Date: 16.02.2016

Representative, direct telephone:
Karl Johan Lier, 90795334

Raunes Fiskefarm AS
Raunes
5578 Nedre Vats

Nedre Vats, 16. February 2016

NENT

The National Committee for Research Ethics [Den nasjonale forskningsetiske komité]

# REQUEST FOR ASSESSMENT OF WHETHER NIVA HAS CONTRAVENED NENT'S GUIDELINES IN CONNECTION WITH PROJECTS FOR AF DECOM OFFSHORE

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# 1 Introduction

Raunes Fiskefarm AS (hereinafter referred to as RF) hereby requests NENT to assess the role of the Norwegian Institute for Water Research (NIVA) [Norsk Institutt for Vannforskning] in connection with the activities of AF Decom Offshore AS (hereinafter referred to as AF Decom) on Raunes in Rogaland. AF Decom operates a plant for the dismantling of decommissioned oil installations on site, and NIVA was given the task to carry out environmental monitoring of AF Decom's activities.

It should be noted at the outset, that RF has previously been in a legal dispute with AF Decom and its principal, ConocoPhillips Skandinavia AS, as operator and license-holder on the Ekofisk field. The legal dispute has now been resolved by Gulating Court of Appeal deciding that a claim for damages was outdated. The Supreme Court's appeals committee has not referred an appeal for consideration by the Supreme Court. Nevertheless, RF has engaged itself in a general way the pollution situation associated with AF Decom's business on Raunes, including on behalf of other neighbours and the wider society.

As a result of its involvement in the court case, RF has had to familiarize itself with the conditions on Raunes. RF began by examining attic gutters on houses along a route towards the centre of the fjord. These were analysed for various toxins, and it was discovered that the composition of the toxins was the same as in the working area of AF Decom, with declining values proportional to the distance from the base. The same was confirmed when ventilation filters were examined. Higher contents of toxins were found closer to the base, and with AF Decom's "fingerprint", i.e. the same quantitative relationship between different metals. RF concluded that this had to be dust escape from the base, something AF Decom originally denied, partly on the basis of statements from NIVA.

NIVA's investigations concluded that there have been no emissions of toxins beyond what is permitted by the Norwegian Environment Agency.

RF has in turn launched a number of studies that show that large amounts of toxins have been emitted from the activities of AF Decom.

Since RF was convinced that these studies were not erroneous, NIVA's investigations and conclusions could not be correct. We therefore eventually began to ask questions about the credibility of NIVA's studies.

RF had several investigations conducted and during the trial we engaged several experts to help us figure out what had actually happened on and around AF Decom's base on Raunes:

- Evidence-securing report and analyses of the dust in the attic of RF (outside the base area but within 100 metres from where the breaking up occurs)
- NIFES in Bergen - (seafood examination of Vats fjord in 2013 and 2014)
- The Norwegian Institute of Bioeconomy Research [Bioforsk jord og miljø] (now Nibio)
- Report from Aarhus University
- UiO survey of Pb210 in otoliths in fish

- Professor Rosanna Bossi - Aarhus University - Organic pollutants
- Professor Henrik Skov - Aarhus University - Mercury
- Professor Einar Sletten - UiB - Mercury
- Professor Eiliv Steinnes - NTNU - Floor moss surveys - Radioactivity
- Professor Anders Goksøyr - UiB - Pollutants - Toxicology.
- Dag Øistein Eriksen at UiO - Radioactivity
- Senior researcher Ketil Haarstad - Bioforsk - Soil Analyses

and others.

Thus, RF has gradually acquired considerable information about what has happened and is happening at the base and about the environmental challenges. More than 7,000 pages of documentation were submitted in court.

The people behind RF are positive towards research, science, industry and oil operations and several have industrial backgrounds. RF therefore has no political agenda, other than being concerned about the local environment and lost business opportunities.

Because public bodies and society in general places great emphasis on NIVA's surveys, assessments and conclusions, it is in our opinion of the utmost importance that there should be no doubt about NIVA's independence and professional standard.

Although NIVA was engaged by AF Decom, NIVA's environmental monitoring programme is a societal concern, not least because third parties, including government agencies, base their decisions on NIVA's studies.

It is our belief that NIVA, in conducting its monitoring assignment for AF Decom on Raunes, does not meet the requirements that must apply with regard to (i) impartiality/independence and also (ii) professional standards/quality for such an important societal task, so that we are now requesting NENT's assessment of whether NIVA has breached NENT's ethical guidelines.

We would like to emphasize that we are talking about the environmental monitoring task that NIVA has performed for AF Decom in Vats. Obviously, we cannot express an opinion about NIVA in general.

NIVA has published ethical guidelines on its website. It can be expected that these guidelines will be followed. It is stated clearly in these ethical guidelines that NIVA *"is committed to exercising good research practices in line with research ethics guidelines for natural science and technology, which have been prepared by the National Committee for Research Ethics Committee for Natural Science and Technology (NENT)".*

This request to NENT has been very extensive. We have found this to be necessary because our arguments are based on an extensive factual basis. What is striking in this case is that there are so many factors to note, which are basically independent factual issues. However, a thorough review reveals that there is an inherent connection between the mistakes that we assert have been committed by NIVA (breach of the quality requirements in the ethical guidelines), and which must be seen in the context of NIVA's lack of independence in this assignment (breaches of the independence requirement in the ethical guidelines). This means that, in our view, this matter must be regarded as very serious, not least because of NIVA's position in the research and investigative environment in Norway.

It must also be noted initially that the Environment Agency, which should be an independent regulatory agency, without reservations, for some reason accepted NIVA's and AF Decom's assessments and conclusions, without even commenting on the objections made against NIVA's methods. We will therefore hereinafter also comment on some aspects of the Environment Agency's conduct in the case, in order to place this request in an overall perspective.

Gradually, as we have worked with the pollution situation and recorded the behaviour of several actors, which has in turn led us to delve even further into the material, it has been our experience that the issues just get worse and worse. We have continuously engaged qualified expertise, cf. above, and we have come into contact with other government agencies, individuals engaged in politics, organizations and society in general. These have gradually come to share our perceptions and have encouraged us to continue our involvement in this matter. In our opinion, therefore, that this request in fact also imposes a major responsibility on NENT and that considering and deciding on this request is challenging, both professionally in relation to the use of resources, and with regard to the need for impartiality.

We assume that the people in NENT who will work with this request are independent relative to AF Decom, NIVA and the environment authorities.

In the following, we will describe the activities of AF Decom, which are the basis for the surveys for NIVA and say something about the pollution situation at Raunes before and after operations for AF Decom were initiated. We will then describe NIVA's behaviour in relation to NENT's guidelines.

# 2 The project

## 2.1 Introduction

Our expert advisers, especially professors Skov and Bossi from Aarhus University, have emphasized to us the necessity to acquire the greatest amount of basic knowledge possible, before launching a monitoring project of this nature; about the place, its history, the topography, weather and wind, sea current and especially what the enterprise to be monitored is working with. In this context, it is also a question of examining which substances the company is working with, and to develop methods to detect emissions and improve working techniques, conduct a thorough review of the impact assessment and any possible emissions etc.

In Vats, there was never a basic analysis prepared regarding emissions of priority substances that could possibly occur. AF Decom even stated to stakeholders that there would not be one drop of contamination released in connection with the decommissioning activities, cf. for example:

**Bilag 1** A copy of the article in the newspaper Haugesunds Avis, dated: 5.10.2004

When such an analysis is not available, the party who shall be responsible for monitoring whether pollution actually takes place, accepts a responsibility and must be expected to conduct independent research on whether pollution can happen, cf. above. Our experience shows that NIVA did not carry out such thorough investigations before the monitoring programme began.

It is therefore necessary to provide NENT with an understanding of the conditions at AF Decom's business, so that NENT can assess NIVA's monitoring work.

## 2.2 How it was before AF Decom AS came to Vats

Some surveys were conducted before AF Decom AS established themselves in Raunes, including:

**Bilag 2** 15.09.2002 TLP Hutton - Report from Rogaland's research - organic

**Bilag 3** 15.09.2002 TLP Hutton - Report from Rogaland's research - inorganic

**Bilag 4** 18.08.2004 - Environmental investigation - Vats, performed at the request of AF Decom

These reports show that there was practically no mercury in the fjord or in the sediments around Raunes before AF Decom established themselves. The Vats fjord has never had polluting industries, or any other activities that have discharged mercury, PCB, PFOS, dioxins or other similar prioritised toxins.

NIVA completely disregards the earlier surveys, which show the pollution that was not present in the area, except the parameters that showed contamination, such as TBT, which is duly noted. NIVA started its investigation in 2009, when AF Decom had already been operating for more than 4 years.

## 2.3 What does AF Decom work with?

As mentioned above, AF Decom works with decontamination, dismantling and scrapping of decommissioned oil platforms. It is widely known that these contain a variety of environmental contaminants, which is documented, among other places in:

**Bilag 5** 18.07.2005 Ekofisk Tank-Survey of radioactivity and mercury, rev.3

**Bilag 6** Climate and Pollution Agency (KLIF) [Klima- og forurensningsdirektoratet]report TA2643 about scrapping/decommissioning of disused offshore installations of 10.05.2010

During the court case, we received the following information from AF Decom regarding the quantities of hazardous waste:

| *Year* | *Disused marine structures* | *Discarded electrical and electronic products* | *Hazardous waste* | *Total* |
|---|---|---|---|---|
| 2005 | 2,329 tonnes | 73 tonnes | 31 tonnes | 2,433 tonnes |
| 2006 | 17,910 tonnes | 414 tonnes | 1162 tonnes | 19,486 tonnes |
| 2007 | 14,791 tonnes | 82 tonnes | 245 tonnes | 15,118 tonnes |
| 2008 | 1,445 tonnes | 2.9 tonnes | 805 tonnes | 2,253 tonnes |
| 2009 | 15,493 tonnes | 365 tonnes | 305 tonnes | 16,163 tonnes |
| 2010 | 17,247 tonnes | 29 tonnes | 59 tonnes | 17,335 tonnes |
| 2011 | 18,972 tonnes | 37 tonnes | 50 tonnes | 19,059 tonnes |
| **Total** | **88,187 tonnes** | **1002.9 tonnes** | **2657 tonnes** | **91,847 tonnes** |

Table 1: Quantities of hazardous waste

Unfortunately, AF Decom was unwilling to disclose a specification and distribution of the hazardous waste. RF has particularly wanted to know the percentage of mercury-containing and radioactive material (scale), but we have not received this information. Mercury-containing and radioactive scale is nevertheless a substantial proportion of the hazardous waste. Most of the hazardous waste from oil rigs is so-called prioritised environmental poisons,
see: http://www.miljostatus.no/Tema/Kjemikalier/Kjemikalielister/Prioritetslisten/

The mercury content in scale varies in the different devices. Gas installations are known to contain high concentrations of mercuric sulphide and "black powder" with radioactive Pb210. As an example, we have enclosed the mercury mapping from 3 gas platforms:

**Bilag 7** 12.05.2006 "Mapping" of the Albuskjell platform 1-6A

**Bilag 8** 12.05.2006 "Mapping" of the Albuskjell platform 2-4A

**Bilag 9** 12.05.2006 "Mapping" of the Edda platform 2-7

**Bilag 10** 12.05.2006 Arithmetic mean

As the mapping shows, there may be 40,000 mg/kg of mercury in some places, i.e. in worst cases 4% of the scale. According to AF Decom, the average in the scale is 2,000 mg/kg mercury, i.e. 2 per mille, if this is analysed and measured correctly (cf. below regarding analysis of mercuric sulphide in paragraph 6.2.6). Nevertheless, therefore, very large amounts of mercury are involved in the work at AF Decom.

## 2.4 Where and how the work at AF Decom's activities takes place

The work mainly takes place outdoors, in all weather and wind conditions.

These are large structures and large tools must be used.

Large axes are mounted on excavators in order to cut pipes, H-beams, etc.

Figure 1: Image of "clippers" mounted on an excavator

There is considerable use of torch cutting - preheating both with induction and using gas to 900ºC and lance burning over 3,000ºC. We refer to the Proactima report of 31.12.2011 on the environmental situation at Raunes, which was commissioned by AF Decom at the request of the Climate and Pollution Agency (KLIF, now the Environment Agency), where the processes and the time used for torch cutting is specified at approximately 5,000 hours per year.

**Bilag 11** The Proactima Report of 31.12.2011

**Bilag 12** Associated analysis of the dust on the work surface at AF Decom, dated 06.01.2012.

## 2.5 Summary of emissions risk

- They work with large quantities of environmental poisons (prioritised substances.)
- They work with large structures,
- They work outdoors with large volumes,
- They use large equipment, such as clippers mounted on excavators etc.
- They weld at high temperatures.

## 2.6 In what way can emissions occur?

A) Since the area of the work surface is large (78,000 $m^2$, i.e. 11 football fields with international dimensions) and there is little shielding from wind and weather, it is obvious that there must be dust escape from the area.

1) By air, directly from the source and out of the base area by wind
2) From the source via the work surface (fallout) and out from the base area by wind
3) By throwing (when tipping over platform structures).
4) Using sweeping/brush machines (from 2010 to 2012), where the smallest particles are thrown into the air and blown out of the base area.
5) Wheel loaders and similar machinery whirl up dust, which is then blown out of the base area.
6) Use of cutting equipment, such as angle grinders.

Dust escape will contain the same substances that are found at the work area, i.e. a number of prioritised poisons such as metallic mercury, mercury salts, in particular mercuric sulphide, PCB, TBT, DBT, MBT, PFOS, isocyanates, dioxins etc. (some of these are analysed and are presented in Bilag 12) and radioactive material, as particularly the "oil nuclides" Pb210, Ra226 and Ra228 are enriched during oil drilling and production in the field.

B) The work area is constructed with a slope inwards so that drainage water containing pollutants from the work on the operating site will be led to the treatment plant.

1) Faulty drainage installations nevertheless allow surface water to flow into the sea untreated.
2) Extreme weather, so that surface water can nevertheless be swept into the sea untreated.
3) Faults at the treatment plant
4) Power failure (pump systems may stop during a power outage, for example during storms)
5) Faulty pumps

6) Clogged sewers
7) Holes in the membrane-cover on the working area due to damage caused by falling platforms etc.
8) Mercury fumes from metallic mercury in scale on the operating site.
9) Other errors with the drainage system, which has been demonstrated previously, ref. paragraph 9.5

C) Since the company operates with a large degree of torch cutting, approx. 5,000 hours per year, emissions in relation to this must also be examined.

1) Mercuric sulphide separates under preheating at 900ºC and torch cutting at 3,000ºC. Decomposition of mercuric sulphide occurs at temperatures of 265ºC to 345ºC [1]. This produces emissions of metallic mercury, and with continued heating forms mercuric oxide.
2) Burning on painted surfaces containing bromine and chlorine (e.g. PCB) can form dioxins.
3) Burning on painted surfaces may also cause emissions of isocyanates, PCB and many other prioritised substances.

D) Other possibilities where prioritised substances can leave the area without being detected.

1) Mercury absorbed into the steel is not removed after mercuric sulphide and other scale is removed.
2) Misclassification of waste - defective leaching experiments - delivery of waste containing mercury as ordinary waste.
3) Incorrect storage of contaminated equipment. AF Decom has previously been fined NOK 750,000 on 28.11.2011 for storing cooling tubes containing mercury outside the base area.
4) Storing large quantities of radioactive material will lead to some emissions of radon, which will transform into Pb210 and form "Black Powder" on contact with rust and sulphide.
5) In the event of a fire. There have been a number of fires and outbreaks of fires in the area.

E) Marine fouling.

1) Odours from marine fouling
2) Marine growth leads to large amounts of seagulls due to unlimited access to food.

[1] http://www.osti.gov/scitech/biblio/41313

3) Large numbers of sea gulls take the marine fouling and poisons from the activities out of the base area.

F) Evaluate whether there may be other opportunities for emissions.

The emission limits for prioritised poisons apply to all forms of poison emissions and pollution from the base.

Since NIVA guarantees that **emission limits are not exceeded**, NIVA must have full and complete control of all possible pollution parameters, including those described under: 6.2.1, 6.2.2, 6.2.3 and 6.2.4 in this letter.

Below are some pictures from the base that illustrate how dust and particles are dispersed from the operating site at AF Decom.

Figure 2: Example of dust escape from the base

Figure 3: Example of dust escape when platform structures are tipped over.

Figure 4: Example of dust escape due to torch cutting.

Figure 5: Dust that has settled in tub at RF after a few months

Figure 6: Dust containing 109 mg/kg Hg on the sea after overturning as mentioned above.

Figure 7: Dust that settled in the attic of RF after an overturning as mentioned above.

We are also sending a memory stick with even more photos and video clips showing how dust and particles are dispersed from the operating site, including dust and particles from structures contaminated with poison:

**Bilag 13** Memory stick with analyses, photographs and video clips from the activities at AF Decom

## 2.7 Topography

⅔ of AF Decom's installation base is adjacent to land and ⅓ of the base is adjacent to the sea. The terrain around the base is steep, which results in a high level of water run-off to the sea.

**Bilag 14** Map of the border area of AF Decom, dated: 19.01.2015

For emissions by air, therefore, much of the dust and vapour will fall on land, but due to the nature of the terrain around the base, a substantial proportion of this will ultimately end up in the sea (time delay before contamination reaches the sea).

AF Decom has implemented measures with sweeping (from April 2010) and irrigation of the operating site (from April 2012). The irrigation has reduced the air spread, but there will continue to be air spread from the operating site.

**Bilag 15** Confirmation from AF Decom AS when sweeping and irrigation was initiated, dated: 21.3.2013.

# 3 AF Decom's emission permits

## 3.1 Introduction

NIVA's monitoring programme concerns AF Decom's emission permits and whether emissions have occurred in violation of the emission permits.

There are two current emission permits; (i) from the Environment Agency (formerly the Climate and Pollution Agency (KLIF) and the County Prefect of Rogaland) and (ii) from the Norwegian Pollution Control Authority.

## 3.2 Permit from the Environment Agency of 27.04.2007, last amended on 13.03.2013

**Bilag 16** A copy of the emission permit and the conditions section from the Environment Agency, latest version 13.03.2013

With regard to emissions to the sea, it emerges inter alia from paragraph 3.3 in the permit that AF Decom has the right to emit 40 grams of mercury per year. Before March 2013, the emission limit was 60 grams per year.

It should be noted with regard to emissions to the air:

It follows from paragraph 2.1 of the conditions section that

> *The emission components from the activities that are assumed to have the greatest impact on the environment are explicitly regulated by specific conditions in section 3 et seq of this permit. Emissions that are not specifically regulated in this manner are covered by the permit to the extent that information concerning such emissions was presented in connection with the proceedings or must be deemed to have been known by other means when the decision was made. However, this does not apply to discharges of prioritised substances listed in the annex to this permit. Emissions of such components are only covered by the permit if this is stated explicitly in the terms in section 3 et seq, or they are so small that they must be deemed to be of no environmental significance."*

It further emerges from paragraph 4.2 of the conditions section that

> *"Emissions of dust/particles from the activities in the business area must not cause the quantity of fallout dust to exceed 3 g/m$^2$ per 30 days with an averaging period of three months. This applies to the mineral portion measured at the nearest neighbour or another neighbour who may be more exposed."*

Annex 1 lists the prioritised environmental poisons that are covered by paragraph 2.1 above. It follows from the text in the annex that

*"Emissions of these components are only covered by the permit if this is stated explicitly in the terms in section 3 et seq, or they are so small that they must be deemed to be of no environmental significance."*

The principle is thus that there is a requirement for **zero emissions** to the air of metals and metal compounds such as arsenic, lead, mercury and mercury compounds and organic compounds, such as chlorinated dioxins and polychlorinated biphenyls (PCB). + Nevertheless, Annex 1 contains exceptions in case *"the components ...* ***are so small that they must be considered to have no environmental impact."*** (our emphasis)

What is considered to have no environmental impact is discretionary, but the limit set for e.g. emissions of mercury to the sea is an adequate reference (40 grams per year). Furthermore, what has an environmental impact must be seen in the context of the objective of having zero emissions of mercury at a national level by 2020, cf. Norway's obligations under the OSPAR treaty.

## 3.3 Permit of 10.12.2013 from the Norwegian Radiation Protection Authority for AF Decom Offshore AS

The permit is presented as a

**Bilag 17** Copy of the grounds section and conditions section of the permit from the Norwegian Radiation Protection Authority of 10.12.2013

**Bilag 18** Copy of the conditions section of the permit from the Norwegian Radiation Protection Authority of 10.12.2013

It follows from paragraph 1.3 of the conditions section that

*"The permit does not cover the release of radioactive substances into the air or soil."*

Paragraph 2.2 also has the following provision:

"Emissions that are not specifically regulated through specific conditions in this permit are covered to the extent that information concerning such emissions was presented in connection with the proceedings or must be deemed to have been known by other means when the decision was made."

The application of 30.06.2011, paragraph 5.2, page 15, states the following regarding emissions to the air or ground:

*"AF Decom Offshore has, in addition to undertaking a number of measures to minimize the risk of spreading radioactive substances or dust, also invested considerable effort to investigate whether operations in Vats lead to or may lead to radioactive contamination of the air or soil.*

***There is no evidence, and there is also no reason to expect, that the activities cause radioactive contamination of the air or soil*** *(ref. letters of 25.06.2010, 22.12.2010 and 01.03.2011 from AF Decom Offshore regarding emissions to air or soil - see Annex 2)*

*AF Decom Offshore will use the established environmental monitoring programme to continue to monitor the local environment with regard to possible radioactive contamination of the air or soil."*

(our emphasis)

**Bilag 19** A copy of the application of 30.6.2011 from AF Decom Offshore AS to the Norwegian Radiation Protection Authority

Paragraph 1.3 of the permit, cf. paragraph 2.2, together with paragraph 5.2 of the application thus implies that no emissions of radioactive substances at all would occur from AF Decom's operations.

The permit from the Norwegian Radiation Protection Authority contains no restricted right to emissions with regard to what

is diffuse or what has no environmental impact, although we have been informed by the Norwegian Radiation Protection Authority that they nevertheless interpret into this a right to make emissions in relation to this, without this being quantitatively defined in more detail.

# 4 NIVA's conclusions and acquittal of AF Decom AS

NIVA has submitted the following reports from environmental investigations carried out in connection with AF Decom's activities on Raunes regarding the scrapping of oil rigs:

**Bilag 20** A copy of the annual report from the Environmental Monitoring of AF Miljøbase Vats for 2009, issued in 2010

**Bilag 21** A copy of the annual report from the Environmental Monitoring of AF Miljøbase Vats for 2010, issued 11.02.2011

**Bilag 22** A copy of the annual report from the Environmental Monitoring of AF Miljøbase Vats for 2011, issued 21.02.2012

**Bilag 23** A copy of the annual report from the Environmental Monitoring of AF Miljøbase Vats for 2012, issued 04.03.2013

**Bilag 24** A copy of the annual report from the Environmental Monitoring of AF Miljøbase Vats for 2013, issued 04.04.2014

**Bilag 25** A copy of the annual report from the Environmental Monitoring of AF Miljøbase Vats for 2014, issued 25.02.2015

NIVA consistently concludes that the environmental situation in the area around AF Decom's operations on Raunes, including in Vats fjord, are no worse than was the case before the operations commenced.

In the preface to NIVA's last report for 2014, published on 25 February 2015, NIVA states:

***"NIVA's environmental monitoring of AF Miljøbase Vats shows that the operation's emissions to the sea in 2014 were within the applicable emissions permit and were without any appreciable impact on the pollution status in the fjord environment outside the base."*** (our emphasis)

Thus, NIVA makes 2 different assertions:

a) Within the applicable emissions limit.
b) Without any significant impact on the pollution status of the fjord environment outside the base.

It is our opinion that this is clearly incorrect.

Based on what we intend to present, we believe that NIVA does not have a single viable argument for asserting that AF Decom operates within the applicable emissions limits.

Moreover, the emissions definitely have had and continue to have a major impact on the pollution status of the fjord environment outside the base.

We do not expect NENT to consider the environmental situation in the area around AF Decom's operating area, but we ask NENT to assess NIVA's role, methods and quality and to give its opinion on whether these analysis methods are in accordance with the requirements expected for environmental investigations of this type, especially since NIVA itself claims to follow NENT's ethical guidelines.

It is not just NIVA's measurement methods and conclusions that we believe are largely incorrect. It is also the relationship between NIVA as monitor, the Environment Agency as inspector and AF Decom as client. The Environment Agency relies on NIVA's premises, both in relation to the environmental reports that are submitted and as a direct adviser for the Environment Agency in relation to the activities of AF Decom. We are also aware that the Environment Agency is also a major client for NIVA.

We therefore also find it necessary to provide examples of the Environment Agency's mode of action in order to provide NENT with an understanding of the case, although it does not directly have anything to do with our request to NENT, other than to put it in some perspective and demonstrate the significance that NIVA's behaviour has for the Environment Agency's exercise of its authority.

# 5 NIVA's independence

## 5.1 Introduction

A central ethical principle in research is the requirement for independence/impartiality. This is enshrined in paragraph 6 of the General guidelines for research ethics of NENT (which also apply to NIVA), that:

*"Impartiality is about avoiding mixing roles and relationships that could provide reasonable grounds for suspecting conflicts of interest. Openness about relevant roles and the relationships that the researcher has, should be clarified for colleagues, research participants, funding sources and other relevant stakeholders. "*

Thus, there are requirements set not only for *independence in fact*, but also for so-called *independence in appearance*. This is an important guideline and in accordance with the independence requirements for other actors, who also base their activities on the trust of society, such as auditors, and where, among other things, it is foreseeable that e.g. reports from such an actor will form the basis for decisions by third parties.

In connection with the assignment on Raunes, we have experienced several times that NIVA acts in roles that are not consistent with an independent role, and that at the very least *"could provide reasonable grounds for suspecting a conflict of interest"*. Examples of this include:

## 5.2 Acting as a spokesperson for the client regarding "competing" investigations

In connection with RF taking samples from gutters and air filter in the area around the operating site of AF Decom, which showed that there is a dispersal of toxins from the site, project manager Astri Kvassnes from NIVA acted as a spokesperson for AF Decom when they tried to explain that these samples could not be accepted.

The arguments used by NIVA were also incorrect and can be countered if necessary - but the important issue in this context is that NIVA acted as a spokesperson regarding "competing" investigations and thereby attempted to undermine these investigations. NIVA cannot act both in an independent role towards the client and simultaneously act as the client's representative regarding other investigations that produce a different result than the result obtained by NIVA.

**Bilag 26** A copy of the article in the newspaper Haugesunds Avis, dated 12.03.2012.

## 5.3 Orders from the client to change the implementation of investigations

In 2012, NIVA changed fishermen to obtain analytical material for analysis of fish and shellfish. This occurred according to instructions from AF Decom because they were not satisfied that the fisherman that had been used until then had spoken out about AF Decom's activities in the press, like many others in the local community. No information has come to light indicating that the fisherman's statements had any impact on his professional performance of the assignment for NIVA. This matter

was raised in an article in the newspaper Dagbladet. Initially, NIVA argued that there were technical reasons for the change of fisherman, but it later changed its statement and acknowledged that the change of fisherman had occurred at the request of AF Decom. NENT has previously criticized NIVA for this change of fisherman.

This is an illustrative example of an institution that is not acting independently of the client. For these studies, it is also of technical importance that there is continuity in terms of how and where the samples of the organisms are taken, cf. below regarding the requirement for quality in the surveys. This consideration was not taken into account, since there was no transfer of knowledge from one fisherman to the other. NIVA will not even disclose who the new fisherman is, making it impossible to verify that the catch has taken place with the necessary continuity in order to assess the surveys over time based on the same factual basis.

**Bilag 27** Copies of articles in the newspaper Dagbladet, 25.03.2012 to 24.09.2014

**Bilag 28** A copy of the letter from NENT to the journalist Asle Hansen in the newspaper Dagbladet dated 07.05.2012

Despite this, NIVA did not correct the information regarding the fisherman on its website, even after several reminders from the Norwegian Fisherman's Association.

**Bilag 29** A copy of a letter from the Norwegian Fisherman's Association dated 17.10.2014.

## 5.4 NIVA's employee in a dual role

The audit report from the Norwegian Radiation Protection Authority from the autumn of 2014 for AF Decom's plant on Raunes states that Per Varskog was acting as AF Decom's representative. At a public meeting in Tysvær on 3 June 2015 organised by the Tysvær branch of the Norwegian Labour Party, it was also confirmed by AF Decom's representatives at the meeting, Jøran Bann and Veslemøy Eriksen, that Per Varskog actually worked on an assignment for AF Decom.

NIVA's annual report for AF Decom's "Miljøbase Vats" regarding the environmental survey of 2013 (page 31) and 2014 (pages 80-91) states that Per Varskog was responsible for this part of the investigation for NIVA.

Thus, Per Varskog acts as a representative for both AF Decom, who were to be monitored, and as a representative for NIVA who were to carry out the monitoring. Although the representation on behalf of AF Decom was in relation to the Norwegian Radiation Protection Authority and not directly in relation to NIVA, in our view this is yet another example of the fundamental mixing of roles - and without this mixing of roles being described in the report to NIVA (that the monitor also works for the person being monitored). In this context, it is irrelevant whether Per Varskog is acting as a consultant or an employee in these roles.

**Bilag 30** A copy of the audit report from the Norwegian Radiation Protection Authority of 24.11.2014.

## 5.5 NIVA also advises on the same matter for the Environment Agency

In connection with the district court's consideration of the case between Raunes Fiskefarm AS and ConocoPhillips Skandinavia AS (CoP) in January 2014, the witness answered questions from Head of Department at the Environment Agency, Signe Nåmdal, about the pollution situation in Vats fjord in such a way that the Environment Agency felt it necessary to provide corrective information to the media.

In this regard, the Environment Agency used NIVA as a consultant with regard to how to behave in the media. Subsequently, it also emerged that NIVA was an advisor for the Environment Agency before this presentation of evidence, where NIVA also acted in consultation with AF Decom (at that time, AF Decom was not a party, but was still very involved in the case as the directly accused polluter. AF Decom later entered into the proceedings - in the Court of Appeal - as intervener and supported all of CoP's stances in the case). This is evident from:

**Bilag 31** A copy of the memorandum of 22.01.2014 from NIVA to the Environment Agency with a copy to AF Decom

**Bilag 32** A copy of an e-mail of 23.01.2014 from the Environment Agency to NIVA, and a reply from NIVA to the Environment Agency

**Bilag 33** A copy of an e-mail of 24.01.2014 from Jonny Beyer in NIVA to the Environment Agency

It is our belief that here, NIVA has been actively involved in a legal process by providing advice about their own and other research institutes' investigations. This is particularly striking, since NIVA here discussed emissions of PCB, which were measured in cod livers by NIVA immediately outside the installation base with double the amount that the Norwegian Food Safety Authority considers acceptable, without this being noted or challenged in its report in any way, cf. below under "quality". This was pointed out during the trial.

The journalist, Tor Gunnar Tollaksen, commented in the newspaper Stavanger Aftenblad, after hearing Signe Nåmdal's explanation in Stavanger District Court in January 2014, where she could not answer 18 simple questions about pollution:

*"The clear criticism that the 22 July Commission presented in its report refers to, among other things, the fragmented administration. Responsibility and follow-up disappear in the bureaucratic system. The testimony of Head of Department Signe Nåmdal from the Environment Agency was in this respect no reason to clear the administration. As a representative for the Environment Agency, she demonstrated little knowledge of what is happening in Vats. She was also unable to say whether the agency monitor NIVA's work."*

**Bilag 34** Stavanger Aftenblad article 24.01.2014

After negative press, NIVA obviously had a need to explain itself and it used the Environment Agency as a means of presenting an attempt at correction. The Environment Agency could use NIVA as legitimacy to correct a very bad impression in court, cf. refer to the media reports above.

If NIVA has regarded it assistance to the Environment Agency in this context as an assignment, we assume that there is both an order for the work and that the work was invoiced.

The point here is that NIVA is not acting independently when they involve themselves during the actual judicial process "behind the scenes" in coordination with AF Decom and as an advisor for the Environment Agency, which has administrative responsibility for AF Decom, and otherwise has a vested interest in the case, since the Environment Agency has disputed that there is any contamination at all occurring, except what is permitted.

## 5.6 Summary of impartiality

In general, we believe that NIVA's behaviour shows an institution that is clearly violating the conditions for impartiality in relation to the client and also in its role in relation to the Environment Agency, as well as in relation to society generally, which must be able to rely on NIVA's integrity.

NIVA has worked closely with the Environment Agency and AF Decom and has spent many hours on compilations for and questions from the Environment Agency in this case. While we will later in this letter show that NIVA demanded payment from RF to disclose information which, in our view, for reasons of technical method and trust in order to verify conclusions, should be enclosed in annual reports, see 8.4.3.

We request NENT to make an assessment of this and to give its opinion on whether this behaviour is in accordance with what one would expect of an independent research/investigation body, based on NENT's ethical guidelines.

NIVA's behaviour must be seen in the context of the financial importance that the assignment has for the institution, and not only in relation to the assignment's size, but also in view of the possibility of obtaining new assignments. Any contractor like NIVA will obviously dispute that financial considerations affect its investigations, assessments and conclusions. Such links would also be difficult to document. Precisely for this reason, there must be a focus on the requirement for impartiality/independence, which is also enshrined in NENT's guidelines, cf. above.

**Bilag 35** Showing how AF Decom advertises about monitoring on its website.

# 6 The requirement for quality

## 6.1 Introduction

Another key principle of research ethics is the requirement for quality, cf. paragraph 3 of the General guidelines for research ethics, which states that:

*"The research must be of high technical quality. It is a requirement that the researcher and the institution possess the necessary expertise, design relevant research questions, make appropriate method choices and ensure proper and appropriate project implementation in relation to data collection, data processing and storage of the material."*

When conducting an environmental survey of potential environmentally harmful emissions from a company (i.e. the project), it must be expected that the party carrying out the study has the necessary knowledge ("possesses the necessary expertise") and familiarises itself with which environmental poisons such companies are known to work with which there is a risk that they may be released into the environment, and the manner in which such emissions can occur and the best way in which these can be detected ("relevant research questions"). Secondly, in our opinion it is important to establish measurements that have detection limits that can capture adverse and illegal emissions, and also to make sure that the analysis and measurement methods used ensure that such emissions are both detected and analysed in a correct manner ("choice of method") and that the samples are stored for later reference ("storage of material").

## 6.2 Methodological errors in NIVA's monitoring programme

### 6.2.1 *Introduction*

Since AF Decom is required by the Environment Agency to operate according to BAT ("Best Available Technology"), it is in our view also obvious that a monitoring body (NIVA) must follow the BAT principle in order to perform adequate monitoring, cf. the remarks above.

In our opinion, NIVA has not performed an adequate risk assessment of the substances arising from the work processes. This is a clear qualitative defect in NIVA's monitoring. If this had been done, NIVA would have had better knowledge of what the company is doing, that the company process large amounts of environmental poisons and how the company operates. The monitoring that has been initiated and to which we will return, shows that NIVA cannot have thoroughly familiarised itself with how the company is run.

The natural continuation after having looked into what happens would be to construct a methodology in order to monitor this on as good a basis as possible.

If NIVA does not have the necessary expertise to perform all necessary monitoring, NIVA should have added other monitors who had such expertise, or else not accepted the assignment.

Since NIVA states that the company does not pollute the environment and has complied with the emission limits, this includes not only the usual pollution from the company, but also other

contamination risks. Examples of other circumstances that NIVA should have been especially aware of when the monitoring programme was designed:

### 6.2.2 Monitoring of radioactive lead

We cannot see that radioactive lead, Pb210, was separately monitored in a technically acceptable way.

It is well known in the industry that Pb210 is found in "Black Powder". Pb210 is formed from Radon (Rn) during the drilling process and the production process. Pb210 is found in both the water phase and in the oil/gas phase. Because of the way Pb210 is formed, a large proportion of the particles are extremely small, about 20 nm. These nano-particles can float in the air over long distances, and therefore require special monitoring.

Black Powder that dries can also ignite spontaneously. Based on the monitoring of the radioactivity that NIVA initiated, it seems that they focused only on radioactivity that is formed in the water phase and did not take account of radon and consequently of radioactive lead that is formed in the oil/gas phase. Pb210 emits only beta radiation, which rust, asphalt etc. will shield for radiation, and it is not easy to measure Pb210 on convex surfaces such as pipes with hand-held instruments. To find the Pb210 content, therefore, samples must be submitted for analysis.

### 6.2.3 *Monitoring of emissions of dioxins*

Torch cutting on painted surfaces where there is chlorine and bromine present (e.g. paint containing PCB) will release dioxins. Large parts of the dioxins will be dispersed outside the base through the air. These are highly toxic substances that should be monitored separately. NIVA does not have an adequate monitoring programme for dioxins. Other analyses from Vats fjord show that the dioxin levels in fish analyses are far higher than the EU limit for food safety.

It is a methodological error that NIVA has not considered the relationship between the work that is done and the risk of emissions and initiated investigations on this basis

### 6.2.4 *Monitoring of metallic mercury and mercuric oxide*

Torch cutting of pipes with scale containing mercuric sulphide and other mercuric salts, the mercuric sulphide will decompose during induction pre-heating or pre-heating before torch cutting. During the actual torch cutting, the mercuric sulphide decomposes to metallic mercury and sulphur. Due to the high temperature, the sulphur will then react with oxygen to form sulphur dioxide. Some of the metallic mercury will then react with oxygen to form mercuric oxide.

NIVA's monitoring programme has not arranged for measurements that can detect these emissions. This is a clear qualitative defect in the programme.

### 6.2.5 *Monitoring of mercury in steel*

Another well-known phenomenon in the oil industry is "mercury in steel," the metallic mercury which penetrates the steel in pipes and equipment that have carried oil and gas. This will be released

during torch cutting and remelting of the steel and cannot be removed with high pressure hosing, as is the case with mercury sulphide. NIVA has not commented on the fact that the mercury penetrates into the steel and it has not made any measurements of this. This could lead to harmful mercury emissions when the steel is remelted or where the dust filter is processed. *This is also a methodological error.*

### 6.2.6 *Expected treatment of mercuric sulphide*

It is well known that the most problematic waste in scale is **mercuric sulphide** (Ref. Annex 36 of this letter). Scale is a coating inside production pipes that have carried crude oil and natural gas. NIVA's impact assessment for scrapping operations performed in the fjord also mentions it under paragraph 3.3.3 (Bilag 58 of this letter). This is also confirmed by AF Decom in a letter to the County Prefect in Rogaland

**Bilag 36** Letter to the County Prefect of Rogaland of 04.07.2006, where AF Decom admits to having discharged **558.96 grams of mercury** in the form of mercuric sulphide

There are also some errors in this letter that must be commented upon and which are important to understand.

#### *6.2.6.1 Error 1 - Mercuric sulphide is "a stable compound that will not harm the seabed"*

It is claimed that mercuric sulphide is "a stable compound that will not cause damage to the seabed."

This is completely wrong. We refer here to Professor Einar Sletten's statements regarding methylation:

**Bilag 37** Memorandum from Professor Einar Sletten about methylation of mercuric sulphide, dated 05.01.2015

**Bilag 38** Note from Professor Einar Sletten about methylation of nano-particles of mercuric sulphide, dated 07.02.2015

**Bilag 39** SERDP report on methylation of mercuric sulphide nano-particles, dated 01.08.2014

Mercuric sulphide will be decomposed by bacteria, nano-particles can be methylated relatively quickly, while natural mercuric sulphide will be methylated over 5-30 years, depending on several factors such as particle size, oxygen content, bacteria flora etc. In other words, it takes several years before the release of mercuric sulphide becomes methylated and absorbable in organisms.

NIVA does not mention a single word about methylation in their annual reports, and since the environmental reports claim to present **the current situation on Raunes**, a totally misleading picture is provided to the readers of the report. This is a serious methodological error in the reports.

#### *6.2.6.2 Error 2 - The emissions specified in the letter to the County Prefect (Annex 36) are also incorrectly calculated*

The emissions specified in the letter to the County Prefect (Annex 36) are also incorrectly calculated

According to the precipitation data from the Norwegian Meteorological Institute, precipitation was not linear throughout the year 2005. In the last quarter of the year, when most of the emissions occurred, the precipitation was approximately equal to the other three quarters combined, so that the real emissions are almost double the amount stated.

#### *6.2.6.3 Error 3 - "mercury-containing metal creates a number of new challenges for the receiving facility '*

Furthermore, it is claimed in the same letter *that the "mercury-containing metal creates a number of new challenges for the receiving facility" and that "These conditions were not sufficiently identified when the receiving facility was built and when a permit was applied for pursuant to the Pollution Control Act (emissions permit) in 2004."*

Thus, AF Decom AS had not prepared themselves well enough for what they might have to break up, i.e. a facility that should receive and treat very dangerous toxins and radioactivity was established according to the principle: *"make it up as you go along"*.

During the legal proceedings, however, AF Decom has always claimed that they were well aware of everything they were supposed to receive. This was repeated as recently as the public meeting in Tysvær on 3 June 2015 by AF Decom's HSE manager, Jøran Bann.

One thing is that AF Decom changed their testimony about what they knew and what they did not know. That the client is not in control is something that NIVA should have "detected" by carry out an independent assessment itself of the pollution risk associated with AF Decom's activities, cf. above regarding methodological errors. An institution like NIVA should have expertise and knowledge regarding the different categories of mercury in steel structures contaminated with mercury, and should have designed their own investigation programme in accordance with this.

To conduct a proper, technically professional investigation, NIVA should thus have quality ensured that the analyses would show the correct values of mercury and that mercuric sulphide, which is not soluble in hot, concentrated nitric acid, was measured in the correct manner, i.e. with solubility in aqua regia.

### 6.2.7 *Incorrect use of solubility in NIVA's measurements*

NIVA used decomposition in *nitric acid* to analyse mercuric sulphide.

Professor Einar Sletten at UiB, Eurofins and Molab have all confirmed that solubility in *aqua regia* must be used to make a correct analysis of mercuric sulphide.

**Bilag 40** A copy of the e-mail from Professor Einar Sletten of 08.03.2015

**Bilag 41** A copy of the e-mail from Eurofins of 05.06.2015

Attached are the analyses of sand and gravel from AF Decom's working area that came with the asphalt up to the gravel plant in Røyrvika. The samples are taken both with solution in *nitric acid* and in *aqua regia*. The differences are shown by the analyses:

**Bilag 42** E-mail with analysis from Eurofins, dated 11.06.2015. Analysis from Eurofins of sand and gravel from AF Decom's dumping of asphalt in the crushed stone plant in Røyrvika. Analysed again on 11.06.2015 with both nitric acid solution and aqua regia.

The difference in the results when using *nitric acid,* as NIVA did, and using *aqua regia,* the method NIVA should have used, shows the following:

| | | |
|---|---|---|
| Results with *nitric acid* solution: | **2.52 mg/kg Mercury** | (pos. 6 in the analysis) |
| Results with *aqua regia* solution: | **11.00 mg/kg Mercury** | (last position in the analysis) |

In this analysis, the difference between the measurement methods is **436%**, which shows that it is completely wrong to use nitric acid solution, which we can see that both NIVA and AF Decom have done. The differences are smaller in other tests. Obviously, this depends on the mercuric sulphide level, but it can also appear that a certain amount of mercuric sulphide is analysed by nitric acid solution, probably the nanoparticles and/or the smallest mercuric sulphide particles.

As indicated in the analyses that are attached to NIVA's annual reports, nitric acid solution was used. NIVA has also confirmed this to one of our expert advisers, Professor Anders Goksøyr at UiB.

NIVA has conducted both stairstep moss (Hylocomium splendens) and soil analyses with solutions of nitric acid. NIVA has also stated that previously collected samples have been discarded and therefore cannot be analysed again.

Disposing of sample material is also contrary to NENT's ethical guidelines, cf. Section 3, last sentence.

It is our belief that NIVA, by not following a recognized method for measuring mercuric sulphide and also by not preserving the sample material for later verification, has committed a very serious qualitative and methodological error.

A possible lack of knowledge in this field is also a serious quality defect, because in that case, NIVA has undertaken an assignment that they are not competent to perform.

This means that the previous tests conducted by NIVA, and for that matter AF Decom, regarding mercury levels on the base, are not correct. AF Decom has also used nitric acid solution in the analysis to which we have had access.

**The biggest pollution problem, mercuric sulphide, is beyond control because an incorrect analysis method has been used.**

## 6.3 Emissions to air - Dust escape

The way in which NIVA has chosen to examine emissions to the air and determine that the company does not pollute is by using:

1) Stairstep moss samples
2) Soil samples

We have mentioned the ways in which emissions can occur under 2.6 in this letter.

### 6.3.1 *Stairstep moss (Hylocomium splendens)*

During the court case, when RF referred to the stairstep moss samples and said this had to be pollution from the base, AF Decom explained that the court could not take the moss samples into account because *"the method was not scientifically recognized":*

AF Decom has also expressed this view through their lawyer.

*"Moss analyses as a method to investigate possible airborne contaminants is pioneering work in the sense that one is seeking new methods to investigate any airborne contaminants. This is innovative work and there is no equivalent in connection with any other industrial enterprises that AF is aware of.* ***The method is not recognized,*** *but AF has chosen to fund this research in the hope that this may provide an early warning of possible contamination."* (our emphasis)

**Bilag 43** Printout of written proceedings from Schjødt of 13.02.2012

Thus, in collaboration with AF Decom, NIVA has chosen to use such an "unrecognised" test method, even though there are currently recognized methods, i.e. multiple air filter measurements around and in the base area, combined with anemometers, preferably combined with more advanced equipment that can e.g. measure and quantify any mercury and other emissions occurring minute by minute and which, in combination with video surveillance of the processes, can be used to develop BAT processes.

Using such a method, it is possible to retrospectively investigate at which work processes the highest emissions occurred, improve them and thereby reduce emissions and develop BAT.

Despite the method used by NIVA in connection with the moss surveys, the results of these tests are provided in the annual reports without mentioning any such reservations. NIVA's moss surveys are thus also used as a reference to show the environmental situation around AF Decom's facility on Raunes, without making any attempt to demonstrate that these investigations have limited significance.

The annual reports also made comparisons with and references to the nationwide moss investigations led by Professor Eilif Steinnes at NTNU.

The moss samples that NIVA used to assess the spread of dust from the plant were not gathered according to the methods used by the nationwide survey led by Professor Eiliv Steinnes. Professor Steinnes has commented:

**Bilag 44** Statement from Professor Eilif Steinnes at NTNU of 30.12.2014.

Among other things, NIVA has:

1. Dried the moss in a drying cabinet with fan at 50ºC, while the moss in the nationwide survey was dried at room temperature without a fan.

*A test in the nationwide survey showed a reduction in mercury levels of about 20% when drying using a fan, without increasing the temperature.*

2. NIVA has used last year's shoots, while the nationwide survey used shots from the last three years.
3. There was no correction made for $Na^+$ and $Ca^{2+}$ ions, which is essential in order to take into account the amount of precipitation in Vestlandet.
4. NIVA has also failed to take particle size into consideration.

NIVA's comparison with the nationwide studies is therefore incorrect and directly misleading, since it is implied that the analyses were carried out using the same method.

After NIVA was made aware of the above remarks, the above points were:

1. Rejected by NIVA by referring to a French article that supposedly stated that the temperature had little significance, and that it would investigate this matter further, which was done in NIVA's annual report for 2013, published on 7 February 2014. See our comments below.
2. Not commented.
3. NIVA promised that they would make corrections in the future.
4. NIVA confirmed that analysis of particle size was not performed.

**Bilag 45** Questions for NIVA regarding stairstep moss samples dated 13.03.2013

**Bilag 46** Reply from NIVA dated 16.05.2013

**Our comments:**

The national stairstep moss programme was tested around the country in 470 different localities, of which 15 were metallurgical enterprises. The mercury emissions from these companies were in the form of metallic mercury in vapour form. This means that the experiences with mercury uptake in the moss are based on metallic mercury that behaves very differently than the particulate mercury which is mainly the case in Vats.

It is known that metallic mercury in vapour form has a dispersal radius of about 1,000 km, while all particulate mercury will fall in neighbouring areas. Particulate mercury is therefore far more serious for the area where the emissions occur.

NIVA performed a simple test, varying the temperature theoretically in the drying room, where they took some samples closest to the source, with the highest values and compared these under virtually the same conditions, and then found only a reduction of 1.8% and they draws the conclusion that the temperature is immaterial.

Example:

The mercury in the stairstep moss consists of 90% mercury salts and organic mercury (mercuric chloride, mercuric bromide, methyl mercury etc.) and 10% metallic mercury. The loss due to using a fan in a heating cupboard is approximately 20%. The result for NIVA will be correct about 2%, but the conclusion NIVA has made would still be wrong.

The base emits metallic mercury e.g. during metal cutting and thermal decomposition of the mercuric sulphide coating inside the pipes, vapour from metallic mercury in scale, etc. It is known that mercuric chloride, mercuric bromide and mercuric oxide are present, in addition to the **main component mercuric sulphide**.

The ratio of these components depends on the work that is performed at the base and yet the figures that NIVA arrives at are random and not based on the academic standards we would expect of NIVA.

But the most important matter is:

We also cannot see that NIVA has examined whether mercuric sulphide, which **is the main pollution parameter at the base, is even absorbed in the stairstep moss.**

The stairstep moss absorbs metal ions from the fallout, mercuric sulphide does not dissolve in water and does not form metal ions. How is mercuric sulphide then absorbed by the stairstep moss? If any mercuric sulphide is absorbed by the stairstep moss, would the quantification of the mercury then be correct?

The mercuric sulphide is not released to the air elsewhere in this area, other than where platforms are decommissioned, as far as we know. NIVA should therefore have conducted very thorough research around the operating site, before NIVA decided to detect any air spread from the base using stairstep moss.

It is natural that the heaviest particles drop down nearest the base. NIVA has confirmed that it has not conducted any analysis of the particle size of the dust escape. We have noted that the particle size may range from flakes of several millimetres, down to nano-particles. How are the largest particles absorbed in the moss?

The stairstep moss has capillary tubes with a diameter of 10-20 microns. How then is it possible to obtain reliable measurements of mercuric sulphide fallout, when the particles to be measured may be hundreds of times larger than the moss can absorb, since mercuric sulphide is not soluble in water?

These conditions should have been thoroughly examined before NIVA chose this method to detect any mercury dispersal from the business.

It is stated in NIVA's annual reports that the moss samples were analysed at NIVA's laboratory in Bergen. However, this laboratory is not accredited for these analyses.

This is not evident from the report, but is mentioned in small print in the annexes to the report.

Although this does not necessarily mean that the results themselves are not correct, it should be made clear in the body of the report that the analyses were not conducted by an accredited laboratory. This raises questions regarding the requirement for quality, cf. the guidelines' Section 3, but also with respect to the guidelines' section 1 regarding the quest for truth and Section 4 regarding probity.

Furthermore, NIVA has not analysed the mercury in the stairstep moss using aqua regia solution.

**The circumstances described here mean that it is highly probable that the way in which NIVA has chosen to detect the dust escape from the base has resulted in incorrect and far too low mercury levels.**

### 6.3.2 *Detection limits in soil - NIVA's soil samples*

The soil tests performed by NIVA were not carried out according to the methods that should be applied. We refer to the statement from Professor Eilif Steinnes at NTNU, who points out that these were not performed in a competent professional manner.

**Bilag 47** Statement to the Ministry of Local Government and Modernisation from Professor Eilif Steinnes at NTNU, dated 27.05.2015

According to NIVA's reports, a sharp increase in mercury levels occurred at some locations outside of AF Decom's area, cf. measurement point (J1), located just outside the fence of AF Decom facing north.

The development at the point J1 from NIVA's reports:

2009 **0.14 mg** Hg/kg
2010 **3.39 mg** Hg/kg
2011 **2.73 mg** Hg/kg
2012 **5.33 mg** Hg/kg

According to the Environment Agency's standard, 5.33 mg Hg/kg is defined as Class IV, poor, which according to the standard can result in "Acute toxicity with short-term exposure."

It is apparent to anyone that supply an addition of mercury will mean that, **not many square metres** are needed before the emission limit values for AF Decom are reached and exceeded.

The emission limit is only 40 g mercury per year to sea, but even if this has arrived by air, the emission will eventually end up in the sea due to run-off.

Since we also know that there is a lot of rain and heavy run-off in the area, the supply of mercury should have concerned NIVA and they should have initiated a more thorough investigation. NIVA has only commented on the emissions and the increase.

This emission that was demonstrated by NIVA, along with RF's own investigations, made us decide to contact Bioforsk in order to map out the mercury added to areas outside the base.

NIVA did not ask the neighbours for permission to take soil samples or whether something might have happened to the area where they take soil samples. One example of this:

The farm of Elling Frøland, one of the neighbours to AF Decom, was quarantined by the Norwegian Food Safety Authority due to suspected scrapie because he had bought lamb from another herd where the purchase scrapie had been detected. Although Elling Frøland's farm was well marked and signposted according to the Norwegian Food Safety Authorities' rules, NIVA's personnel took no notice of this and went in and took samples before they proceeded to the neighbouring farm.

### 6.3.3 *Detection limits for air emissions*

**Regarding the use of status classifications as reference for the pollution situation in the soil outside the base area.**

Pollution, i.e. the supply of environmental pollutants from the company to areas outside the company's area, with the exception of emissions from the actual discharge pipe, were described by NIVA such that the toxins around the operating site ***are within acceptable status classifications,*** which are established by the Environment Agency.

As mentioned, the Environment Agency has stipulated that the emissions permit to the sea is for only 40 g of mercury per year. The emission limit for toxins to air is zero, provided this does not have any "environmental impact". This is a vague concept of emissions, but the emissions limit to the sea is an adequate benchmark for what are acceptable emissions, since most mercury, for example, will run off into the sea anyway.

In our opinion, referring to status classifications is not a qualitatively acceptable method for measuring whether illegal emissions of toxins occur over time (addition of toxins by air), or whether the activity has an impact on the environmental conditions.

Changing a status classification in the border zone (see Bilag 14) for e.g. AF Decom, would require the addition of 43.4 kg of mercury based only on a changed mercury level than status classification only in the top layer of 5 cm, i.e. 1,000 times more than what AF Decom has permission to release into the sea. The statements of the Environment Agency and NIVA that the limit value for Class I in the area has not been exceeded, appears to indicate that they indirectly accept emissions to the air of this magnitude.

This means that a significant amount of mercury must be emitted before NIVA will change its perception about the pollution situation. The way NIVA describes it in its annual reports, a change of a few status classifications is rarely a problem.

The detection limit for NIVA's soil analyses and measurements is therefore many kilos and not just a few grams, as NIVA tries to present it. NIVA cannot therefore conclude on the basis of the soil samples, that the company has not violated the emissions limit.

This would be like if the police were to measured alcohol in the blood, but not with instruments that showed parts per mille, but with instruments that could not show values below 10%. Then we would not have many drunk drivers in Norway. Also, there would not be many companies that pollute if this is the way NIVA performs monitoring.

NIVA also commit a professional error in this context with regard to concluding that toxins have not been released from AF Decom's operations base.

## 6.4 Emission to the sea

### 6.4.1 *Emissions from the discharge pipe via the treatment plant*

The only indicator where NIVA **quantifies emissions** is from the **discharge pipe.** This leads water from the treatment plant out into the sea after a lengthy purification process. But, as they say in Vats: "It is no good measuring what is in the sewer pipe if you do not find the toilet."

Initially, we had no reason to ask questions about the low values that were released via the discharge pipe and which have been significantly lower than of mercury per year.

Now we are asking questions about whether the analysis methods for mercury have been correctly and thus whether the reported emission levels have been too low. Nevertheless, we assume that after going through the treatment plant, these are such small particles, that the mercury is analysed fairly accurately, even with nitric acid solution.

The emission through the emission pipe is nevertheless only insignificant compared to e.g. other emissions such as dust escape.

Astri Kvassnes at NIVA was careful to stress that when RH, in the beginning of 2012, was responsible for taking samples itself, that one could not fully rely on the results since some of the samples were taken by RF itself.

NIVA has stated that it is AF Decom who takes the samples of the discharged water and delivers them to NIVA for analysis, so that NIVA is in practice acting merely as an analysis company and not as a monitor.

Although the system is arranged by NIVA, it does not change the fact that the samples **are taken by AF Decom** and delivered to NIVA for analysis.

Why is it worse that RF takes samples and sends them for analysis, than that AF Decom does the same? Is it because AF Decom is NIVA's client and the results of RF's tests show that the pollution is larger/different than NIVA's results?

NIVA had no knowledge about RF's tests and sampling, but NIVA nevertheless went to the press and criticized RF's surveys with regard to how the samples were taken. Meanwhile, NIVA accepts that their client's (AF Decom) sampling is correct and without error.

NIVA guarantees unconditionally that AF Decom has taken samples correctly.

This means that NIVA identifies with AF Decom and that NIVA accepts AF Decom's actions, including:

**AF Decom adopts different views depending on the situation they find themselves in:**

**a)** AF Decom said first: *"mercury-containing metal creates a number of new challenges for the receiving facility" and that "These conditions were not sufficiently identified when the receiving facility was built and when a permit was applied for pursuant to the Pollution Control Act (emissions permit) in 2004."* (ref. letter of 04.07.2006) Bilag 36, but it was also stated in several other letters and e-mails that they were unfamiliar with the mercury problem when the business started up.

*In the proceedings in the Court of Appeal in Bergen in March 2015, and in the public meeting in Tysvær on 3 June 2015, AF Decom stated that they were very familiar with the mercury problem right from the start, and that there was mercury in the structures.*

**b)** AF Decom argued during the trial that the stairstep moss testing is not a recognized method of measuring air pollution.

*Meanwhile, at the public meetings, AF Decom and NIVA boasted about the stairstep moss method and how good and accurate it is. The Environment Agency was also present at the public meetings and endorsed the claim that AF Decom does not pollute.*

**c)** AF Decom denied publicly on several occasions that there was air dispersion from the base, from 2004 and up until 2012. For example, in its application to the Norwegian Radiation Protection Authority on 30.06.2011, AF Decom also alleged that there is no dust escape from the base.

*At the same time, they say in minutes from a meeting with KLIF that* ***"AF Decom considers dust escape from the quay areas and odour from marine growth as the most important environmental challenges."*** just two months afterwards. (our emphasis)

**Bilag 48** Minutes of a meeting between AF Decom and KLIF on 06.09.2011

**d)** In connection with an oil spill from Statfjord C loading buoy, AF Decom at first denied that the spill came from the loading buoy.

***AF Decom has subsequently had to admit the emissions, while simultaneously trying to say that it was they who had discovered the spill.***

**e)** The spill on 14 September 2013 was redefined from a direct spill from the operating site that has been ongoing for several years, to being an insignificant oil spill. In recent years, there have been "inexplicable oil spills" in Vatsfjord on several occasions. These were documented from 2012 by RF. There were 10 spills in 2012 and 14 spills in 2013, until the cause of the spills was discovered on 14 September 2013.

In other contexts, AF Decom's behaviour has also been in a grey area:

**f)** It backed Vindafjord municipality's "Millennium Project" with NOK 100,000 shortly before the zoning plan was to be adopted.

**Bilag 49** Newspaper article in Grannar - See no adverse linkings - ethics committee critical, dated: 21.05.2007:

*Comment unnecessary.*

**g)** Refers to an article regarding the sale of a RIB boat to the Norwegian Armed Forces.

**Bilag 50** Newspaper advertisement in the newspaper Dagbladet dated: 22.6. 2015:

*Comment unnecessary.*

**h)** Illegal removal of concrete containing PCB in Oslo.

**Bilag 51** Newspaper notice in Aftenposten, dated: 05.07.2015

*Comment unnecessary.*

There are a large number of other examples that can be obtained from the press.

**i)** Openness about environmental issues.

*AF Decom has refused to disclose environmental information requested by RF. Most recently, when we requested analysis data etc. for leaching experiments that were conducted to redefine special/hazardous waste as normal waste.*

**Bilag 52** Letter from RF to AF Decom with questions about leaching experiments, dated: 05.05.2015

**Bilag 53** Letter from AF Decom to RF about leaching experiments, dated: 18.05.2015

**j)** During the court case and in communication with the press and the Environment Agency, AF Decom has claimed that RF had a "financial interest" in discrediting our tests.

*Now the court case is over and the case is definitely nothing but work and costs for us, but many of AF Decom's employees have share option programmes that are dependent on the company's performance and one can then ask whether this has any significance?*

**Bilag 54** Newspaper notice in Finansavisen about AF Decom's employee share option gains, dated: 12.02.2014

Some of these examples are not relevant for this matter, but they describe a company with a level of credibility that entails that an institution such as NIVA cannot simply accept the information that is provided by AF Decom. NIVA must itself perform control of the information that comes from AF Decom. It does not appear from NIVA's annual reports that this has been done.

### 6.4.2 *General information about discharges to sea*

The way NIVA has chosen to investigate discharges to the sea is mainly to use analyses of fish (liver and meat), crab (claw meat and offal) and mussels.

It is predominantly methylated mercury that is absorbed in fish (liver and meat), crab (claw meat and offal) and mussels, but inorganic, water-soluble and fat-soluble mercury salts may also be absorbed.

Mercuric sulphide, which is the main problem at AF Decom, cannot be absorbed by these organisms, because mercuric sulphide is insoluble in water and fat. **Before the mercuric sulphide is absorbed in fish or shellfish, the mercuric sulphide must first be methylated.** (Ref. Amund Måge – NIFES).

As already mentioned, NIVA bases its studies on an incorrect factual basis with regard to mercury analyses in the annual reports.

**NIVA cannot measure, and has no method for measuring, emissions of mercury in the form of mercuric sulphide until several years after it has been methylated.**

### 6.4.3 *Detection of discharge to water*

Moreover, there must be relatively large amounts of pollutants for mercury emissions to be detected using biota such as cod (in meat/liver), crab (in offal/claws) and mussels, as NIVA has used in the study.

NIVA has actually referred to this itself in another context. During the Outokumpu-Norzink (today Boliden Odda) emissions in Sørfjorden from December 1999 to February 2000, when at least 40-100 kg (maybe more) of mercury was released in the form of water-soluble mercuric chloride. Mercuric chloride can be absorbed into fish directly, and mercuric chloride has a much shorter methylation time than mercuric sulphide. The discharge led to a short-term increase in the concentrations of mercury in fish. The mercury values in the cod increased from approx. 0.27 mg/kg to 0.54 mg/kg Hg over 2 years, and then reduced again to 0.15 mg/kg Hg the following year. (The values are taken from the graph in Bilag 55 page 26)

**Bilag 55** Slides from Amund Måge-NIFES Hardangerfjord seminar 03.05.2013 Norzink emissions - slide page 26.

Such a relatively small change to the mercury levels in fish within 2 years of a large spill of around 40-100 kg of mercury means in practice that an emission of 40 g, which is 1,000 times less than it is allowed for AF Decom to emit, will be impossible to detect in this way, even if this had been in the form of a type of mercury other than mercuric sulphide, which NIVA cannot measure.

In the same way as large amounts are required in order to change the status classifications in the soil, a relatively large mercury emission would be required in order to change the valuesin fish and other biota.

Since mercuric sulphide is not absorbed in fish and shellfish and thus cannot be measured, it is only the part that is already methylated, i.e. fat-soluble and water-soluble mercuric salts, that is measured by NIVA.

It is therefore not technically sustainable for NIVA to assert that AF Decom has released more or less than 40 g of mercury per year, by referring to fish and shellfish, as they do in their annual reports.

### 6.4.4 *Analysis of sediments outside the base*

NIVA has also taken samples of sediments outside the plant base on Raunes.

However, we cannot see that NIVA has challenged the sampling of sediments outside the base, as they should have done. The background is as follows:

In 2008, Raunesholmen, which lay just outside the work site, was removed in connection with the expansion of the site and the sea topography was changed.

From the summer of 2009, AF Decom received whole structures instead of parts from the North Sea that had already been separated, and the work at the base was reorganised. Since these structures are very large, they had to be transported to AF Decom's base on Raunes using large vessels.

One of the vessels that often visited Vats was Thialf, which is one of the world's largest marine cranes.


Figure 8: Thialf

When Thialf came to Vats previously, it could not be moored at the base because of its size, and it had to remain with GEO positioning and its engines running. Sediments were whirled up and carried away by the current, both inside and outside the bay, sue to the vessels enormous propellers, which create large currents in the sea around the base. If we examine previous current measurements, we can see that it is most likely that the sediments would be carried into the bay.

NIVA has prepared reports on the consequences of currents caused by propellers elsewhere.

How can it be possible to find PCB oil from hydraulic systems or transformers used on Ekofisk or for that matter, PCB paint residues, by using analyses of sediments immediately outside the base, if large vessels' propellers move the emissions away from the base?

### 6.4.5 *NIVA's reference to the Norwegian Food Safety Authority's references*

NIVA refers to the Norwegian Food Safety Authority's references for what is an acceptable level of contamination. Refer also to the EU regulations, which have been adopted into law in Norway with regard to mercury:

**Bilag 56** EU regulations "Commission regulation (EC) No. 1881/2006 of 19 December 2006, setting maximum levels for certain contaminants in foodstuffs - updated: 03.12.2012

Where it refers to concentrations of mercury in fish, which until now has been **below** the Norwegian Food Safety Authority's requirements, NIVA refers to the requirements of the Norwegian Food Safety Authority. However, NIVA is not consistent in these references when there are grounds to "sound a warning" when measured toxins are above the requirements set by the Norwegian Food Safety Authority. Regarding the PCB **levels** that are above the Norwegian Food Safety Authority's requirements, which are adopted as the current law in Norway, reference is consistently made to the Environmental Directorate old standard from 1997, which is currently under revision (TA-1467/1997).

We refer in this context to NIVA's report of 2012, published on 04.03.2013, page 47 (Bilag 23).

Cod liver Vats (Eikan) 434 ng/kg and Raunes 468 ng/kg.

Here, the content of PCB in cod liver is over twice as high as the Norwegian Food Safety Authority's requirements, but this is not commented upon in the report.

It is a quality defect when NIVA's report does not even comment on the deviation from the Norwegian Food Safety Authority's requirements. This example helps to corroborate the question that we have posed above about whether NIVA is actually working with the necessary impartiality.

What is mentioned, however, is the value at the reference point, Metteneset of 647 ng/kg. This measurement point in Nedstrand fjord has been used as a dumping ground for ships and other waste since before the war. The values there are very high and it is therefore unnatural to use it as a reference point.

### 6.4.6 *Summary of discharges to the sea*

NIVA present their reports as the "status quo" situation, but did not comment at all on the fact that:

1) Mercury from dust emissions on land will drain into the sea via run-off, but that this will take time.
2) Mercuric sulphide must be methylated over several years before it can be absorbed by organisms, with the exception of nanoparticles, which are methylated much more quickly.
3) Then the methylated mercury bioaccumulates in organisms.

4) Finally, this is biomagnified/accumulated upward in the food chain.

It will therefore take several years before the results of the emission of mercuric sulphide can be measured as methylated mercury in fish. Thus, NIVA fails to explain the fundamental relationship regarding the situation for pollution to the sea in their annual reports.

Aarhus University has also made some comments after reviewing NIVA's annual reports that were prepared for AF Decom. The report shows that there can be several critical questions regarding the annual reports.

**Bilag 57** Report from Aarhus University - comments on the Proactima report and on NIVA's Environmental Report 25.06.2014

As we gradually came to understand why NIVA has not discovered what happened, i.e. incorrect analysis methods, incorrect detection limits (ref. 6.3.2 and 6.3.3) and a lack of expertise and insight into what is happening at the base, we had to ask ourselves why NIVA has not taken our analysis and objections into account, which have been thoroughly communicated to them, and realized their mistakes earlier.

## 6.5 NIVA's report on scrapping at sea

AF Decom has applied to expand its decommissioning operations so that they can take place in the fjord in addition to only taking place ashore on the installation base on Raunes. In this regard, AF Decom has requested that NIVA should conduct an impact assessment, cf.:

**Bilag 58** Copy of NIVA's report on scrapping at sea, dated 15.01.2013

We also request NENT to consider whether this report sets the necessary quality requirements, so that the report can form the undisputed basis for decisions that government agencies must make with regard to whether it would be associated with an unacceptable risk to extend the scrapping operations so that they take place directly at sea.

We also request NENT to consider whether it is ethically correct to carry out such an impact analysis for a company, while simultaneously preforming environmental monitoring for that company.

What is striking about this report is that NIVA argues the opposite of what they claimed in the annual reports.

### 6.5.1 *The summary of the report states*

*"The report covers accidental emissions releases that could potentially arise in connection with planned activities at sea by AF Mljøbase Vats. Potential emissions may include marine growth, heavy metals, ethylene glycol, hydraulic oil, gear oil, diesel, crude oil, PCB, NORM, biocides and corrosion inhibitors. A conservative estimate is that the impacted area will be limited to distances shorter than approx. 250 m downstream from the discharge point and 50-70 m to the side of this, and that the necessary dilution will take from 5 to 20 minutes. It is unlikely that a spill will have a demonstrable impact on spawning, nursery or feeding areas for fish. The exposure time is too short to produce*

*effects on fish in cages or nets, or lobsters and crabs in pots. The area of impact does not come into conflict with the registered fish farms. Risk of damage to fish stocks during transport in fish carriers is considered to be small. Oil that drifts ashore may affect important populations of grey heron and gulls. The risk of effects on the ecosystem in general is considered to be low. It is considered that even frequent emissions would not impair the overall ecological status. The quality of water for swimming may be impaired in the short-term from spills of cement."*

### 6.5.2 *According to the construction magazine Grannar article of 25.03.2014, it was further stated that:*

*"Project manager Torgeir Bakke from NIVA believes there is little chance that an accident occurring during operations in Vats and Yrkes fjord would have particularly serious consequences. His explanation is that the emissions would be relatively small and that harmful substances would be quickly diluted. Toxic limit values for accidents would in most cases not occur more than 100 metres from where the accident happens, according to NIVA."*

*"Here is the list of key pollution sources that are considered in the report:*

- *Heavy metal*
- *PCB*
- *Various oil types*
- *Marine fouling*
- *Naturally occurring radioactivity"*

### 6.5.3 *Emissions amounts stated in NIVA's impact assessment*

AF Decom Offshore has itself prepared the list with potential volumes and the time limitation of adverse substance that can be discharged accidentally, and the type of accidents that could happen.

| *Division of installations* | | |
|---|---|---|
| Lead | 50 g | (15 min) |
| Zink | 200 g | (15 min) |
| Chrome | 50 g | (15 min) |
| PCB paint | 0.1 g | (15 min) |

Table 2: Emission quantities for division of installations

| *Dismantling of deck equipment* | | |
|---|---|---|
| Ethylene glycol | 50 litres | (15 min) |
| Gear oil | 10 litres | (15 min) |
| Hydraulic oil | 50 litres | (15 min - booms used) |
| Diesel | 100 litres | (15 min - booms used) |
| PCB-containing oil from transformer | 10 litres | (15 min - booms used) |
| PCB from light fixtures | 15 g as PCB | < 15 min |

Table 3: Emissions quantities for dismantling of deck equipment

| *Anchoring* | | |
|---|---|---|
| Marine fouling | 100 kg (uncertain) | (12 hours) |
| Hydraulic oil | 1 litre | (24 hours) |

Table 4: Emissions quantities for anchoring

| *Ballasting/de-ballasting of installations* | | |
|---|---|---|
| Lubricating oil | 5 litres | (15 min) |

Table 5: Emissions quantities for ballasting/de-ballasting of installations

| *Dismantling of process equipment* | | |
|---|---|---|
| Crude oil | 40 kg, 50 litres | (15 min - booms used) |
| Mercury | 0.1 g | (5 days) |
| Low level radioactive deposits | 10 Bq/g, 10 g | (5 days) |

Table 6: Emissions quantities for dismantling of processing equipment

| *Removal of equipment using crane barges* | | |
|---|---|---|
| Hydraulic oil | 50 litres | (15 min - booms used) |
| Diesel | 5 litres | (15 min - booms used) |

Table 7: Emission quantities for removal of equipment with crane barges

| *Installation of wind turbines* | | |
|---|---|---|
| Hydraulic oil | 10 litres | (15 min) |
| Diesel | 5 litres | |

Table 8: Emission quantities for installation of wind turbines

Thus, NIVA's report is based on the presumed accidental emissions figures from AF Decom AS.

How has AF Decom obtained the quantities of the so-called **worst-case accidental emissions?** And what has NIVA done to quality assure this data?

NIVA's report is based solely on accidental emissions and not on continuous emissions from the operations of the business, which we have designated as *structural emissions.*

AF Decom only measures emissions via the discharge line. As shown in this letter, AF Decom has no knowledge about the emissions that take place by air, because they have not made scientifically quantifiable measurements of air emissions, dust escape, steam, gas emissions from torch cutting, fires etc.

NIVA's annual reports state that the emission limits have not been exceeded. As already mentioned, the threshold limit for mercury emissions to the sea is per year and for PCB the limit is 0 g per year.

In other words, NIVA is claiming in their annual reports that even such small discharges can be detected, while the impact assessment states that emissions are negligible 100 metres from the platform.

How has AF Decom arrived at the amounts of the so-called accident emissions?

We will comment on a few of the aforementioned substances here:

### 6.5.4 *Mercury*

NIVA's claims regarding mercury: *Maximum accidental emission: 0.1 g mercury over 5 days in the form of mercuric sulphide.*

Figure 9: Picture from a valve that was screwed apart on Ekofisk

As can be seen in Figure 9, it is overflowing with metallic mercury on platforms that are brought in for dismantling at AF Decom. Dismantling of valves will now take place in Yrkes fjord.

It has previously been said by AF Decom that only mercuric sulphide enters the base. It has previously been suggested that metallic mercury must have evaporated on the way from the North Sea to Raunes.

Tonnes of scale are dealt with, and no matter how AF Decom tries to prevent it, a large quantity of scale will be spilled and end up in the sea during normal operations when the pipes are dismantled and cut. AF Decom does not operate with either microelectronics or nanotechnology, but only with coarse work.

On the platforms where the production operations take place, there is usually no impermeable floor, but rather grates to walk on. This means that it is even more difficult to prevent emissions and spills of scale from going directly into the sea.

AF Decom states to NIVA that the accidental emissions can be up to 0.1 g of mercury over 5 days. This is obviously not correct. There is no treatment plant on the platform that captures toxins, as is normal for activities on the operating site on land. The emission figures from AF Decom in this report seem to be based on the emissions from the discharge pipe after the treatment plant.

It seems inconceivable for us that it is possible to operate AF Decom's dismantling operations and simultaneously claim that the emissions are at the level indicated by AF Decom as a maximum accidental emission.

It was during the cutting of production pipes and production equipment that there have been large emissions of mercuric sulphide, metallic mercury and other mercury salts at the base on land. Now

part of the work will be performed at sea, on a production deck made of non-slip mesh gratings. This means that everything that is spilled will go into the sea and sink, except for light oils that can be gathered up by oil booms.

RF's surveys show that kilos of mercury have left the base. Bioforsk's report indicates the same, and even with their faults, NIVA's soil samples and NIVA's stairstep moss surveys produce the same conclusion. Nevertheless, NIVA accepts producing an impact assessment based on the scenario that the worst spills would be 0.1 g over 5 days. This does not add up.

### 6.5.5 *PCB-containing oil from transformers*

NIVA's claim regarding *PCB-containing oil from transformers: Maximum accidental emission: 10 litres (15 min - booms used)*

PCB-containing oil was used in transformers due to its insulating properties, and because it is not flammable. In the oil industry, properties with respect to fire are the most important, but to achieve these properties the PCB content needs to be high.

1) PCB has a density of about 1.182-1.566 kg/L, about 1.3 kg/L on average, i.e. it is heavier than water.
2) The PCB oils used in the oil industry are like those on land:
   Abestol, Aroclor, Askarel, Chlophen
   Chlorextol, DK, EEC-18, Fenclor
   Inerteen, Kennechlor, No-Flamol, Phenoclor
   Pyralene, Pyranol, Saf-T-Kuhl, Solvol

3) The PCB content in transformers must be high in order to reduce the risk of fire. The PCB content in the types named above is approx. 65%, between 60 and 70% (600,000 to 700,000 ppm, see Bilag 59)

**Bilag 59** Note from the US Environmental Protection Agency, updated 28.05.2015

This means that an accidental discharge of 10 litres will mean an emission of (if we use average values):

$$10\text{L trafoolje} \times 1.3\text{kg/L} \times \ 65\% = \text{ca.}\ \mathbf{8.5kg\ PCB}.$$

It is striking that the PCB emissions, which the Environment Agency argues are not a problem (ref. 8.4.5), are significantly larger here than the mercury problem.

PCB oil is heavier than water and will sink to the bottom. It will therefore not be collected in booms as the NIVA report suggests. PCB will then be bio-accumulated and bio-magnified and will eventually produce larger concentrations in fish.

NIVA's conclusion states: *"Even frequent emissions would not be expected to impair the overall ecological status".*

However, NIVA's annual reports state that even very small emissions down to gram level can be clearly detected, since the emission limit value for AF Decom is 0 g of PCB, but in this report, "frequent" emissions of 8.5 kg PCB is barely detectable after 100 m!

Why is bio-accumulation and bio-magnification of PCB not mentioned in this report or in NIVA's annual reports?

It is reasonably clear that one need not have knowledge of marine biology to understand that the tiny valuesspecified for accidental discharges below will not have any impact on a fjord:

| | | |
|---|---|---|
| Lead | 50 g | (15 min) |
| Zink | 200 g | (15 min) |
| Chrome | 50 g | (15 min) |
| PCB paint | 10 mg | (15 min) |
| Mercury | 100 mg | (5 days) |

Such emissions are not detectable a few hundred metres from the platform. It is only NIVA who claims that they can detect such small spills through their monitoring programme.

**8.5 kg PCB**, however, will have significantly more impact on the environment and PCB is easier to detect in biota than mercury, also further away from the platform.

PCB is bio-accumulative without having to be methylated first, unlike mercuric sulphide. It therefore takes less time for the PCB to be bio-accumulated and concentrated in the food chain. NIFES's research has shown that relatively small amounts of PCB can have major effects on fish.

**Bilag 60** Amund Måge-Report on PCB released to Sørfjorden due to refurbishment of listed buildings. Tyssedal Power Station 2001, dated 05.05.2003

**Bilag 61** Anders Ruus, Norman W. Green, Amund Måge, Jens Skei – MarPollBull PCB containing paint and plaster caused extreme PCB concentrations in biota from the Sørfjord, dated: 01.11.2005

The spill in Sørfjorden involved around 250 g of pure PCB, but in the form of flakes of paint that are visible to the fish and which could therefore be confused with food and consequently can more easily be absorbed by the fish directly.

We are talking here about an accidental discharge of 8.5 kg of pure PCB oil, which must first be processed by micro-organisms before it is absorbed. Nevertheless, NIVA trivialises this as if the PCB will "disappear" after 100 metres, although this discharge will be 34 times greater than the PCB emissions above.

More than NOK 1 billion worth of farmed salmon alone is produced each year in the Vindafjord basin, and there is also a considerable catch of wild fish with an estimated value of about NOK 0.6 billion, and one or more possible emissions of approximately 8.5 kg PCB is **not insignificant.**

On Mula, not far from AF Decom's base in Vats, the PCB values in cusk fish livers have increased steadily from 163 µg/kg in 2009 (NIVA) to 850 µg/kg in 2014 (NIFES). This is downplayed by both NIVA and the Environment Agency.

NIVA has previously tried to refute this by showing that there are also high values at the reference point outside Metteneset.

It should be noted in this regard, that the point that NIVA has used as a reference point has been a ship cemetery and dumping site before the war. A little farther out in Nedstrand fjord, the Alexander L. Kielland platform was also sunk. It is striking that NIVA, during multi-annual studies, has changed a reference point without further ado. We have asked NIVA for an explanation of this change, but NIVA has refused to tell us why they moved the reference point from Kråkenes to Metteneset, a point with higher levels of contamination, during the measurement period.

### 6.5.1 *Bio-accumulation and bio-magnification*

In this report, NIVA obviously knows that the main component of the mercury comes as mercuric sulphide. Here, NIVA writes in Section 3.3.3 that:

*"Mercury will occur as sulphide. Under anoxic conditions,* ***mercuric sulphide is only slightly soluble,*** *but in oxygenated waters it must be expected that it will eventually be dissolved."*

Why is **methylation** not mentioned in NIVA's annual reports?

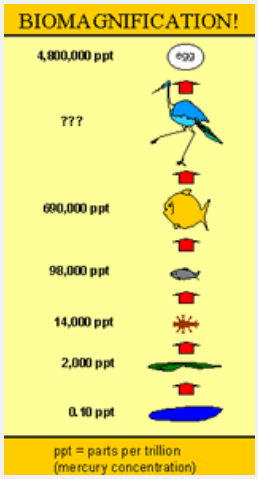


Figure 10: Bio-magnification[2].

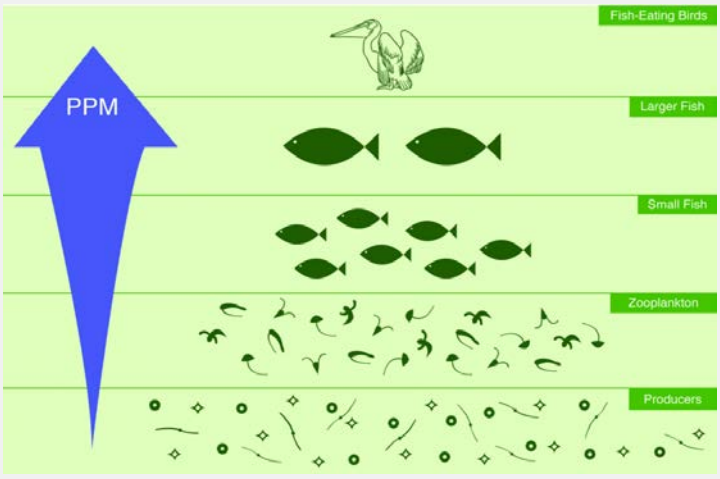


Figure 11: Bio-magnification[3].

[2] Source: http://toxics.usgs.gov/definitions/biomagnification.html

[3] Source : http://www.joshgitalis.com/bioaccumulation-what-you-must-know/

Why are **bio-accumulation and bio-magnification** of mercury, PCB or other pollutants not mentioned in this or in NIVA's annual reports?

### 6.5.2 *Oil spills*

Claim by NIVA: The sum of the maximum accidental spills of various oils will be less than **236 litres.**

To put this in some perspective, refer to 9.3 below in the letter, which describes the demolition of Statfjord C loading buoy. The survey said that the total should not exceed **500 kg hydrocarbons** on board the platform.

AF Decom did not use booms around the buoy as they were required to do, but it did not matter because the oil came up more than 400 m from the platform. The leak was at 60 metres depth and the sea current and the time for the oil to rise meant that it came to the surface far away from the platform.

AF Decom has done much to deny and diminish the importance of the spill, but eventually they had to confirm to the media that they had collected around **4,000 litres of oil** from the buoy (oil that originally should not have been there).

The loading buoy is a small structure in relation to the production platforms that will be dismantled in the fjord. Thus, it is not correct to say that the worst accident concerns a maximum of 236 litres of oil in such an operation. This spill occurred simultaneously with the work on the impact assessment and NIVA must have been familiar with the spill. In other words, NIVA knew that 236 litres as a maximum accidental spill indicated by AF Decom was not correct. Nevertheless, NIVA uses AF Decom's numerical basis for the report, without even commenting on this.

What significance do these remarks have for NIVA's impact assessment of decommissioning activities at sea?

It may be appropriate to prepare an impact assessment, where the impression is given that there is no problem cutting up structures at sea, when the estimated quantities of emissions is based only on putative, unrealistic, accidental emissions data from contaminates, where continuous emissions of the operation is omitted.

The dust escape from the operations carried out at sea will be at least as large. It will be even more open and exposed to the wind and weather and there is no fixed cover where prioritized poisons and harmful substances such as mercury and PCB can be cleaned away in the treatment plant. For operations out at sea, the emissions will go directly into the sea.

Another factor is that these substances will not simply be diluted and disappear. Mercuric sulphide is **methylated,** and both mercury, PCB, dioxins etc. **are bio-accumulated and bio-magnified.**

Most people who read the report, including public and political authorities, interpreted this as if there is no problem with emissions from the platform during dismantling out at sea.

The fact that the analysis is based on AF Decom's estimated volume for accidental emissions, nevertheless implies that NIVA endorses the analysis. Since this has such fundamental weaknesses, NIVA must share the responsibility, at least when NIVA fails to emphasize that they have not undertaken any quality assurance of the analysis. NIVA must understand that the analysis nevertheless appears to third persons, like public authorities, as a NIVA analysis.

Accidental emission quantities are also so small that in our opinion they are clearly erroneous. In fact, they are so small that NIVA itself should have realised that they were not realistic.

Here, NIVA also fails to use the expertise they have gained through their annual reports, and they should therefore have realized that that information from AF Decom was not realistic.

NIVA knows that so-called "diffuse" emissions occur all the time from the base from torch cutting and dust escape. Yet NIVA fails to mention in the report the continuous emissions from operations at the base.

AF Decom, the Environment Agency and NIVA have previously explained at the public meetings in the Vindafjord Hal, how important it is to operate on land with a cover that captures environmental poisons like mercury etc. There is no such permanent cover out on the platform. AF Decom claims that they have spent around NOK 600 million building a plant with membranes and a dock that slopes inward, as well as an advanced treatment plant so that emissions are minimal. What is the purpose of these investments if they are not needed at sea?

Now AF Decom has discovered that millions can be saved on dismantling the platforms out in Yrkesfjord (instead of this having to occur out in the North Sea, which is partially the case today) and then taking the parts into Raunes to dismantle them further.

We ask NENT to take the following documents into consideration in relation to what emerges from NIVA's impact assessment report:

| | |
|---|---|
| **Bilag 62** | Letter from Professor Anders Goksøyr to the Ministry of Local Government and Modernisation, dated 05.21.2015 |
| **Bilag 63** | Letter from Professor Einar Sletten to the Ministry of Local Government and Modernisation, dated 05.26.2015 |
| **Bilag 64** | Grannar article 25.03.2013 "Kan leve med uhell – fortynning" [trans: Can live with accident - dilution] |
| **Bilag 65** | Absorption of oil spill - Article in Grannar |

## 6.6 Summary of NIVA's deficient compliance with quality

As described above, it is our opinion that NIVA has not fulfilled the requirements that must be imposed on an institution of this nature and they have also failed to meet the quality requirements in NENT's ethical guidelines. We question whether NIVA meets the basic requirements for quality

assurance, or whether the assignment is actually too complicated and comprehensive because NIVA does not have the technical expertise to carry out such a task.

In our opinion, each of the above-mentioned deficiencies in the quality requirements are of a significant nature. In combination, the quality flaws are very seriously.

We ask NENT to consider the circumstances which we have highlighted in relation to the ethical guidelines for quality requirements.

# 7 Supplementary studies for NIVA - Dust-fallout measurement

Until 2012, both AF Decom and the Environment Agency denied that there was dust escape of any significance from the plant.

It took 8 years of operations before the company admitted that there was dust escape and before the Environment Agency realized this. The Environment Agency then issue a permit for dust discharge from the base in a letter dated 13.03.2013.

But the Environment Agency still does not grant permission for dust discharge of prioritised substances, except for what has *no significant impact on the pollution situation in the fjord environment outside the base.*

Since 2012, RF has pointed out that there was dust discharge from the base and has repeatedly pointed out deficiencies and quality issues associated with the methods that NIVA has used to map the dust discharge.

Aarhus University (AaU) has informed RF about how they would have carried out quantifiable measurements of the airborne emissions.

They would use some air filters placed inside the base, several air filters in the border zone around the plant and a combination of acoustic and conventional anemometers and on-line mercury gauges and other instruments, depending on what should be measured, as well as video monitoring with on-line quantification of emissions via data. They would compare the emissions with the ongoing work and see where the greatest emissions occurred, so that in this way they could take action, develop BAT techniques etc.

RF has also received offers from the Norwegian Institute for Air Research (NILU) for such monitoring, also using air filters and metering stations, although in a simpler version.

Unfortunately, the Environment Agency would not listen to RF when we suggested quantifiable analyses of the dust escape from the base. On the contrary, the agency decided that AF Decom could use dust traps, which are not particularly suitable for measuring and analysing prioritised poisons.

We were informed in the Court of Appeal that the Environment Agency had accepted by telephone that it was acceptable that AF Decom actually only used one single dust trap.

In the district court, Signe Nåmdal from the Environment Agency referred to this single dust trap and said that this was representative of the dust escape from the base (she also failed to mention that the dust trap had blown down during the period and that the analyses for the period were worthless).

The Environment Agency must have known that it was not sufficient to have only one dust trap, and there cannot be other reasons that this method was approved for use, other than as a new attempt to hide AF Decom's real dust emissions.

## 7.1 Use of dust trap(s) for the measurement of particulate dust

AF Decom and the Environment Agency have claimed that the installed dust trap shows that there were no releases of toxins. The dust traps are not directly linked to our request, other than that according to the Environment Agency, it was NIVA who recommended the method. We must include this information in order to explain that the results from the "dust traps" are used by the Environment Agency, in combination with NIVA's information, to demonstrate that the dust escape is and has been minimal.

After having the Proactima report evaluated by Aarhus University, it was pointed out that the size of the dust particles was not measured and that the stated values for dust escape for torch cutting can vary between 3 kg and 3.2 tonnes, with **89 kg as the "central estimate".**

The figure in the Proactima report of approximately 50 kg per year is therefore very uncertain, since scientific measurements of the dust particles' nature, size and distribution were not carried out.

AaU also believed that dust escape from the work area was probably a considerably greater problem than dust and vapour from torch cutting, which the Proactima report had focused on.

RF therefore requested in letter after letter sent to the Environment Agency, that quantifiable measurements of the dust should be initiated, and that the so-called diffuse emissions could easily be measured with the right equipment.

## 7.2 The Environment Agency's directives on measurement of air emissions

In the renewed permit from the Environment Agency of 13.3.2013, AF Decom was required to monitor the dispersion of fallout dust released into the air. The reason for measuring the dust dispersion by air is that Section 4.2 of the terms and conditions sets limits for emissions to air. The provision reads as follows:

*"Emissions of dust/particles from the activities in the business area must not cause the quantity of fallout dust to exceed **3 g/m$^2$ per 30 days** with an averaging period of three months. This applies to the mineral portion measured at the nearest neighbour or another neighbour who is most exposed."*

*"Sampling and analysis of dust fallout shall be conducted by an independent actor with expertise in this area."* (our emphasis)

It also emerges from Section 11.1 of the terms and conditions of the permit, that the company must, among other things, carry out measurements of the air and that these measurements must be performed so that they are representative of the activities' actual emissions. According to Section 11.2, there are qualitative requirements for the measurement programme and, according to Section 11.3, the measurement must, among other things, be carried out according to Norwegian Standard.

The provision on monitoring of the air and water is described in Section 12. It follows from Section 12.3 that:

*"The company shall monitor the spread of dust fallout in the border zone around the company's area in order to document that the current requirements are complied with, cf. Condition 4.2.*

*The company must analyse the composition of the fallout dust. The analysis results must be attached to the annual internal control report. In addition, the requirements for monitoring that follow from Chapter 7 of the Pollution Regulations shall also apply."*

Thus, there are no conditions imposed that analysis shall be carried out to determine whether there has occurred a tangible spread of prioritised substances, such as mercury, PCB, dioxins, which it is still not permitted to release to the air. There are also no requirements to quantify such emissions.

On page 14 of the part of the permit setting out the reasons, it is required, among other things, that:

*"In order to document compliance with the limit value, measurements must be carried out in the border zone around the company's area. We find it necessary to impose a separate requirement that the company shall carry out measurements of the dust fallout. We therefore imposes new requirements under Section 12.3 of the permit that the company shall monitor the spread of dust fallout in the border zone around the company's area in order to document that the current requirements are complied with, cf. Condition 4.2.*

*We also believe that it is important to know the composition of the fallout dust. We have therefore imposed a requirement for annual analyses of the composition of the dust fallout and we have added this under Section 12.2. Advance notice of this requirement was provided to the company by e-mail on 07.02.2013.*

*We require that the company engages an independent and competent actor to establish measuring stations and to conduct measurements of dust fallout, and that standard methodology is used for such measurements. We have specified requirements in this regard in Section 4.2 of the permit.*

*All measuring stations and their location must be agreed in consultation with the expert consultant. We require that at least one station shall be placed in close proximity to Raunes fish farm, which is the closest neighbouring property to AF. We are aware that they have no outdoor activity."*

**Instead of selecting a method that can quantify the toxic emissions, AF Decom decided to use dust measurements that are designed to capture mineral dust from stone crushing works and mining.**

As long as measurements are only taken of the mineral portion, the release of toxic organic substances is basically disregard, even though our analysis has shown that there has been major dust escape, including of TBT, DBT and MBT. This in itself shows that NS 4852:2010 measurement of dust fallout is the wrong method to use on Raunes.

We refer to:

**Bilag 66** A copy of NS 4852:2010 Air studies, Outdoor air, Measurement of dust fallout

It is our view that AF Decom does not comply with the condition for measuring stations. Until now, there has only been one measuring point. In the beginning, there was also only one dust trap. Today

there are two dust traps, which are placed side by side: one for measuring the dust fallout and one to obtain sample material for chemical analysis. These measuring points are placed furthest out in the peripheral zone at another neighbour, in the northern end of the base, and are located where one can expect the least amount of wind and, in other words, the smallest quantity of dust. The position is also at a higher level than the base. Also, no measuring station has been established in close proximity to Raunes Fish Farm. It should be mentioned, however, that AF Decom is now in the process of establishing a new measuring point.

Figure 13: Picture of measuring station, taken 19.01.2015

Figure 12: Photo of the measuring station 17.11.2014

Figure 14: Photo of the measuring station, 03.01.2015

The method has also been adversely affected by some technical issues:

a) When the traps were erected in the latter part of 2013, there were strong winds and the traps were blown down.
b) It rains a lot in Vats, and the traps are often full of water and these often overflow (ref. Figure 12 and Figure 14), so that particularly the surface dust falls to the ground.

In AF Decom's case, in other words, the measurement method provides incorrect information about the real dust fallout.

The analysis of the dust fallout is also subject to major deficiencies:

For example: According to NS 4852:2010, Sections 5.2.1 and 5.21, the filtrate must be dried at a temperature of 105-110 C, when volatile organic poisons will disappear, and metallic mercury and volatile mercury salts will also be thermally decomposed. To find the mineral proportion, the filtrate is heated to 550 C. At 550 C, most organic substances will have evaporated or turned to ash. Remaining mercury compounds will also disappear, including mercuric sulphide, for which decomposition starts at 265˚C. It can therefore be stated that the method NS 4852:2010 is not suitable for the measurement of prioritised substances.

Nothing is mentioned about whether the filtrate is analysed after evaporation or after reduction to ash.

The reason that we include this in the letter is that the results from this single point at the very edge in the border zone to the north and at a higher level, are used in the press and during the trial as evidence that AF Decom does not pollute via the air and has never done so.

It is reasonably clear that the dust escape is proportional to the operation of the plant and which activity takes place. During the last few years, the level of activity at the base has been moderate and demolition of residential modules does not entail mercury emissions in the same way as the demolition of production equipment.

A major objection to the dust trap measurements is regardless the **number** of dust traps.

When RF presented their initial calculations, which we called a **sign of dust escape and the spread of mercury** in over the fjord as far as Åmsosen, Astri Kvassnes at NIVA contacted an acquaintance in NILU and it was claimed, among other things, that 4 measuring points was far too few points to provide a credible indication of dust escape.

The Bioforsk surveys are criticized because there were apparently not enough measurement points, although Bioforsk had 60 measurement points where heavy metals were measured. Several of the points were analysed at several depths in the soil.

The real question remains. Why did NIVA not recommend and why did the Environment Agency not demand scientifically quantifiable air filter measurements? In other words, multiple air filter measurements around and in the base area, combined with anemometers, preferably combined with more advanced equipment that can e.g. measure and quantify any mercury and other emissions occurring minute by minute and which, in combination with video surveillance of the processes, can be used to develop BAT processes. One must be able to see where and how the emissions occur, also as a basis for how the processes can be improved.

## 7.3 Third-party investigation

In the revised emission permit of 13.03.2013, AF Decom was required to establish measuring stations for air emissions from the plant.

After several inquiries from RF stating that the stations were not placed in accordance with the permit and that the measurements with dust traps with one measuring station positioned both higher and at the furthest edge of the border zone to the north, is inadequate and that the measuring method for the detection of toxic pollution is incorrect, the Environment Agency also asks AF Decom in this letter for a **third-party investigation,**

AF Decom initiates such an investigation. However, it turns out that the person who should have performed the investigation was apparently not informed about the issues, or was directly misinformed. The third-party investigations are therefore irrelevant for the current pollution situation.

The third party investigation is attached as:

**Bilag 67** Third party investigation dated: 23.03.2015

This study does not address the problems and shortcomings we have mentioned in terms of the dust dispersal studies for SINTEF. Whoever has written the report clearly knows nothing about the toxic substances they are dealing with at the base. In other words, AF Decom must have refrained from informing them about this.

The Environment Agency tries to give the impression that with one or two dust traps, they can determine the spread of toxic dust from the base. It is also claimed that this would show that the contamination previously was no greater than it is today.

In the same way as NIVA/NILU criticize RF because it was not even possible to **indicate** an emission by using only 4 measuring points, the Environment Agency criticizes Bioforsk for analysing an *insufficient number* of points. Bioforsk has analysed soil samples in 60 points, many at different depths within a limited area (1/11 part of the border zone), where Bioforsk only draws conclusions relating to the measured area.

If the measurements via the dust trap were representative of the entire area, as Signe Nåmdal of the Environment Agency claimed during her testimony at the main hearings in Stavanger District Court, then it must also be true that:

1) All NIVA's soil samples must have been the same
2) All NIVA's stairstep moss samples must have been the same
3) The dispersal must have been completely linear
4) The dispersal could not have diminished with the distance from the base.
5) The activity on the base must have been constant
6) The same type of demolition activity must take place on the base all the time

The argumentation of the Environment Agency is therefore mistaken.

# 8 RF studies and reports

## 8.1 Introduction

RF's reports have no direct relevance for RF's request to NENT. These studies are alternative and complementary to NIVA's studies and, in our opinion, they show that there must have been extensive emissions of toxins from AF Decom's activities that NIVA has failed to detect in its investigations, at least not to the same extent. NIVA has worked with the Environment Agency in an attempt to discredit other studies.

Thus, we believe it is important to describe the investigations that RF has conducted, partly through other national research and investigation institutions, in order to assess NIVA's work in relation to what other studies have shown.

## 8.2 Dust escape

After RF became aware in January 2012 of the Proactima report of 31.11.2011 (Annex 11), which referred among other things to the fact that emissions of dust and particles from AF Decom's operations occurred beyond the operations site and that these particles contained a combination of toxins that are considered hazardous waste, RF decided to conduct their own investigations. The Proactima report has several weaknesses, but it nevertheless identified the release of toxins by air, despite the fact that both AF Decom and the Environment Agency have disputed this.

RF first demonstrated dust escape from the base, containing prioritised substances, through gutter surveys, soil surveys and filter investigations.

We could make approximate calculations of the dust escape due to

a) half-yearly air filter studies.
b) the dust that was carried into the attic of RF's production facilities had occurred between late 2007 and March 2012, i.e. over a period of 4½ years.

**Bilag 68** Analyses of the dust in the attic of RF, March-April 2012

**Bilag 69** Evidence-securing report on the dust in RF's attic

It only needed a little maths to understand that large amounts of mercury-containing dust had left the base area.

The area of the air valve at RF that the dust came in through is 0.7 $m^2$ and 930.6 g of dust settled on the roof of 2 cooling units that constituted an attic with 56% of the area in the room from the 4th quarter of 2007 until March 2012, i.e. during a period of about 4½ years. We could therefore calculate approximate values regarding how large the dust escape had been on average per $m^2$ per month during these years. If one only considers what was in the attic and does not adjust for the fact that it was only on 56% of the area, it still shows significant dust escape that can be simply calculated:

$\frac{930{,}6\text{g}}{0{,}7\text{m}^2 \times 54\text{mnd.}} = \mathbf{23{,}6\text{g pr m}^2\text{ pr mnd}}$. *average for the period Q4 2007 to March 2012*

The average mercury content in the dust sample was 18.9 mg/kg (unfortunately the dust sample was also analysed with nitric acid solution and the real mercury content is probably considerably higher).

Even with this value on 18.9 mg/kg Hg, and since RF's production hall is located closer to AF Decom than the edge zone's perimeter, but on the other side the base is elongated and the mercury work takes place closer to the middle and the base's border zone is 542,960 $m^2$, one can nevertheless easily estimate that there will be significant amounts of mercury emissions around and outside the base.

**It is obvious that emissions of several kilograms of mercury are involved**

Combined with NIVA's measurements of the soil outside the base, this made us confident that there was serious dust contamination from the base.

The stairstep moss samples also showed dust escape, but it gave us no indication of the quantity that had been released. The air filter analyses confirmed the same, but in addition, we received an indication of the size of the mercury emissions from the base.

The air filters were replaced regularly every 6 months. The first analyses were carried out in 2012 and they confirmed that mercury emissions were still ongoing.

We tried to contact the Environment Agency, but it was useless. They only referred to NIVA, who said everything was in perfect order. This was even though NIVA's soil samples showed that relatively large emissions must have occurred, and NIVA's stairstep moss samples also showed dust dispersal of mercury, with valuessignificantly higher than the nationwide surveys. But these samples provided no quantification of the emissions.

We therefore asked the Environment Agency to request AF Decom to provide quantifiable measurements of the so-called diffuse emissions. The Environment Agency claimed at first that it was impossible to measure diffuse emissions. We showed them that we had received offers for this from both NILU and Aarhus University, and that it was necessary to use multiple air filter measurements combined with anometer equipment.

Since we realised during 2012 that the information from NIVA could not be correct, we engaged Bioforsk to attempt to quantify the emissions we had estimated.

Due to the topography around the base, dust emissions to the air will ultimately end up in the sea. This is also not mentioned or discussed in NIVA's reports.

## 8.3 The Bioforsk report

**Bilag 70** Bioforsk report of: 30.12.2014, published on 14.01.2015

The Bioforsk report showed that there have been significant mercury emissions at the border area of AF Decom's operations base on Raunes.

The Bioforsk report was prepared in 3 steps, first with measurements around RF and then in an area on the west side of the operations site, where we thought there would be the most mercury found due to the wind direction. The mercury supply was initially calculated at approximately 2.9 kg of mercury in this area of 49 decares. The area was later expanded and more samples were taken at a total of 60 sampling points, many with measurements at different depths and the mercury quantity was calculated at **1.3 kg of mercury** in the new measurement. The report speaks for itself.

It is important to highlight in connection with the Bioforsk report, that the statistical treatment of the distribution of concentrations of mercury, and partly Pb210, shows that AF Decom is the probable source of the dispersal. The distribution shows a large area, where the concentration in the top layer is higher, and the location of this area corresponds to AF Decom being the source. It is completely unreasonable to expect that emissions from AF Decom should be large enough to change the condition classification for such a large area. As previously discussed, this would require tens of kilograms of mercury emissions. The dust also disappears very quickly into the fjord after rainfall. The area also shows an area where the dust fallout should have been monitored better, over both time and area.

The Environment Agency has been very keen to show that the basis for the calculations of quantities are of poor quality, and it constantly emphasises that the classification limit has not been exceeded, which is not of particular interest in this context. Very large amounts of mercury emissions would be required in order to change the classification for such a very large area.

What is interesting in this context, is that the Environment Agency, as we understand it, with the help of NIVA, has devoted substantial resources to discredit the report, especially in the media, without so far having presented a single valid argument.

The Environment Agency used several arguments in the media (e.g. Dagbladet 13 and 14 October 2014 and later arguments put forward to Dagbladet journalist Asle Hansen after a meeting with the Environment Agency on 22 October 2014), to explain that airborne mercury emissions at Raunes had not occurred, and in a letter to AF Decom and RF.

**Bilag 71** Copies of articles in Dagbladet on 26 and 29 September and 13 October 2014

We will review and comment on these arguments. The arguments themselves show how far the Norwegian Environmental Agency is willing to go to explain away any information other than that produced by NIVA and AF Decom:

1) **"The mercury may have come from "the other side of the North Sea" with so-called long-range mercury pollution. (cf. Signe Nåmdal of the Environment Agency)**
   The problem with this is that all research on this says that this long-range pollution is fairly constant across the country. Reports published by the Environment Agency show that

deposition of mercury could be approx. 0,27 g per year on an area of 49 da, which Bioforsk investigated, irrespective of run-off. In other words, long-range transport of mercury is of no importance in the context of discharges measured in kilograms.

In addition, the Bioforsk report shows large emissions of the isotope Pb210. We know that there are significant amounts of this on the base and it is also found in oil scrap, which is used in both the water phase and the oil phase, and that some is obviously also produced from radon during storage of radioactive materials at the company. The proven amounts of up to 13 times the background values of Pb210 show that this also cannot be due to long-range transported pollution.

The concentration of mercury is generally higher the closer you get to AF Decom's site, which would not be the case with long-range transported pollution.

The argumentation of the Environment Agency is therefore mistaken.

2) **Both Signe Nåmdal and Ingvild Marthinsen state in Dagbladet that the soil where Bioforsk has measured is within Condition Classification (good) and better, which would imply that the area can be used for housing and the soil for growing vegetables.** This is also a mistaken inference and even an attempt to belittle and play down the pollution situation.

When the wind stirs up dust and carries it out of the base area, this dust is not uniformly distributed on the ground, as the Environment Agency assumes. Like snow, it drifts and the dust is distributed non-uniformly over the terrain and forms "poison pits".

The surface outside the base is not homogeneous, as the Environment Agency assumes! The same thing happens as when it rains, puddles form where the dust is concentrated.

There are places on Raunes outside the site with up to 5.33 mg/kg mercury (cf. Section. J1 NIVA's Annual Report 2012, cf. 6.3.2 in this letter, which means Condition Classification IV = poor. According to the Environment Agency's TA 2553/2009, Condition Classification IV can entail: "Acute toxicity with short-term exposure."

No one knows how many such points exist or how high the concentration is in the various "puddles", or what poisons are found in the puddles or what the overall toxic load is.

**Bilag 72** The Environment Agency's guide TA 2553/2009

Guide TA2553-2009 states:

*"Soil for cultivation at homes and green childcare nurseries: Here the soil used for the cultivation of vegetables must satisfy **Condition Classification I** for the substances PCBsum7, PAHsum16, benzo(a)pyrene, cyanide and hexachlorobenzene."*

In Section J1, cf. NIVA's annual reports, in 2010 benzo(a)pyrene was up to 0.41 mg/kg, Condition Class III. In 2012, the level dropped to 0.14 mg/kg, i.e. Condition Class II.

With regard to mercury, many points were measured by NIVA and RF outside the base at over 2 mg/kg mercury. *All points were analysed based on nitric acid solution and thus probable shows values that are too low.*

It is simply illegal to grow vegetables in this area.

The argumentation of the Environment Agency is therefore mistaken.

3) **The Environment Agency claims that the environmental condition is good (same reasoning as NIVA uses), i.e. that the "condition classification" has not changed.**
For the condition classification to change in such an area in a 5 cm thick layer in the area Bioforsk has measured, it would require significant emissions of mercury. Our calculations indicate the following:

For undisturbed soil to reach Condition Classification I from II or II from III in an area of the size measured by Bioforsk, it would require the addition of 1 mg mercury per kg of soil.

For $49\ 000 m^2$ in a thickness of 5 cm of undisturbed soil to reach Condition Classification II, it would require the addition of: 1 mg/kg Hg on $49\ 000 m^2 \times 0{,}05 m = 2450 m^3$ soil with a density of 1.60 it would equal 3,920 tonnes of soil, which with 1 g of mercury per tonne of soil, corresponding to **3.92 kg of mercury** (if we count on 20 cm soil, it becomes **15.7 kg of mercury)** that is required to change the condition classification.

Accordingly, in order for the entire periphery zone around AF Decom to move up a step in one of the lowest condition classifications, it would require the addition of:

1 mg / kg Hg on $542\ 960 m^2 \times 0.05 m = 27.148 m^3$ soil with density 1.60 which would correspond to 43,436.8 tonnes of soil with 1 g mercury per tonne, corresponding to **43.4 kg of mercury.** Obviously, the emissions do not stop at the periphery, so that the real emissions must have been much larger.

We have submitted these calculations in several letters to the regulatory authorities and also in the written pleadings against CoP and AF Decom, without them being refuted.

It is known that AF Decom is allowed to discharge 40 g of mercury into the sea per year after March 2013 (it was previously 60 g per year), but the company is still not allowed to release any prioritised substances into the air.

The sea area within the border zone is 209,130 $m^2$, and one can easily calculate the emissions that could have gone into the sea if we use the Bioforsk report as a basis. Even if the wind data is unknown, large quantities must nevertheless have fallen into the sea.

The argumentation of the Environment Agency is therefore mistaken.

4) **The Environment Agency also says that there are similar amounts of mercury in the soil elsewhere in the country. Our comments on this are:**

a) *"NTNU has conducted several comprehensive surveys of heavy metal levels in natural soil in Norway nationwide and they have data for mercury spanning a period of over 40 years. The level of mercury in natural, humus-rich surface soil varies little in Norway over time, as well as geographically, and is consistently at a level of 0.15-0.20 mg/kg. There is little data from Norway for mercury in the underlying layer of mineral soil, but international literature suggests a general level between 0.01-0.02 mg/kg.", cf.* Professor Eiliv Steinnes.
b) There may be locations that have higher levels, in the same way as some places contain gold or uranium or other metals.
c) But The Environment Agency fails to take into account that the investigations that were carried out before AF Decom came to Vats, ref. 2.2 in the letter (Bilag 2, Bilag 3 and Bilag 4), where 24 analyses performed by TLP Hutton and AF Decom before AF Decom commenced operations in 2002 and 2004, showed that there was no mercury in the area.
d) If the mercury had not been added, but had been there from the beginning of time, the mercury values would then have been fairly homogeneously distributed in the soil and would not have had large concentrations on the top, which decreases down into the soil and then disappear at a depth a little deeper than 20 cm.
e) Mercury is not normally found in the type of soil found on Raunes, according to the Bioforsk report.

How can the Environment Agency explain that the analyses generally have the same distinctive distribution between heavy metals in the soil's top layer outside the base, as is found in AF Decom's dust inside the working area at the base, and that it decreases with distance from the base. NIVA's Environmental Report 2012 states: *"The distribution pattern of the metals resembled the distribution pattern previously found in sweepings from the operations area" (AF Decom's fingerprint).*

At our meeting with the Environment Agency on 27 January 2015, we asked about how they would explain that the mercury (and the other prioritised substances) disappears when the wind and weather moves the dust over AF Decom's fence?

Ingvild Marthinsen of the Environment Agency replied that there was no point in discussing with us because we would never agree, no matter what.

The argumentation of the Environment Agency is therefore mistaken.

**5) "AF Decom must be allowed to run the business for which they have permission."**

The Environment Agency has not granted AF Decom permission to pollute more than the pollution they are allowed to discharge. This reasoning could otherwise be used by any business when they pollute.

The Environment Agency, AF Decom and NIVA has repeated at every opportunity how clean the business is and how little it pollutes, and that it is well within the acceptable limits. AF Decom must keep its promises.

There is no doubt that the situation seriously deteriorated when AF Decom started taking large structures ashore in 2009, i.e. began with rough dismantlement ashore.

In 2009, AF Decom could no longer stick to the procedures imposed by ConocoPhillips (CoP) and the dust problems became much worse.

It is not BAT to change to a technique, which yields inferior results, only for financial or practical working purposes.

As a general comment, the Environment Agency has not, even after 3 years of demands and reminders from RF, requested **scientifically quantifiable** and precise dust measurements of the mercury emissions on Raunes. It is entirely possible to do so with modern technology and RF has even received offers for this from several sources. It should be an essential requirement for AF Decom to ensure that they can measure such emissions from the very first day of operations.

The argumentation of the Environment Agency is therefore mistaken.

**6) Past activities on Raunes may have caused the pollution**

When the Environment Agency responds to our questions, it has become customary that they only answer a few points and that the agency fails to respond to the rest. After RF's comments on the above to the Environment Agency, we have not yet received any reply. Nevertheless, we received a letter from the Environment Agency immediately before we were to meet CoP and AF Decom in the Court of Appeal:

**Bilag 73** The Environment Agency's letter concerning requirements for third party control of fallout dust from AF Decom's facility in Vats, dated: 02.02.2015

This letter now presents a new argument:

*"There has been industrial activity on AF Decom's property for 40 years and it would be unnatural if this activity did not have some effect on the neighbouring property. We believe, however, that this report shows that the activity on AF Decom's plant is within acceptable environmental impact limits and therefore provides no grounds for concern."*

The Environment Agency must be aware that the former industry, i.e. the assembly of Condeep platforms out in Yrkjesfjorden, did not entail major industrial activity on Raunes in Vatsfjord (where there was shipping, administration and living quarters), and certainly not industry that could contaminate with mercury (or other prioritised substances for that matter). In addition, there was another "environmental business" for a brief period, which received used tires for a period, but these do not contain mercury.

As mentioned above, environmental surveys were conducted after these activities were terminated there in 2002 and 2004, cf. 2.2 in this letter (Bilag 2, Bilag 3 and Bilag 4), which showed that there was no mercury in the area before AF Decom started operations in 2005. The Environment Agency is aware of this information, including through correspondence from us.

The argumentation of the Environment Agency is therefore mistaken.

But the Environment Agency did not give up when the time approached for the case to be heard in the Supreme Court and at the public meeting in Tysvær on 3 June 2015. We assumed that there would be some statement or other from the authorities, which also occurred.

A new letter criticizing the Bioforsk report arrived on 01.06.2015:

**Bilag 74** Feedback on the Bioforsk report dated: 01.06.2015.

Bioforsk responded to the Environment Agency on 09.06.2015:

**Bilag 75** Letter of reply from Bioforsk to the Environment Agency by Kaya Grotheim, dated 09.06.2015.

But even when Bioforsk refuted the Environment Agency's claims, a new letter was issued by the Environment Agency.

**Bilag 76** Response from the Environment Agency, dated: 29.06.2015

The Environment Agency stated at our meeting on 27 January 2015, that the monitoring of Raunes is similar to how they monitor all Norwegian industry, and that our criticism for this reason was "ridiculous". This was repeated in the letter from the Environment Agency:

*"We will continue our monitoring of AF Decom's plant at Vats in the same way as we do with all other types of industry."*

If all monitoring of emissions in Norway is performed in this way, that no attempt is made to detect **discharges** but the **condition classification** is measured instead (something that condition classifications were not intended to be used for), the Environment Agency is legitimizing the release of large amounts of poisons.

When they rationalize mercury emissions, accepts that mercury-containing and other toxic substances are delivered as conventional waste after incorrectly performed leaching experiments, the Environment Agency is also contributing to legitimizing the release of large amounts of poisons and to breaching the OSPAR Convention.

This can happen by NIVA, as the professional body upon which the Norwegian Environmental Agency bases its opinions, providing inaccurate and misleading information to the Environment Agency, both through its reports and in direct communication with the Agency, cf. the documentation outlined above (cf. Bilag 52 and Bilag 53).

Reply from Nibio (formerly Bioforsk), where the Environment Agency's claims are once again refuted.

**Bilag 77** Letter of reply from Nibio (formerly Bioforsk) dated 10.08.2015.

### 8.3.1 *Summing up*

The Bioforsk reports clearly show that mercury and radioactive substances have been emitted through dust dispersal and torch cutting at the site. The emissions must have been far higher than the permits granted to AF Decom for the discharge of mercury. AF Decom only has permission for discharges to the sea and has no permit for air emissions, beyond what have no environmental consequences. Although the Environment Agency attempts to discredit Bioforsk and, curiously enough, has no objections to NIVA's reports, in our view there is no scientific basis for contesting Bioforsk's reports.

## 8.4 Fish analyses

### 8.4.1 *Introduction*

After RF was made aware through the Proactima report that releases of toxins into the air must have occurred, it was also considered whether the measurements performed by NIVA at sea were methodical and actually on a technically qualitatively acceptable level.

When NIVA, e.g. detects an increase or a high value in a parameter such as claw meat in crabs, NIVA does not deal with the issue of why the claw has become contaminated, why **there is an increase or a high value.** It then refers to another fjord or somewhere else with equal or higher pollution. What NIVA then fails to remark on in their reports, is that the pollution in the fjords they compare with, are places where there have been polluting industrial activities for many years, and where the locations have been contaminated accordingly.

This is in spite of the fact that NIVA's attempts at trivialisation and evasion in our opinion, **actually measured increasing amounts of mercury, PCB and dioxin levels** in recent years, even though the detection limits are enormous and require major pollution.

Analyses of the soil outside the base (cf. 6.3.2 in this letter) and fish analyses of both cod and cusk fish (NIFES's report 2013 and 2014) show that the emissions from the base must have been considerable.

Vatsfjord has not had any metallurgical industry, ship industry or any other industry that contaminated with prioritised substances prior to AF Decom's arrival at Raunes. As already mentioned, there have been no industries in Vatsfjord working with substances such as mercury and PCB. The only industrial activities of any significance have been moulding and assembly of Condeep platforms, and these activities took place before studies were conducted that showed that Vatsfjord was not polluted like the fjords with which NIVA draws comparisons.

**In our opinion, when conducting environmental monitoring, one both must and should focus on the increase of undesirable substances in the environment.** Why are the increase of environmental poisons such as mercury, dioxins and PCB in Vatsfjord poorly explained and not at least queried by NIVA?

On this basis, RF found it necessary to engage a recognized institution and the choice fell on NIFES who, among other things, preform national studies on the environmental situation in the Norwegian fjords, as an addition to NIVA's investigations.

### 8.4.2 *NIFES's measurements in Vats fjord*

Reports from NIFES's studies are presented as:

**Bilag 78** NIFES report 2013 on metals and organic contaminants in seafood from Vatsfjord, published 03.10.2014

**Bilag 79** NIFES report 2014 on metals and organic contaminants in seafood from Vatsfjord, published 29.06.2014

The actual analysis data from NIFES is in the form of very extensive Excel files, which are included on the memory stick, Bilag 13.

#### *8.4.2.1 Investigations related to PCB and dioxins*

The results from NIVA's and NIFES's investigations of PCB7 show in context the following:

| **Cod liver** | | | | | | | **Cusk fish Liver** | | |
|---|---|---|---|---|---|---|---|---|---|
| Sampling year | Measuring point Eikanes | | Measuring point Raunes | | Ref. point Kråkenes | Ref. point Mettenes | Measuring point Mula | | Ref. point Mettenes |
| | µg/kg (ng/g) | µg/kg (ng/g) | µg/kg (ng/g) | µg/kg (ng/g) | µg/kg (ng/g) | µg/kg (ng/g) | µg/kg (ng/g) | µg/kg (ng/g) | µg/kg (ng/g) |
| | **PCB6** | **PCB7** | **PCB6** | **PCB7** | **PCB7** | **PCB7** | **PCB6** | **PCB7** | **PCB7** |
| **2009-NIVA** | | 122 | | 54.7 | 78.8 | | | 163 | 432 |
| **2010-NIVA** | | | | | | | | | |
| **2011-NIVA** | | nd | | nd | | nd | | | |
| **2012-NIVA** | | 434 | | 468 | | 647 | | | |
| **2013-NIVA** | | 43 | | 38 | | 92 | | | |
| **2013-NIFES** | 396 | 448.5 | | | | | 707.1 | 778.8 | |
| **2014-NIFES** | 298 | 330.0 | | | | | 796.0 | 850.0 | |

Table 9: Results from the studies by NIVA and NIFES for PCB in cod and cusk fish liver

We especially want to highlight the following:

**2013** analysed for PCB7 with the following average values

cod liver Eikanes NIVA 43 µg/Kg

NIFES 448.5 µg/Kg NB! **10.4 times higher** value at NIFES.

**2014** NIVA has stopped analysing fish.

Based on the 2013 figures from NIVA, the Norwegian Environmental Agency "exonerated" AF Decom for PCB and mercury contamination in the fjord.

**Bilag 80** Letter of 09.04.2014 from the Environment Agency

When we documented an increase of mercury in crab claws from 2009 to 2012, the Environment Agency claimed that it was necessary to take samples over an even longer period of time in order to determine whether there was actually an increase. Conversely, when NIVA found abnormally low values in 2013, this one year was sufficient to exonerate AF Decom.

The Environment Agency and later NIVA, have argued that there are no significant differences between NIFES's figures and NIVA's figures for 2013.

When one compares similar surveys conducted by NIFES in other fjords, including industrial fjords in Norway regarding PCB, one finds the following figures:

*Developments in Vatsfjord from 2009 to 2014, compared to other polluted fjords:*

| PCB in cod liver | Average | |
|---|---|---|
| | PCB6 | PCB7 |
| | µg/kg (ng/g) | µg/kg (ng/g) |
| Borgundfjord | 848 | |
| Oslofjord Øst | 522 | |
| Hardangerfjord | 483 | |
| Vatsfjorden (NIFES 2013, Eikanes) | 396 | 448 |
| Vatsfjorden (NIVA 2012, Eikanes) | 383 | 434 |
| Oslofjord Vest | 328 | |
| Sognefjorden | 293 | |
| Vatsfjorden (NIFES 2014, Eikanes) | 298 | 330 |
| Telemark | 275 | |
| Balsfjord | 236 | |
| Ryfylke | 193 | |
| Mongstad | 144 | |
| Indre Lofoten | 142 | |
| Vikna | 123 | |
| Vatsfjorden (NIVA 2009, Eikanes) | 107 | 122 |
| Møre bank | 102 | |
| Porsanger | 98 | |
| Average cod liver | 293 | |

| Dioxins in cod liver | Average |
|---|---|
| | |
| | pg/kg |
| Borgundfjord | 72 |
| Telemark | 53 |
| Oslofjord Øst | 45 |
| Vatsfjorden (NIFES 2013, Eikanes) | 42 |
| Sognefjorden | 41 |
| Oslofjord Vest | 39 |
| Hardangerfjord | 35 |
| Ryfylke | 30 |
| Vatsfjorden (NIFES 2014, Eikanes) | 27 |
| Mongstad | 24 |
| Indre Lofoten | 23 |
| Balsfjord | 18 |
| Porsanger | 15 |
| Vikna | 14 |
| Møre bank | 13 |
| | |
| | |
| Average cod liver | 32 |

Table 10: The development of PCB in Vatsfjord from 2009 to 2014 compared to other fjords in Norway

*Comments on the comparison:*

- Compared as PCB6, NIVA has measured PCB7 and the value is therefore reduced by 13% in order to obtain the PCB6 value.
- Tusk liver in Mula (entrance to Vatsfjord) shows the same trend for PCB7, from 163 µg/kg in 2009 (NIVA) to 850 µg/kg in 2014 (NIFES).
- NIVA did not analyse for PCB in cod liver in 2010

- NIVA used the wrong method of analysis in 2011. Cod liver was analysed using a method that only had 10 µg/kg as its detection limit for each PCB type.
- It is easy to contaminate with PCB, but it takes a long time to remove it from the environment.

It can be seen in overview that both the level of PCB and dioxins in cod liver is lower in Vatsfjord in 2014 than in 2013. This is positive, but the level is still higher than the limit set for food safety, although this is not discussed by NIVA, cf. the description above. The limit for food safety has been adopted as Norwegian law.

The decline may be due to random variations, but it cannot be ruled out that the cessation of emissions from the operating site after 14 September 2013 has had a positive impact.

It should be noted however, that for tusk from Mula (which is closer to AF Decom's operations site than Eikan, where the cod samples were taken) also exhibits an increase in 2014 in the content of PCB, dioxins and mercury, so this could just as easily be dependent on the direction of the current in the waters.

#### *8.4.2.2 NIVA's and NIFES's measurements of mercury compared to other fjords*

The trend in mercury values in Vatsfjord and the results of the monitoring set in the context of other polluted fjords:

| Cod liver | Average | +/- |
|---|---|---|
| | mg/kg | |
| Hardangerfjord | 0.180 | 0.170 |
| Sognefjord | 0.170 | 0.040 |
| Vatsfjorden (NIFES 2014, Eikanes) | 0.161 | |
| Vatsfjorden (NIFES 2013, Eikanes) | 0.150 | 0.050 |
| Oslofjord Vest | 0.140 | 0.110 |
| Oslofjord Øst | 0.110 | 0.090 |
| Borgundfjord | 0.100 | 0.080 |
| Telemark | 0.081 | 0.060 |
| Ryfylke | 0.070 | 0.050 |
| Fensfjord | 0.061 | 0.080 |
| Vatsfjorden (NIVA 2009, Eikanes) | 0.040 | |
| Vikna | 0.032 | 0.011 |
| Møre bank | 0.029 | 0.017 |
| Lofoten | 0.028 | 0.018 |
| Porsanger | 0.024 | 0.013 |
| Balsfjord | 0.015 | 0.020 |
| Average | 0.070 | 0.090 |

| Cod muscle (meat) | Average | +/- |
|---|---|---|
| | mg/kg | |
| Vatsfjorden (NIFES 2014, Eikanes) | 0.200 | 0.130 |
| Hardangerfjord | 0.190 | 0.130 |
| Sognefjord | 0.180 | |
| Borgundfjord | 0.160 | 0.070 |
| Vatsfjorden (NIFES 2013, Eikanes) | 0.150 | 0.080 |
| Oslofjord Øst | 0.140 | 0.090 |
| Ryfylke | 0.130 | 0.060 |
| Oslofjord Vest | 0.130 | 0.060 |
| Telemark | 0.120 | 0.060 |
| Fensfjord | 0.086 | 0.060 |
| Vatsfjorden (NIVA 2009, Eikanes) | 0.083 | |
| Møre bank | 0.082 | 0.043 |
| Lofoten | 0.071 | 0.036 |
| Vikna | 0.063 | 0.033 |
| Porsanger | 0.044 | 0.026 |
| Balsfjord | 0.033 | 0.017 |
| Average | 0.110 | 0.090 |

Table 11: Development of mercury levels in Vatsfjord from 2009 to 2014 compared to other fjords in Norway

*Comments on the comparison:*

AF Decom started their scrapping activities in 2004

The NIFES figures for fillet are adjusted for fish size 68 cm. The average value for cod fillets in 2014 was 0.222 mg/kg, but is adjusted down to 0.200 mg/kg due to fish size.

NIVA has analysed very small fish and the value is not adjusted for weight or length. There is still a significant increase in mercury content from 2009 to 2014.

### 8.4.3 *Methodological issues related to NIVA's fish surveys*

It is RF's opinion, based on expert advice, that the difference between NIVA's research and NIFES's research may be due to differences in fish size, and also on whether the fish that was caught were free fish or farmed fish. On this basis, RF wanted to find out more about the factual basis for NIVA's research and we therefore asked them to provide information about the fish that were caught and examined by NIVA. The reason for this request was that NIVA had not revealed the weight of the fish in the annual reports, nor in the annexes. Everyone who measures the levels of toxins in fish knows that the age, length and weight of the fish are essential factors for the analysis.

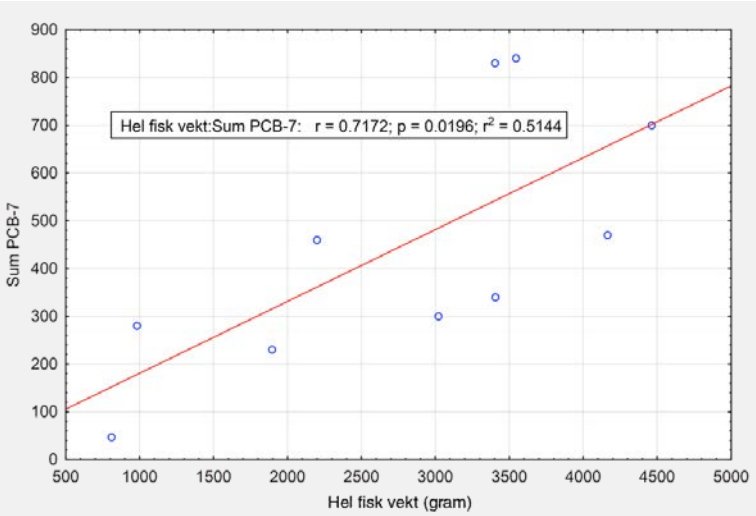


Figure 15: Graph from NIFES showing the relationship between weight and PCB content

RF therefore asked NIVA to reveal the weight of the fish, something which in our view should have been included in the basis for the report. In our view, it should be possible for any study of this nature to be reviewed with regard to the factual basis for the assessments made. NIVA responded that this information was not readily available and that they wanted NOK 165,000 + VAT in order to obtain the weight of the fish.

NIVA promised full transparency at the beginning of the monitoring and referred to NIVA's slogan. Afterwards, NIVA decided which actors could or could not receive information, and who should receive the information for free and who should pay for it.

Comment [A1]: can write the slogan in ""

**Bilag 81** RF's letter to NIVA of 10.02.2014 requesting the background material for NIVA's annual reports

**Bilag 82** NIVA's answer by email of 11.02.2014 that they would require payment in order to produce the background for the reports.

**Bilag 83** Offer of 14.02.2014 from NIVA by e-mail - project contract

**Bilag 84** E-mail of 14.02.2014 with comments from RF to NIVA's submission of the project contract dated:

Nevertheless, we have been advised that NIVA has later revealed the average weight of the fish to the Norwegian Fishermen's Association (cf. Bilag 29) so that this information eventually became available to us.

The weight of the fish as reported to the Norwegian Fishermen's Association shows that NIVA analysed fish that were too small to be comparable with results from other analyses of Norwegian fjords, and they have thus given the impression that the mercury valuesin Vatsfjord were lower than in other fjords. (NIVA has reported an average weight to the Norwegian Fishermen's Association of 1.2 kg in 2013, whereas NIFES's nationwide surveys have an average weight of 2.7 kg (between 2.5 and 3 kg).

#### *8.4.3.1 Changing the reference point during the measurement period*

As already mentioned, NIVA changed the reference point for the cod samples from 2009 to 2011, from Kråkenes to Mettenes, without this being explained. It is not normal to change the reference point during a measurement period, and Metteneset (the measurement point extends out into Nedstrand fjord) is a place where it is widely known that there is a high level of pollution, because Nedstrand fjord has been a dumping ground for ships etc. since before the war. The official dumping area, in which the Alexander Kielland platform was sunk, among others, lies further out in Nedstrand fjord, and the current in the fjord goes on the east side past Metteneset. RF has asked NIVA for an explanation for the change of reference point, without reply.

#### *8.4.3.2 Changing the fisherman during the measurement period*

As previously mentioned, NIVA changed fisherman in 2013, but refuses to say who this new fisherman is. This is important information because it is important to obtain information about whether the fish are caught according to the methods that are otherwise used in order to compare with other analyses, and whether the fisherman has the knowledge to safely differentiate between sedentary fish or migratory fish. If one does not know who the fisherman is, it is impossible to ask and receive answers to these important questions, and to be certain that the fisherman has the necessary knowledge, for example, to differentiate between sedentary fish or migratory fish. Neither NIVA nor AF Decom will disclose this information. This means that NIVA's surveys cannot be verified.

#### *8.4.3.3 NIVA's behaviour in a research ethics perspective*

It is our belief that this is both inconsistent with the requirement for quality, cf. Section 2, the quest for truth, cf. Section 1, integrity, cf. Section 7, good reference practice to ensure verifiability, and publication of results, cf. Section 11 in NENT's ethical guidelines.

We have taken up several of these issues with NIVA, but they will not comment on or remedy the situation. In our view, this is contrary to the requirement for the institution's responsibilities in the Section 10 of the guidelines, which states that:

*"Ethical behaviour is not just the responsibility of the individual researcher, but also of the research institution. The institution is responsible for ensuring compliance with good scientific practice and for establishing mechanisms to deal with suspected breaches of ethical standards."*

Generally, there are many issues related to the analysis methods. It can also be observed in NIVA's reports from the surveys in Vatsfjord, that several pieces of information that it is necessary to have an insight into in order to e.g. be able to verify the surveys and compare them with other studies, are not provided. For example, NIVA has not made data concerning fish size available.

### 8.4.4 *The Environment Agency's attempt to "exonerate" AF Decom*

As already mentioned, NIVA and the Environment Agency had discussions about how criticism from RF should be explained. This has occasioned e.g. press releases, acquittal letters and article in the newspaper Dagbladet from the Environment Agency.

Example of statements from the Environment Agency in Dagbladet:

**Bilag 85** Article in Dagbladet of 13 October 2014 "Unyansert om utslipp i Vatsfjorden" [trans: Oversimplified about emissions in Vatsfjord].

Here, Signe Nåmdal states among other things *"Co-owner Jacob Hatteland in Raunes Fish Farm has expressed a lack of confidence in NIVA's measurements. He therefore hired NIFES to survey the fjord.*

*It is good to obtain more data about the state of the environment, but there are no major differences in the survey results from NIVA and NIFES."*

This is deliberate disinformation from the Environment Agency and NIVA: we will give some examples:

**Comment [A2]:** proven or deliberate - NIVA or NIFES? I, the translator, corrected 2 obvious errors here.

#### *8.4.4.1 PCB*

NIVA's figure for 2012 for PCB7 in cod liver in Eikanes in Vatsfjord was 434 µg/kg. The following year, in 2013, the value from NIVA was only 43 µg/kg i.e. a significant reduction.

NIFES's figure for 2013 for PCB7 in cod liver in Eikanes in Vatsfjord was 448.5 µg/kg,

i.e. 10 times higher than NIVA's results (as already mentioned, the limit for food safety according to Norwegian law is 200 µg/kg).

#### *8.4.4.2 Mercury*

NIVA's figure for 2012 for mercury in crab claw on Raunes in Vatsfjord was 0.15 mg/kg Hg. The following year, in 2013, the value from NIVA was 0.094 mg/kg Hg, also a significant decrease.

NIFES's figure for 2013 for mercury in crab claw on Raunes in Vatsfjord was 0.22 mg/kg Hg.

Thus, there are differences of 80-90% when it comes to PCB and up to 50% for mercury when we compare NIVA's and NIFES's research for 2013. NIFES's figures show an increase, which is in line with the experience of previous years, while NIVA's figures show a marked decrease in 2013.

Comment [A3]: 800-900%?

**But there are "no major differences in the results" according to Nåmdal from the Environment Agency.**

But although both NIVA and the Environment Agency was aware of these major differences when NIVA was preparing the 2013 annual report for AF Decom, the differences were not mentioned or debated at all.

The focus was only on evasive explanations, like Nåmdal is attempting here. It is widely known that pollution can be released into the environment quickly, but it takes time before it disappears. NIVA knew therefore, or at least should have known, that there had to be something wrong with the 2013 analyses, but they chose to ignore it.

NIVA also knew about NIFES because in NIVA's 2014 annual report for AF Decom , they referred to NIFES as many as 16 times.

We will comment below on the press release from the Environment Agency of 27.01.2014. Here we will make a fairly detailed analysis of the press release, because it shows how NIVA's behaviour affects the agency:

**Bilag 86** The Environment Agency's press release of 27.01.2014 and acquittal letter of 04.02.2014

### 8.4.5 *Press release: "Low PCB emissions in Vats fjord"*

- Discharges to the sea:

  *"There are no reports of PCB discharges to the sea"*

  *"The plant cleans the emissions"*

  *"We are also unaware of uncontrolled PCB emissions"*

RF's comments:

It is incorrect that the Environment Agency is not aware of PCB emissions.

AF Decom works with PCB and PCB delivered for dumping is reported to the Environment Agency in its annual waste reports from AF Decom. RF has informed the Environment Agency repeatedly about dust dispersal from the base. This dust will contain the same as the dust on the base area, including PCB.

RF reported the emissions on 14 September 2013 to the Environment Agency, and RF has reported to the police the incident where the dust on ⅓ of the work area (25,000 $^{m}$ 2) has been able to drain around the treatment plant and into the sea.

We refer to the description of this emission below under 9.5 in this letter. We also refer to 6.5.3 in this letter, where AF Decom has also brought up PCB as a possible source of accidental spills.

**The seabed:**
*"There is no evidence of PCB above background values in the seabed. All samples show low values."*

RF's comments:

This is not unusual, since due to the volatility of PCB, it will seep into hollows in the seabed and remain there.

NIVA has not sought out such hollows as far as we know and there are also doubts about whether NIVA has taken samples and fixed these properly in Vats. As already mentioned, PCB in paint chips and PCB oil is highly volatile and it is therefore important that the sample is taken without the PCB, water or sediment being allowed to move. NIVA themselves have explained in connection with their investigations on Svalbard that this is the method that should be used.

The base on Raunes has many boat moorings, several with GPS positioning (cf. 6.4.4 in this letter). A consequence of this is that it would be completely unnatural to find PCB in an analysis of sediments outside the dock area, since it would be stirred up and carried away with the current.

**Mussels:**
*"There is no evidence of PCB in any samples at any measuring stations"*

RF's comments:

The fact that one gets "not detected" in response to the analyses does not mean that **there is no** PCB in the mussels, but only that the analytical method is not sensitive enough (PCB is still detected in NIVA's 2014 annual report, as they used a different method of analysis here).

PCB is heavier than water and sinks to the bottom and it is not certain that the mussels come into contact with the PCB pollution.

Comment [A4]: volatile?

**Crab meat and crab claws:**
*"There is no evidence of PCB in any samples at any measuring stations"*

RF's comments:

Like above, PCB binds to fat and it is not usual to analyse crab claws for PCB, because this meat contains little fat. In NIVA's 2014 analyses, however, they detected PCB in crab claws.

**Cod fillet:**
*"There is no evidence of PCB in any samples at any measuring stations"*

RF's comments:

This would also not be expected, since there is very little fat in cod meat.

PCB is therefore usually measured in the liver of the cod and the EU limit values are therefore specified only in the liver.

**Cod liver:**
*"There are low levels of PCB at the measuring stations in Vatsfjord. The samples from the reference station further out on Metteneset are somewhat higher, but still low. This station is positioned so that it is unaffected by the activity in Vats"*

RF's comments:

This is not correct. There are not low values in Vats fjord, cf. «Table 10: The development of PCB in Vatsfjord from 2009 to 2014 compared to other fjords in Norway». The values have increased to the same level as old industrial fjords.

Comparing with Metteneset is also completely wrong, cf. our comments regarding the relocation of the reference point and using the reference point in a dumping area.

One can question why it is more important for the Environment Agency and NIVA to assert that there is no contamination of PCB, than to perform inspections and conduct more thorough investigations.

The Environment Agency also argued that the measurements of mercury and PCB in Vatsfjord have not been taken over a sufficiently long period of time in order to say with certainty that the mercury levels and PCB levels are increasing, because there may be annual variations.

When NIVA's 2013 figures arrived, the Environment Agency went out and "exonerated" AF Decom for all emissions of mercury and PCB. Then it was suddenly sufficient to use one year's results in order to conclude and exonerate AF Decom, while at the same time they knew that NIFES's figures for PCB were 10 times higher and the mercury values were double.

# 9 Extraordinary toxic emissions

## 9.1 Introduction

These emissions are also not directly related to our request to NENT, but it is important to comment on them because extraordinary emissions may be a reason why toxins have been detected.

According to NIVA, its monitoring programme has not detected the significant mercury emissions which, in all probability, have taken place for several years due to a misplaced and a missing blind cover (discovered as a result of the "14 September 2013 spill"). The discovery of these emissions can explain the increase of mercury, PCB and dioxin levels in Vats fjord. It is striking that NIVA themselves have not sought to find the cause for why there are even toxins in the fjord and they do not query the increase of these toxins in their reports. It is also striking that it is always RF who discovers that emissions occur from AF Decom's operations, and not AF Decom themselves, or NIVA who are engaged to carry out environmental monitoring.

AF Decom has exonerated itself for the spill and for other issues, and the Environment Agency has (as always) accepted AF Decom's obviously erroneous explanations.

We will in the following section describe the individual and the most severe conditions about which RF has knowledge.

## 9.2 Removal of contaminated soil - 2009-2015

### 9.2.1 *Leaching experiments*

CoP and AF Decom informed the Court of Appeal in Bergen in March 2015 that since 2008/2009, they had delivered sweepings to normal landfill, i.e. the toxic mix of dust and gravel from the work surface, containing a number of prioritised substances.

AF Decom claimed that leaching tests had shown that mercury-containing sweepings could be reclassified and sent to landfill, meaning that this was no longer considered special category waste.

RF has therefore asked AF Decom and the Environment Agency:

- to get access to the analyses of the sweepings that were delivered
- to get access to the analyses after the leaching tests
- to be informed and receive documentation for how much was delivered as normal waste
- to be informed of where the waste was delivered etc.

If the leaching tests were conducted with *nitric acid* solution and did not take methylation into account, then the tests will be incorrect with the consequence will be that large quantities of mercury have been driven to the dump as ordinary waste.

The Environment Agency has asked us to contact AF Decom.

AF Decom has so far refused us access and justified this by referring to "business secrets".

(cf. 6.4.1 above of this letter and Bilag 52 and Bilag 53)

It is not unlikely that AF Decom has dispatched large quantities of waste to landfill that should have been classified as special category waste. This will not be clarified until sufficient information about the content of the waste is made available.

## 9.3 Major oil spill from Statfjord C loading buoy 16. Nov. 2012

On 16 November 2012, RF's staff member Kjell Inge Kvamen was out fishing in Vatsfjord when he discovered an oil slick which was approx. 4 km long and around 50-200 m wide. The spill stretched from approx. 400 m from where AF Decom works with the cutting of the Statfjord C buoy and into the fjord, all the way into Solvik.

Figure 16: Statfjord C


Figure 17: The extent of the oil spill

Kvamen alerted the emergency number 113, but the fire department was not informed about the spill until the next day.

Kvamen collected a sample of the oil in a 1½ litre bottle, and took pictures and video of the spill with GEO positioning. A copy of the video was sent to the Norwegian Coastal Administration and they stated that it was blue-shine and that the spill had to be significant.

That evening there was a strong wind with metre-high waves and the next morning there was little to see of the spill, but the fishermen got oil in their equipment and traps, as well as in fish farms in the weeks thereafter.

AF Decom had received permission to carry out demolitions based on a survey of what should be left in the loading buoy. The survey said that there should be a total of no more than **500 kg of hydrocarbons** on board the platform.

AF Decom did not use booms around the buoy as they were required to do, but it did not matter because the oil came up more than 400 m from the platform. The leak had occurred at 60 metres depth and the sea current and the time for the oil to rise meant that it came to the surface far away from the platform. The oil spill came from the lower part of the platform, where there is a cavity, and it began to flow out after the platform has reached a certain angle of tilt, cf. Figure 18 and Figure 19 below.

AF Decom at first denied the spill to the media. Having realized that the spill came from them, they tried to diminish the importance of the spill. Finally, AF Decom confirmed to the media that they had collected about **4,000 litres of oil** from the buoy (oil that originally should not have been there).


Figure 18: 79.74° tilting of Statfjord C loading buoy

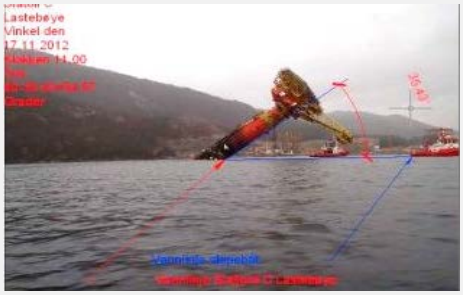


Figure 19: 35.43° tilting of Statfjord C loading buoy

The dimensions of the cavity where the oil came from were known and they knew the tilting of the buoy when the spill started and they therefore had the opportunity to work out exactly how big the spill was.

But the Environment Agency would not request AF Decom to figure this out. Therefore, no one knows how many litres were actually released into the sea. Once again, the Environment Agency did its utmost to ensure that an emission from AF Decom would be forgotten as quickly as possible.

If RF has not detected the spill, the remaining over 4,000 litres of oil could also have been leaked into the sea.

Since the explanations provided by AF Decom do not appear to be logical, RF sent a letter to the Environment Agency asking more questions about this incident and requested the agency to demand answers from AF Decom. In our opinion, these questions are easy to answer, but we have not yet received an adequate reply.

**Bilag 87** A copy of the letter from Advokatfirmaet Simonsen Vogt Wiig, dated 07.01.2013

**Bilag 88** A copy of the letter from RF to the Environment Agency, dated 14.10.2014.

## 9.4 Removal of contaminated soil in Røyrvika – 2013

In connection with the construction of bollard foundations on AF Miljøbase Vats in March 2013, 270 tonnes of contaminated soil was removed from the base area to a crushed stone plant on Sjørseikjeneset in Røyrvika near Vatsvatnet.

Video and photographic material was recorded of the transport and dumping of the soil.

The dumped soil came from AF Decom's operations area. A collecting membrane has been laid at a certain depth at the operations site to prevent contamination from the operations penetrating into the ground.

The soil that was removed and dumped in the relevant crushed stone plant consisted mostly of asphalt, but since there was still frost in the soil, it also included gravel, sand and soil originating from layers located between the asphalt and the membrane, and was thus heavily contaminated.

AF Decom's application to the municipality for the construction of the bollard foundations described the soil as follows: *"The excavation soil that is located above the membrane is defined as contaminated, and will be treated in accordance with the builder's action plan for excavation of contaminated soil."*

Application to Vindafjord municipality regarding bollard foundations from Norconsult, sent 28.01.2013

It is further stated in the application that there *"... **will not be a waste plan prepared because the excavated soil will be temporarily stored on site."*** (our emphasis). Contrary to what the municipality had envisaged from the application, instead of caching the excavated soil in the area, AF Decom sent 270 tonnes of this contaminated excavation soil to the crushed stone plant in Røyrvika.

The stone-crushing plant has run-off directly to Vatsvannet and is not equipped with a treatment plant or similar measures to prevent emissions of hazardous substances to soil or water.

RF made several analyses of the soil under the asphalt and since we wanted to find out whether there was a difference between nitric acid solution and aqua regia solution, we also analysed the samples we had once again.

As mentioned, the results when Eurofins used the following solution were:

| | | |
|---|---|---|
| Nitric acid | : | 2.52 mg/kg mercury |
| Aqua regia | : | 11.00 mg/kg mercury |

Other analyses showed that the dumped soil contained several hazardous substances, including mercury 11 mg/kg (III), zinc 1,800 mg/kg (IV) TBT 5.4 µg/kg, sum PAH16 18 mg/kg (III), sum THC (C16-35) 1,700 mg/kg (IV) and benzo(a)pyrene 0.96 mg/kg (III) - condition classification in parentheses, cf. Bilag 72 TA 2553/2009.

These substances are not normally found in a stone-crushing plant. AF Decom's fingerprint also shows where the soil came from. The newspaper, Haugesunds Avis, also obtained a set of samples of the soil under the asphalt, so that this can also be verified.

Nobody knows how much soil came with the asphalt, but even if it was only as little as 5%, then it would amount to 13.5 tonnes of contaminated soil. With a mercury content of 11 mg/kg, this would mean 148.5 g of mercury were dumped in Rørvika.

The media gave this matter some attention.

Since the media unfortunately focused on the **asphalt** and not on **the soil that came with the asphalt**, the Environment Agency used the opportunity to ask AF Decom to only **analyse the actual asphalt**, although RF had notified the agency that the contamination was in the accompanying soil.

AF Decom's comment was that it had washed the asphalt, "i.e. driven sweepers over the area" before the delivery to the stone-crushing plant. Naturally, this washing did not affect the underside of the asphalt which the waste was attached to due to long and persistent cold, but this was not commented upon.

The asphalt pieces should have been power washed on both sides in order to ensure that harmful substances did not escape from the base, but that would also have entailed more work and higher costs.

The Environment Agency obviously gave a helping hand to AF Decom when it was in trouble and said:

***"The contaminated soil from the stone quarry must have been included with the bucket when the asphalt was collected in the stone quarry."*** (our emphasis)

This means in this case that the soil that is analysed on the asphalt and showed to contain, among other things, heavy metals and TBT ***allegedly should originate from the stone quarry,*** *which is located 7 km inland*.

S-lab on Stord also took a control sample at RF's expense, in the stone-crushing plant from the area a few metres from the pile of asphalt and gravel. There were no unnatural occurrences of toxic substances found, neither mercury nor TBT.

In this way, AF Decom also escaped from this event without a single remark from the Environment Agency.

## 9.5 24 oil spills documented by RF since 2012

### 9.5.1 *Description of the 14 September 2013 spill*

RF has noted for several years that a film of oil has repeatedly formed in Vatsfjord, which must have occurred due to spills from some source.

RF therefore began to document the oil spills in 2012 as they were discovered and has since then documented 10 oil spills in 2012 and 14 oil spills in 2013 (without guaranteeing that we have

documented all the oil spills). All these spills have been downplayed by AF Decom, with assistance from the Environment Agency.

On 14 September 2013, Sigbjørn Langhelle from RF discovered a new spill. Langhelle alerted the fire brigade, who mobilised and were quickly in place. This time it turned out that the spill came from a stream that flowed into the sea via a culvert under the operations area at AF Decom. Vindafjord municipality took samples of the discharge water in the sea opposite the culvert. This showed **mercury content in the sea that was 3,500 times higher than normal for seawater.**

**Bilag 89** Vindafjord municipality's analysis of the seawater after the spill, dated 24.09.2013

RF had themselves taken samples of an earlier oil spill that occurred on 28 May 2013, and had this analysed later, after we understood the consequences of the spill of 14 September 2013. The sample was taken in Grønsvika and also here, relatively large amounts of mercury and other toxins were found.

It turned out that the spill was caused by the pipe from a sump at the operations site and into the treatment plant had been blocked by a blind cover which meant that the pipe into the cavern and the treatment plant was sealed. At the same time, "the service outlet" from the sump to the stream, which should have been blocked, was not closed as intended.

Figure 20: Sump

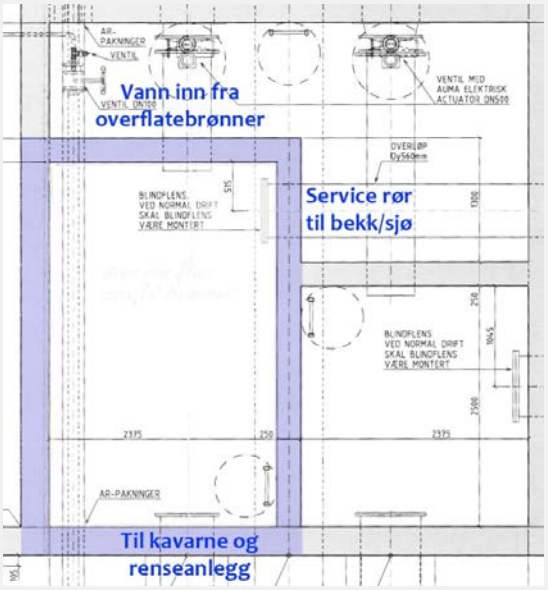


Figure 21: Drawing of the sump

The lower pipe in Figure 20 is the inlet from five drainage basins. The upper pipe is the service pipe that was left open. The brown colour indicates how much sludge was in the basin.

This has led to the surface water from the five drainage basins, which cover 25,000 $m^2$ of the operations area, i.e. ⅓ of the entire area, flowed directly into the stream above and outside the operations area, and then via the stream that runs in a culvert under the operations area and directly out into the sea.

This error has probably been there from when the treatment plant was new in 2008/2009, and since then it has passed 275 million litres of contaminated water through the sump and out into the sea (only based on rainfall data, not counting water used for any flushing of the operations area). If we calculate in the same way as AF Decom did in their letter to the County Prefect of Rogaland on 04.07.2006 and we use the analysis for Vindafjord municipality, **without taking into account that the municipality's sample was taken out in the sea and was already highly diluted, both from the water in the stream and the seawater outside the dock,** there may have been over **7.5 kg of mercury** discharged directly out into the fjord. In addition to the dilution, nitric acid solution was also used for the municipality's analyses, so that the real discharge is probably much higher. If one takes account of the dilution alone, it is more likely that the discharge is closer to 100 kg than 7.5 kg of mercury.

AF Decom themselves state that there was only a discharge of approximately 8 litres of diesel. As we see it, the discharge of oil is the least serious aspect in this context. Why did AF Decom only analyse for hydrocarbons in the discharge. AF Decom knows that they deal with prioritised toxins on the working area.

It is only the largest particles that can be expected to settle in the basins. The smallest and lightest particles will, for the relevant part of the working area, follow the water directly from the operations area via the basins and out into the sea. The very smallest particles will be able to stay afloat in the sea for a long time and are easily carried away and dispersed by the sea current.

The composition of the coarse fraction and the fine fraction on the working area is given in the Proactima report of 31.12.2011 (cf. the Proactima report, 10, Bilag 11 and Bilag 12). As we see it, AF Decom's investigation report is a denial of responsibility for anything that may eventually prove to have a profound impact on the environment in Vatsfjord.

We are aware that AF Decom has collected and analysed water from the sea outside the operations area after the spill on 14 September 2013. However, this happened several days later and after the spill was stopped. Such investigations thus have limited importance, since the particles will already have been carried away by the sea current.

Through correspondence with the Environment Agency, we have also noted that the AF Group has undertaken an internal investigation of what has happened, but it is noted that this investigation is only based on information provided by AF Decom and which does not even take into account other available information, including the investigations of the water that were carried out by the municipality immediately after the spill was detected, or the evaluation of the video recordings of the pipes made by Ragn-Sells at the emptying of the sump.

We are aware that the police are still investigating this matter in order to clarify possible criminal offences and that we must therefore wait with making further comments until this investigation is complete.

Ragn-Sells filmed the pipes to the sump. Before the trial in the Court of Appeal, RF requested a copy of the video but did not receive it. During the proceedings in the Court of Appeal in Bergen, Bengt Hildisch from AF Decom promised that RF would receive a copy of the video. We have reminded AF Decom, but we have still not received it.

**Bilag 90** Request for AF Decom's release of the video produced by Ragn-Sells after the spill, dated 04.05.2015

Had it not been for RF detecting the spill on 13 September 2013, the contamination from ⅓ of the operations area could have continued. Kilos of mercury and other prioritised substances would have continued to flow straight out into the sea with rainwater and sprinkling of the work site.

**NIVA had no method to detect the spill.**

# 10 Self-inspection

In Norway, the monitoring of companies such as AF Decom is based on self-inspection.

The prerequisite for self-inspection to work is obviously that the system designed for the self-inspection must work.

It is self-evident that if the inspector, auditor and business work together to hide errors and defects, then the self-inspection cannot work.

As we have shown through the letter and provided many examples of, the Environment Agency has issued incorrect press releases (ref. Bilag 81), letter to AF Decom which exonerates the company when the company wants to expand, when the company wants to break up structures at sea, during important legal proceedings for AF Decom and ConocoPhillips etc. All based on incorrect assumptions.

An illustrative example of the Environment Agency's discriminatory behaviour is that from the time RF commenced their investigations in 2012, we asked the Norwegian Environmental Agency to come and visit us at the same time as they were visiting and inspecting AF Decom on Raunes. Although the pollution issue means "life or death" for RF, the Environment Agency did not find the time or opportunity to visit RF and receive a briefing on our view of what happened on Raunes. Although the Environment Agency had no time for RF, the Environment Agency had time to be with AF Decom at public meetings and to talk to the press and explain how good the company was. Our first meeting with the Environment Agency was in Oslo, 3 years after this started, on 27 January 2015 due to the Bioforsk report.

It is even worse that the Environment Agency has defended AF Decom during all of the emission cases and has accepted totally illogical and false explanations, cf. the oil spill on 16 November 2012, the dumping in Røyrvika, all of the 24 oil spills, which culminated with the spill on 14 September 2013. All this shows that the Environment Agency has a major vested interest in the case.

During the trial, this became so clear that more than one journalist asked us if the Environment Agency was a party to the case.

At the same time, in other cases we see that the Environment Agency reports polluters for far less serious offences.

For example, in the ERAS case in Høyanger, where the Environment Agency reported the matter to the police and demanded prison terms. Originally, this was a matter involving 30 kg of metallic mercury, but in the Court of Appeal it was reduced to 10 kg.

This was metallic mercury vapour with a dispersal radius of 1000 km. There was never any change of condition classification caused by the emissions in Høyanger. Regardless of whether it was 30 kg or 10 kg, it would have far less local and general environmental consequences than the reported emissions of particulate mercury in 2005 of 558.96 g (Bilag 36) which were emitted from AF Decom and spread locally around the base.

This huge difference in treatment of AF Decom and other companies has surprised us many times, and we have often wondered what could be the reason.

The reason that we are bringing up the circumstances regarding self-inspection and the Environment Agency is to show the consequences of NIVA's actions, and if NIVA had followed their ethical guidelines and heeded the realities more than the desire to satisfy the Environment Agency and their client at all times, the situation would have been quite different.

It would have been completely unthinkable that the Directorate of Taxes had such a relationship with an auditor and a company like the relationship between the Environment Agency, NIVA and AF Decom.

The self-inspection is therefore not working and eventually it goes wrong.

# 11 Summing up

As explained above, RF believes that fundamental questions can be asked about NIVA's role in connection with the environmental reporting from Raunes. Firstly, there are several examples of a lack of independence. In addition, the methods and the quality used are not in accordance with the requirements and standards that should be applied for this type of environment monitoring.

For example: NIVA concludes the following in its annual report for 2014:

*"NIVA's environmental monitoring of AF Miljøbase Vats shows that the operation's emissions to the sea in 2014 were within the applicable emissions permit and were without any appreciable impact on the pollution status in the fjord environment outside the base."*

This is actually incorrect, or perhaps even more serious; confirmation of lack of technical expertise. Any releases of mercuric sulphide in 2014 would not be measurable through NIVA's surveys in the sea until several years later.

NIVA's claims in brief:

**1) Within the applicable emissions limit.**

**Summary of the main case from RF**

- Analysis of mercuric sulphide is not conducted technically correct.
- The stairstep moss tests were performed according to the wrong method. It is also uncertain whether it can detect the main source of contamination.
- The detection limit for dust deposition on land based on "condition classifications" in soil samples is so high that it would not even detect a serious spill.
- The detection limit for contamination in biota is many times higher than the emissions limit to the sea, and would also be unable to detect a serious spill.

Or to put it in a more popular way: The monitoring of AF Decom's operations in Vats has evolved to become a modern version of the fairy tale "The Emperor's New Clothes."

**2) Without any significant impact on the pollution status of the fjord environment outside the base.**

**Summary of the main case from RF**

- This is not a matter of condition classifications, but a question of what the environment can withstand of discharges. Since the Environment Agency has set an emission limit to the sea of 40 g and zero to the air, we must assume that they believe that everything over 40 g is significant.
- Since most of the air emissions will end up in the sea due to the topography, it must mean that the total emissions must not be higher than 40 g.
- Meanwhile, according to NIFES's study, the mercury content in cod fillets in 2014 reached 0.20 mg/kg, which is the Norwegian Food Safety Authority's limit for food safety for children and pregnant women.
- The PCB and dioxin valuesare far above the Norwegian Food Safety Authority's limit for food safety.

In this context, it must be noted that Norway has undertaken through the OSPAR Convention to reduce its total emissions of mercury to zero by 2020. This, it takes very little for mercury emissions to have environmental significance according to the standards laid down by an international convention that Norway has undertaken to observe.

It is our opinion, based on the reports and alternative investigations that we have presented here, that NIVA does not have a single viable argument for asserting that AF Decom operates within the applicable emissions limits.

The emissions from AF Decom's activities have therefore definitely both had and continue to have an impact on the pollution situation in the fjord environment and in the nature outside the base.

Thus, it is our opinion that it appears obvious that NIVA has not met the quality standards to be expected and that this is a clear violation of NENT's ethical guidelines on quality requirements.

We have questioned both ourselves and other people who have involved themselves in this matter in different ways. How can it be that NIVA has actually made so many mistakes, failed generally to respond to the objections that have been made brought, and seeks to influence the regulatory authorities by means other than its statements in the reports as such? The question is whether this may have something to do with a breach of the requirement for impartiality, the first of NENT's guidelines.

We have considered whether we should allow ourselves to use a serious but descriptive metaphor, and we have concluded these the conditions described in this letter are so serious, that we have decided to refer to the following:

*"It is well known that the tobacco industry in the USA had a series of scientific studies prepared that concluded that smoking was not harmful to health. The industry got what they paid for."*

Date: 16.02.2016

Representative, direct telephone:
Karl Johan Lier, 90795334

It is important that research institutions like NIVA set requirements for methodology, independence and quality so that such issues are not a problem, cf. the basic requirement for apparent independence in Section 6 - "**avoiding mixing roles and relationships that could provide reasonable grounds for suspecting conflicts of interest.**" (our emphasis). In this case, NIVA has not done what should be expected of them in this context. The environmental investigations that NIVA carries out for AF Decom are so extensive and of such major economic significance for NIVA, that it must be questioned whether this contractual relationship can influence their ethical standards. The possibility for such an influence means that there must be no doubt that the ethical standards are observed. We have asked several questions in this letter regarding NIVA's conduct.

NIVA's activities are of such major importance to society that particularly strict requirements must be applied regarding their ethical standards.

NENT plays an important role here as a corrective influence to maintain trust for important social institutions. It is therefore important that the quality of environmental investigations is maintained and that negligence is confronted. In our experience, there are few cases in Norway that of such a comprehensive and serious nature.

This means that in this case, NENT plays an important role for society with regard to setting a standard for which requirements should apply in future with respect to research and investigation institutions.

Best regards
Raunes Fiskefarm AS

Karl Johan Lier
Chairman of the Board

A copy of the letter has been sent to the following:

Norwegian Institute for Water Research (NIVA)

The Norwegian Environment Agency

# 12 List of Annexes

**Bilag 1** **A copy** of the article in the newspaper Haugesunds Avis, dated: 5.10.2004
**Bilag 2** **15.09.2002 TLP** Hutton - Report from Rogaland's research - organic
**Bilag 3** **15.09.2002 TLP** Hutton - Report from Rogaland's research - inorganic
**Bilag 4** **18.08.2004 -** Environmental investigation - Vats, performed at the request of AF Decom
**Bilag 5** **18.07.2005 Ekofisk** Tank-Survey of radioactivity and mercury, rev.3
**Bilag 6** **Climate and** Pollution Agency (KLIF) [Klima- og forurensningsdirektoratet]report TA2643 about scrapping/decommissioning of disused offshore installations of 10.05.2010
**Bilag 7** **12.05.2006** "Mapping" of the Albuskjell platform 1-6A
**Bilag 8** **12.05.2006** "Mapping" of the Albuskjell platform 2-4A
**Bilag 9** **12.05.2006** "Mapping" of the Edda platform 2-7
**Bilag 10** **12.05.2006 Arithmetic** mean
**Bilag 11** **The Proactima** Report of 31.12.2011
**Bilag 12** **Associated analysis** of the dust on the work surface at AF Decom, dated 06.01.2012.
**Bilag 13** **Memory stick** with analyses, photographs and video clips from the activities at AF Decom
**Bilag 14** **Map of** the border area of AF Decom, dated: 19.01.2015
**Bilag 15** **Confirmation from** AF Decom AS when sweeping and irrigation was initiated, dated: 21.3.2013.
**Bilag 16** **A copy** of the emission permit and the conditions section from the Environment Agency, latest version 13.03.2013
**Bilag 17** **Copy of** the grounds section and conditions section of the permit from the Norwegian Radiation Protection Authority of 10.12.2013
**Bilag 18** **Copy of** the conditions section of the permit from the Norwegian Radiation Protection Authority of 10.12.2013
**Bilag 19** **A copy** of the application of 30.6.2011 from AF Decom Offshore AS to the Norwegian Radiation Protection Authority
**Bilag 20** **A copy** of the annual report from the Environmental Monitoring of AF Miljøbase Vats for 2009, issued in 2010
**Bilag 21** **A copy** of the annual report from the Environmental Monitoring of AF Miljøbase Vats for 2010, issued 11.02.2011
**Bilag 22** **A copy** of the annual report from the Environmental Monitoring of AF Miljøbase Vats for 2011, issued 21.02.2012
**Bilag 23** **A copy** of the annual report from the Environmental Monitoring of AF Miljøbase Vats for 2012, issued 04.03.2013
**Bilag 24** **A copy** of the annual report from the Environmental Monitoring of AF Miljøbase Vats for 2013, issued 04.04.2014
**Bilag 25** **A copy** of the annual report from the Environmental Monitoring of AF Miljøbase Vats for 2014, issued 25.02.2015
**Bilag 26** **A copy** of the article in the newspaper Haugesunds Avis, dated 12.03.2012.
**Bilag 27** **Copies of** articles in the newspaper Dagbladet, 25.03.2012 to 24.09.2014
**Bilag 28** **A copy** of the letter from NENT to the journalist Asle Hansen in the newspaper Dagbladet dated 07.05.2012
**Bilag 29** **A copy** of a letter from the Norwegian Fisherman's Association dated 17.10.2014.
**Bilag 30** **A copy** of the audit report from the Norwegian Radiation Protection Authority of 24.11.2014.
**Bilag 31** **A copy** of the memorandum of 22.01.2014 from NIVA to the Environment Agency with a copy to AF Decom
**Bilag 32** **A copy** of an e-mail of 23.01.2014 from the Environment Agency to NIVA, and a reply from NIVA to the Environment Agency

**Bilag 33** **A copy** of an e-mail of 24.01.2014 from Jonny Beyer in NIVA to the Environment Agency
**Bilag 34** **Stavanger Aftenblad** article 24.01.2014
**Bilag 35** **Showing how** AF Decom advertises about monitoring on its website.
**Bilag 36** **Letter to** the County Prefect of Rogaland of 04.07.2006, where AF Decom admits to having **discharged 558.96** grams of mercury in the form of mercuric sulphide
**Bilag 37** **Memorandum from** Professor Einar Sletten about methylation of mercuric sulphide, dated 05.01.2015
**Bilag 38** **Note from** Professor Einar Sletten about methylation of nano-particles of mercuric sulphide, dated 07.02.2015
**Bilag 39** **SERDP report** on methylation of mercuric sulphide nano-particles, dated 01.08.2014
**Bilag 40** **A copy** of the e-mail from Professor Einar Sletten of 08.03.2015
**Bilag 41** **A copy** of the e-mail from Eurofins of 05.06.2015
**Bilag 42** **E-mail with** analysis from Eurofins, dated 11.06.2015. Analysis from Eurofins of sand and gravel from AF Decom's dumping of asphalt in the crushed stone plant in Røyrvika. Analysed again on 11.06.2015 with both nitric acid solution and aqua regia.
**Bilag 43** **Printout of** written proceedings from Schjødt of 13.02.2012
**Bilag 44** **Statement from** Professor Eilif Steinnes at NTNU of 30.12.2014.
**Bilag 45** **Questions for** NIVA regarding stairstep moss samples dated 13.03.2013
**Bilag 46** **Reply from** NIVA dated 16.05.2013
**Bilag 47** **Statement to** the Ministry of Local Government and Modernisation from Professor Eilif Steinnes at NTNU, dated 27.05.2015
**Bilag 48** **Minutes of** a meeting between AF Decom and KLIF on 06.09.2011
**Bilag 49** **Newspaper article** in Grannar - See no adverse linkings - ethics committee critical, dated: 21.05.2007:
**Bilag 50** **Newspaper advertisement** in the newspaper Dagbladet dated: 22.6. 2015:
**Bilag 51** **Newspaper notice** in Aftenposten, dated: 05.07.2015
**Bilag 52** **Letter from** RF to AF Decom with questions about leaching experiments, dated: 05.05.2015
**Bilag 53** **Letter from** AF Decom to RF about leaching experiments, dated: 18.05.2015
**Bilag 54** **Newspaper notice** in Finansavisen about AF Decom's employee share option gains, dated: 12.02.2014
**Bilag 55** **Slides from** Amund Måge-NIFES Hardangerfjord seminar 03.05.2013 Norzink emissions - **slide page** 26.
**Bilag 56** **EU regulations** "Commission regulation (EC) No. 1881/2006 of 19 December 2006, setting maximum levels for certain contaminants in foodstuffs - updated: 03.12.2012
**Bilag 57** **Report from** Aarhus University - comments on the Proactima report and on NIVA's Environmental Report 25.06.2014
**Bilag 58** **Copy of** NIVA's report on scrapping at sea, dated 15.01.2013
**Bilag 59** **Note from** the US Environmental Protection Agency, updated 28.05.2015
**Bilag 60** **Amund Måge-Report** on PCB released to Sørfjorden due to refurbishment of listed buildings. Tyssedal Power Station 2001, dated 05.05.2003
**Bilag 61** **Anders Ruus**, Norman W. Green, Amund Måge, Jens Skei – MarPollBull PCB containing paint and plaster caused extreme PCB concentrations in biota from the Sørfjord, dated: 01.11.2005
**Bilag 62** **Letter from** Professor Anders Goksøyr to the Ministry of Local Government and Modernisation, dated 05.21.2015
**Bilag 63** **Letter from** Professor Einar Sletten to the Ministry of Local Government and Modernisation, dated 05.26.2015
**Bilag 64** **Grannar article** 25.03.2013 "Kan leve med uhell – fortynning" [trans: Can live with accident - dilution]
**Bilag 65** **Absorption of** oil spill - Article in Grannar
**Bilag 66** **A copy** of NS 4852:2010 Air studies, Outdoor air, Measurement of dust fallout
**Bilag 67** Third party investigation dated: 23.03.2015

**Bilag 68** **Analyses of** the dust in the attic of RF, March-April 2012
**Bilag 69** **Evidence-securing report** on the dust in RF's attic
**Bilag 70** **Bioforsk report** of: 30.12.2014, published on 14.01.2015
**Bilag 71** **Copies of** articles in Dagbladet on 26 and 29 September and 13 October 2014
**Bilag 72** **The Environment** Agency's guide TA 2553/2009
**Bilag 73** **The Environment** Agency's letter concerning requirements for third party control of fallout dust from AF Decom's facility in Vats, dated: 02.02.2015
**Bilag 74** **Feedback on** the Bioforsk report dated: 01.06.2015.
**Bilag 75** **Letter of** reply from Bioforsk to the Environment Agency by Kaya Grotheim, dated 09.06.2015.
**Bilag 76** **Response from** the Environment Agency, dated: 29.06.2015
**Bilag 77** **Letter of** reply from Nibio (formerly Bioforsk)
**Bilag 78** **NIFES report** 2013 on metals and organic contaminants in seafood from Vatsfjord, published 03.10.2014
**Bilag 79** **NIFES report** 2014 on metals and organic contaminants in seafood from Vatsfjord, published 29.06.2014
**Bilag 80** **Letter of** 09.04.2014 from the Environment Agency
**Bilag 81** **RF's letter** to NIVA of 10.02.2014 requesting the background material for NIVA's annual reports
**Bilag 82** **NIVA's answer** by email of 11.02.2014 that they would require payment in order to produce the background for the reports.
**Bilag 83** **Offer of** 14.02.2014 from NIVA by e-mail - project contract
**Bilag 84** **E-mail of** 14.02.2014 with comments from RF to NIVA's submission of the project contract dated:
**Bilag 85** **Article in** Dagbladet of 13 October 2014 "Unyansert om utslipp i Vatsfjorden" [trans: Oversimplified about emissions in Vatsfjord].
**Bilag 86** **The** Environment Agency's press release of 27.01.2014 and acquittal letter of 04.02.2014
**Bilag 87** **A copy** of the letter from Advokatfirmaet Simonsen Vogt Wiig, dated 07.01.2013
**Bilag 88** **A copy** of the letter from RF to the Environment Agency, dated 14.10.2014.
**Bilag 89** **Vindafjord municipality's** analysis of the seawater after the spill, dated 24.09.2013
**Bilag 90** **Request for** AF Decom's release of the video produced by Ragn-Sells after the spill, dated 04.05.2015