals that include lipophilic and hydrophilic species, the lipophiles facilitate the absorption of the hydrophiles at enhanced levels and produce effects that are not expected from an individual chemical. These effects include enhanced acute and chronic responses, low-level concentration response, and unexpected target organ attack. Octanol:water partition coefficients are predictive of relative lipophilicity and hydrophilicity. The findings have implications for safe drinking water standards, air quality standards, safe industrial and environmental exposure levels, product formulation, product labeling, and protocols for toxicity testing of chemical products.

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Groups 4 and 5. Mutti et al.³¹ described CNS effects that resulted from exposure of shoemakers to *n*-hexane [3.90], cyclohexane [3.44], methylethyl ketone (MEK) [0.29], and ethyl acetate [0.73]. All 4 chemicals were present in concentrations below TLVs when measured in the workers' breathing zones. Valentini et al.³² reported peripheral neurotoxicity following exposure of a shoemaker to MEK [0.29], ethyl acetate [0.73], cyclohexane [3.44], *n*-heptane [4.66], and isomers of hexane and cyclohexane. All exposures were below the TLV. The authors hypothesized that MEK might have potentiated the neurotoxicity of *n*-heptane, just as it does for *n*-hexane. Both of these studies demonstrated the onset of neurotoxic effects from exposures to low-level chemical concentrations.









SAFE og Norsk Flygerforbunds konferanse

"Åpent lende".

Hotel Residence, Sandnes 6. - 7. og 8. mai 2008

Del 1 "Kjemisk helsefare – eksponering og tiltak"

Del 2 "To sider av samme sak – turbin- og hydraulikkoljer
innen luftfart og petroleumsindustri"



Presentasjonene kan lasten ned her: <http://safe.no/index.cfm?id=305217>



SAFE HMS konferansen 5. – 6. mai 2009



Hvor går grensen?

En konferanse om helse og sikkerhet ved skiftarbeid, arbeidsbelastning, arbeidstid og arbeidsmiljøeksponering.

Presentasjonene kan lastes ned her; <http://safe.no/index.cfm?id=305016>

Konferansen

FARLIG FREKVENNS

Om støy og vibrasjon i arbeidsmiljøet

Sandnes, Hotel Residence 5. og 6. mai 2010