

REPORT SNO 3916-98

**C**onversion  
of Filter Presses to  
Vacuum Filter Dryers  
at VEAS

Arbitration Report

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**O-98138**

**CONVERSION OF FILTER PRESSES TO  
VACUUM FILTER DRIERS AT VEAS**

*Arbitration Report*

**Oslo, August 21, 1998**

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**Annex B: Letter from NIVA to DryVac's lawyer, August 6, 1998.**

**Annex C: Minutes of Meeting August 11, 1998.**

**Annex D: Program for Testing of Vacuum Filter Press Delivered to VEAS by DryVac.**

**Annex E: Letter from VEAS to the arbitrator, July 30, 1998.**

**Annex F: Letter from NIVA to the lawyers, August 10, 1998.**

**Annex G: Compiled faxes and letters handed out to the parties by VEAS August 11. (not attached)**

**Annex H: Recordings from the Cold Pressing Test, August 14.**

**Annex I: Copies of correspondence between the arbitrator/parties during preparations.**

**Annex J: Memos to the arbitrator handed over by DryVac by the end of the meeting at VEAS August 14, 1998.**

**Annex K: Two letters from VEAS (including attachments) to the arbitrator August 17, 1998.**

*This report represents the arbitrator's own perception, findings and conclusions regarding the technical issues of the dispute between VEAS and DryVac Environmental Inc..*

*Therefore, the statements and assessments made herein do not necessarily reflect the opinions of DryVac or those of VEAS.*

## **Summary**

NIVA represented by Mr. T. Damhaug has been appointed to act as arbitrator in the dispute between VEAS and DryVac in connection with a contract regarding conversion of three conventional filter presses to vacuum filter dryers at the VEAS sewage treatment plant. NIVA's approach to this task involved: (i) examination of the contract and background documentation provided by the parties, (ii) implementation of a test program to verify the scope of delivery, condition and quality of supplied equipment, mechanical functions, capacity and the efficiency of the retrofitted press; and (iii) give a statement concerning the key issue, whether or not DryVac has met the terms of the contract. As reflected in the available documentation the project is delayed by more than 6 months, mainly due to functional and performance problems with the first retrofitted press. This has also hampered the conversion of the two remaining presses. The current situation is that DryVac claims that they have met intent and volume of the contract, a statement that VEAS objects.

The test programme proposed by NIVA was basically agreed between the parties, but with certain reservations. The parties also disputed the performance targets. The arbitrator suggested that the original capacity demands were too ambitious and proposed that these criteria should be adjusted to accept that the performance calculations should be based on 4 converted presses instead of 3. During the testing of the first converted press DryVac terminated their participation in the rest of the program arguing that the sewage sludge at VEAS was not properly conditioned for their press. This meant that the conditioning should not include polymers and that the sludge needed de-ragging to reduce differential pressure problems leading to plate damages. The arbitrator decided to run the test that had been prepared in order to observe at least one full press cycle. After this test the program was terminated.

The arbitrator's conclusion regarding the principal question is that DryVac has not met its terms and conditions of the contract. Some particular arguments have been made in the main document support this conclusion. These arguments are particularly dealing with the terms and conditions that the arbitrator feels not have been met, and not with the other conditions that have been met. The arguments suggest that there is a lack of conclusive performance testing, there are unsettled issues about damaged plates, relevant drawings documentation and operating instructions have not been delivered, and there are no test results suggesting that the converted presses will meet VEAS's de-watering demand.

## 1. INTRODUCTION

Vestfjorden Avløpsselskap VEAS (the buyer) signed an Agreement of Contract with the company DryVac Environmental Inc. (the contractor) based in Rio Vista in California regarding conversion of three conventional filter presses to vacuum filter dryers at the VEAS sewage treatment plant. Today only one of the three presses has been converted. The contractor has unilaterally claimed compliance with the contract, which has led to a dispute between the contractor and the buyer, if the contractor has met the terms of the contract or not.

In the Agreement of Contract, VEAS and DryVac have jointly appointed NIVA as arbitrator to preliminarily handle any disputes between the parties. The agreement also states that if the parties do not agree whether guaranteed results are obtained or not, this shall be resolved by the named arbitrator. He shall give his statement whether the guaranteed values are met or not within 30 days.

The Managing Director of NIVA, Mr. Haakon Thaulow was requested by Mr. Sagberg of VEAS on July 22, if NIVA would be willing to act as arbitrator in connection with the dispute between VEAS and DryVac. NIVA agreed to take on this responsibility, and the director appointed Mr. T. Damhaug M. Sc. Water and Wastewater Engineering for this assignment.

The arbitrator's familiarisation with the case and the planning and execution of the tests had to follow a very tight time schedule to keep the 30 days deadline.

## **2. ARBITRATION PROGRAMME**

### **2.1 The Arbitrator's Understanding of the Tasks**

The objective of the arbitration process and appurtenant tasks were elaborated in a meeting July 28 between the lawyers of DryVac and VEAS and the Managing Director of VEAS. It was stated that the arbitrator should basically deal with the technical issues of the arbitration process, and not cover the legal aspects of the contract and financial transactions. As understood by the arbitrator, the objective of his task was to undertake an impartial verification of the scope of delivery, condition and quality of supplied equipment, mechanical functions, capacity and the efficiency of the retrofitted press. The above issues will be assessed with respect to the key question of the dispute i.e. whether or not DryVac has met the terms and conditions in the contract.

The arbitrator's understanding of his task is:

- ❑ to examine the documentation regarding technical matters of the contract;
- ❑ to examine the actual situation, and test the mechanical functions and process performance of the converted press;
- ❑ to give a statement concerning DryVac's compliance with the Agreement of Contract.

### **2.2 The Roles of the Parties during Testing**

Concerning the roles of himself and the parties during the testing, the arbitrator suggested following overall responsibilities:

- ❑ the arbitrator and representatives for VEAS and Dry Vac shall be present during all testing operations;
- ❑ the arbitrator will be responsible for directing, monitoring and recording of the test operations, sampling procedures, and analysis;
- ❑ VEAS will be responsible for operating the plant in the agreed mode, and provide practical assistance in sampling and related activities;
- ❑ DryVac will verify the condition of the equipment delivered and assist VEAS in preparing the filter press for the testing.

### **2.3 Test Programme**

The test programme covered the following three stages:

1. Testing of mechanical functions, including verification of material quality, identification of plates in acceptable condition, and supplied documentation according to the contract.
2. Testing of de-watering capacity and efficiency of the converted press in the conventional automatic filter press mode;
3. Testing of de-watering/drying capacity and efficiency of this press operated as a filter press with vacuum drying.



## **FINDINGS**

### **3.1 Additional Information**

In order to improve his understanding of the key issues and the positions of the parties, the arbitrator asked them to provide him with more background documentation including their own perception of key aspects related to the dispute. All received memos and copies of correspondence are attached to this report.

### **3.2 Phase 1: Documentation Materials, and Mechanical Functions**

#### **3.2.1 Design modifications**

The arbitrator noticed that the design of the filter press system had undergone several changes since the signing of the Agreement of Contract. The modifications were designed and implemented by DryVac's with some dismantling and erection assistance provided by VEAS upon request from the contractor. The modification activities have also involved full scale testing of alternative technical solutions to the problems. The modification of the first press took place until April 1998. From available documentation, the arbitrator understands that the major modifications of the converted press compared to the original specifications have been to:

- ❑ convert the press into a 45 plates test unit for studying of alternative improvement measures;
- ❑ install new corner adapter plates to improve the out flow of filtrate;
- ❑ insert and test the use of backing cloths;
- ❑ change the feed line from top feeding to bottom feeding which involved modifications of the plate plumbing, hangers and rollers for feeding from the bottom;
- ❑ change the screens form a nylon type to a 3-5 cfm polypropylene screen;
- ❑ add four puck type stay bosses in pockets sewn into each filter cloth;
- ❑ install a clean-out devise to the feed line. (not supplied)

#### **3.2.2 Filter Plates**

The bulk of plates and equipment that has been delivered at site did not show any divergence from the agreed scope of supply. According to the revised programme, DryVac was requested to submit an inspection report on the status of supplied and installed filter press plates and auxiliary materials at site. This record would include identification of which plates are acceptable for permanent installation, and which should be abandoned. DryVac's report was handed over to the arbitrator after the meeting on August 14. DryVac concluded that about 70 to 100 of the used plates have been damaged by pressure differential during various tests at VEAS. DryVac informed the arbitrator that this estimate had been based on an inspection of a portion of the used plates, where 61 damaged plates had been identified, and they did not find it necessary to make a full inspection. The condition of the new plates has not been subject to physical inspection and it is assumed that all these are in acceptable condition. The table below summarises the number, types and condition of delivered plates. The total number of

plates column has been abstracted from the initial survey carried out by the arbitrator on July 24.

<b>Item</b>	<b>In good order</b>	<b>Damaged</b>	<b>Total</b>
Filter press plates with piping and white cloth installed in filter press number 2	122	1*	123
Filter press end plates installed in filter press number 2	2	0	2
<i>Stored in the filter hall at VEAS:</i>			
Filter press end plates	No info.	No info.	6
New filter press plates without cloth and piping	78	0	78
New filter press plates with piping without cloth	39	0	39
New filter press plates with piping and nylon cloth with blue gasket	134	0	134
Used filter press plates with piping and nylon cloth with blue gasket	74 - 44	70 -100*	94
Used filter press plates with piping and white cloth			29
Used filter press plates in various state of assembly			21
Used filter press plates with cut-out pieces of plate material		4	4

\* Figures provided by DryVac and not rechecked by the arbitrator.

As can be seen from the table about 13 to 19% of the plates at site are damaged before this test. The arbitrator noticed that the responsibility for these damages remain unsettled between the parties.

### 3.2.3 Operating Instructions

The contractor has not delivered operating instructions in Norwegian according to the contract. An Operation and Maintenance Manual (in English) dated February 3, 1998 has been delivered to site. This version is based on the original design of the press hence it is not relevant for the modified press as it appears today. The contract also demands a Norwegian version of the O&M manual, which has not been submitted.

### **3.3 Phase 2: Conventional Filter Press Test**

#### **3.3.1 Preparatory Washing and Checking**

Since the converted press had been idle for some time it was agreed to flush the sludge feed line before starting the test, and to run a washing cycle to clean the filter cloths. Because there is no bypass to divert the sludge it was agreed to pump the required flush flow into the press, and dump the wet sludge into the conveyor hopper. After sludge dropping the plates were washed with the automatic washing machine. In general the moving of the plates under these cycles needed substantial manual assistance supported by use of strap and mechanical waist to compress the block of plates. In order to assist keeping the diaphragms of the plates back in position by means of vacuum, a vacuum cleaner has been connected to the hot water manifold system. This has been developed as a temporary measure during the earlier experiments, and was not part of the original design. The arbitrator overruled VEAS' objection to the use of the vacuum cleaner during the test, as he considered that this has been used for several months, and could theoretically be an integrated part of the process.

#### **3.3.2 Description of the Initial Test**

During the first trial it turned out that the pressure alarm stopped the feeding of the press at approximately 10.5 minutes when the pressure had reached 5.5 bars and about 9.5 m<sup>3</sup> had been pumped into the press. After 5 about minutes the pumping was restarted manually, and was cut again by the pressure alarm when the pressure had reached 8 bars, which was the pre-set alarm value when the parties set the operational parameters. When VEAS was fixing this problem, DryVac brought to the arbitrator's attention that the upper manual filtrate valve was closed, and that this valve should have been open during operation. The exact impacts of the closed valve on the overall performance is difficult to quantify, but to eliminate misleading results due to this fact the arbitrator decided that this test should be disregarded and a new test should start the following morning. For practical reasons, the filling of the press continued so that the batch of sludge could be dry enough to be evacuated from the system via the conveyor into the regular sludge transport system provided the cake was dry enough. After one hour filling, however, it was decided to stop the filling and empty fed into the press was then 23 m<sup>3</sup>. It was agreed between the parties that it was not necessary for the arbitrator to be present during emptying and evacuation of this sludge load, sine this test was supposed to be disregarded and no samples should be taken. The next morning VEAS informed the arbitrator that the dropped sludge was too wet to be removed through the regular system, and it had to be washed out from the conveyor belt and dumped on the floor behind the conveyor. After this operation another wash cycle was undertaken to clean the plates.

In connection with the setting of the operational parameters for the next attempt of the official test, Mr. Dan Simpson informed the arbitrator and VEAS that DryVac had decided to withdraw from further testing. After that DryVac's team left the plant. The arbitrator did not foresee the situation where one of the parties pulled out of the testing during implementation, and decided to suspend any further tests until after next day's meeting.

When DryVac after this meeting announced that they would terminate their participation in the ongoing process, the arbitrator considered the following two alternatives for completing his assignment:

- ❑ to immediately terminate the process and report the outcome of current findings
- ❑ to fulfil the ongoing phase 2, possibly followed by phase 3 according to the original programme before preparing the report

The first option would not give the arbitrator an opportunity to observe a full press cycle with sludge in the system before writing his report. For at least having seen the press in action in one cycle as a basis for his evaluation, the arbitrator ordered VEAS to run one cycle under the same conditions as agreed the day before. It was, however, a condition that the feeding of the press should be controlled manually to avoid possible errors due to the computer control system.

The planned pumping pattern was planned to be as follows:

Pressure (bar)	Pumping capacity (m <sup>3</sup> /h)
P0-0	74
P1-1	70
P2-2	60
P3-3	50
P4-4	40
P5-5	30
P6-6	20
P7-7	15

The feed and pressure records from this test can be seen in Annex H. The total sludge volume fed into the press was 25m<sup>3</sup>. The arbitrator observed severe leakage of filtrate from the plates along the whole press during this pressing. The leakage flow-rate was 1.6 l/s measured by bucket and stop-watch at a time when the sludge feed flow into the press was 5-6 l/s. The reason for the leakage was suspected to be excessive thickness of the stay bosses reducing the closing pressure on the frames. In accordance with the test programme, complete sludge cakes were collected from 10 arbitrarily picked plates during controlled dropping. Each cake was weighed before taking about 0.5 kg representative samples for DS analysis at NIVA's laboratory. The dry solids of the conditioned sludge with lime and polymer was analysed at the VEAS laboratory and the result was 4% DS. During press opening and cake dropping, special attention was paid to observe possible large rag pieces etc. that might have blocked the feed line, the inlet sections or other parts of the plates that might have caused blocking. The arbitrator did not observe any such abnormalities during the test. Figure 2 shows some photos taken during the tests, and Annex H gives a printout of the operating records during the last test.

The results are shown in the table below, and a graphical presentation is shown in Figure 1.

Plates no.	Weight of Cake (kg)	Dry Solids (%DS)	Calculated Cake DS Weight (kg)
4 to 5	62.0	35.6	22.1
15 to 16	33.5	16.4	5.5
39 to 40	18.0	17.3	3.1
51 to 52	42.0	19.5	8.2
64 to 68	31.5	15.8	5.0
76 to 77	14.0	16.2	2.3
89 to 90	52.5	23.7	12.4
100 to 101	46.5	21.3	9.8
110 to 111	46.0	19.2	9.2
118 to 119	49.0	20.4	10.0

As can be seen, the sludge feeding capacity ( $25\text{m}^3$ ) was very poor during this test, and the result is approximately half of the best value from earlier reported tests. The results also illustrate the uneven distribution of sludge between the plates, and that the plates with the new (only one previous run) cloth (no 4 to 5) had a significantly higher cake weight (62 kg) and DS (35%) than the other plates. It was observed that the thickness of this cake was up to 61 mm, which is thicker than the nominal cake thickness of 45 mm. This deviation of cake thickness indicates a certain plate deformation.

The arbitrator considered it a possibility that the poor results could be due to blinding of cloths, most likely due to calcium deposits. If this was the case, ordinary washing would not help, and acid cleaning would be required. At this stage, the arbitrator would have insisted on acid cleaning before proceeding with further test cycles to see how that would have improved the filtration properties of the cloths. Acid cleaning would, however, not be possible without stopping the leaks from the filter plates. This would require implementation of measures to stop the leaks, which was considered to be beyond the scope of the test program. The arbitrator therefore decided to terminate the testing at that stage and start on his report to the two parties.

### **3.4 Phase 3: Filter Press Test with Vacuum Drying**

This part of the program was cancelled due to the above circumstances.

## **4. ASSESSMENT OF FINDINGS AND RELEVANT ISSUES**

### **4.1 Modifications**

The contract states that only proven technology and equipment is to be used in the plant. The contract and subsequent correspondence between the parties also confirm that DryVac is responsible for the design, selection of materials and functional descriptions of the retrofitting of the presses. The tight time schedule of this project would not allow much R&D activities apart from minor modifications and tune-up after installation. As stated in section 3.2.1 the technical modifications and associated testing have led to delays and still there are unsolved problems under the responsibility of the contractor.

### **4.2 Damaged Plates**

DryVac's inspection states that about 13% to 19% of the plates are damaged. DryVac also claims that these damages are due to the differential pressure caused by rags and "hair balls" in the sludge. In his letter August 6, the arbitrator agrees that in general it would be favourable to minimise the risks for in-homogenous sludge entering the filter presses by installing de-ragging equipment. Without further elaboration, the differential pressure problems may also be caused by different filtration rates between the plates, uneven blocking of filtrate outlets etc. Since specific investigation of the possible rag problem has not been carried out, it is difficult for the arbitrator to assess the significance of these phenomena on the plate breakage compared to other possible reasons. In conclusion, the causes for these damages and the responsibility for the replacement of the plates have to be settled between the parties before contract compliance can be claimed.

### **4.3 Operating instructions**

There are no additional remarks to chapter 3.2.3.

### **4.4 Performance Criteria and Targets for Acceptance**

#### **4.4.1 Performance Criteria**

Clear conditions and statements related to expected and guaranteed performance are vital elements in a contract involving processing equipment. The arbitrator perceived that there is a disagreement between the two parties concerning which performance criteria shall be applicable for the verification of contract compliance. Therefore, he asked the parties to provide him with their respective documentation and their own elaboration on the contractual requirements concerning the performance of the converted presses to support his judgement of what it should be reasonable to expect from the converted filter presses, independent of what the contract says.

The Agreement of Contract states that DryVac will – together with VEAS- make reasonable efforts to facilitate three presses being able to process the tonnage requirements specified in the Tender Document clause 7.2, leaving 10% of total time available for maintenance. The

numerical exercises of clause 7.2 will not be repeated here. In brief, DryVac claims that the only thing that DryVac can guaranty in the contract is the drying rate (150 kg per m<sup>3</sup> of plate volume) and that this drying rate requires the sludge to be properly conditioned and porous. On one hand, the arbitrator feels that this reservations about “properly conditioned and porous sludge” is considered a non-quantifiable condition, which can not be verified by anybody, and therefore considered as an unreasonable condition. On the other hand, he is of the opinion that VEAS’s expectations of reaching the intended tonnage and required sludge quality by use of only three presses are overly optimistic, taking into consideration the uncertainties related to the performance of the new system. It appears, however, that both parties agree that required sludge de-watering and drying capacity that should be met at the VEAS treatment plant is equivalent to approximately 40 dry tons per day. As a conclusion, the arbitrator suggests as a fair compromise that the performance evaluation shall be based on the use of 4 converted presses to reach the agreed sludge drying requirements of VEAS.

#### 4.4.2 Recorded Performance vs. Targets

Based on the results from the described in this report it is clear that even 4 presses converted into vacuum filter dryers would by far not be able to meet the required capacity. Provided the drying process will work as described, the press would need to receive in the order of 70 m<sup>3</sup> sludge per filling to meet the demand. The best results reported from other tests show up to 50 m<sup>3</sup> per filling, but with obtained drying rates far below the targets. The Arbitrator not received any test results of documentation that can justify a statement of contract compliance concerning process performance at the time of inspection.

### 4.5 *Automatic operation*

#### 4.5.1 General

Filter press operations is basically a batch process where each batch involves a sequence of mechanisms called a cycle. The basis for a fully automated press is a fully mechanised filter press where all mechanisms in the cycle are mechanised, but the sequences of actions are controlled manually. Provided all mechanical functions and sensors are working properly and can be initiated and controlled by electronic signals, the press can be automated by a computer.

#### 4.5.2 Mechanised Operation

In the case of VEAS, mechanised operation has not been achieved. The manoeuvring of the plates do not function without substantial manual support. It seems to be a mismatch between the existing roller system, which is basically designed for cast iron plates, and the handling system that would be needed for plastic plates. It is possible that the much lighter plastic plates can not benefit from the momentum of the heavy cast iron plates when pulled into position. The above is a typical interface problem, where the buyer’s and contractors systems are supposed to be harmonised. Important factors that have to be taken into consideration are that the plates are straight and the hook design is controlled by their thickness. This means that the plate distances are not supposed to be arbitrarily disturbed by elevated diaphragms where the stay bosses determines the space between the un-pressurised plates. Plate spaces controlled by touching pucks were observed during inspection, and the plate pack had to be compressed by straps and jacks. The contract does not give specific tolerances, so it is difficult for the arbitrator to make a conclusive statement about this issue. The arbitrator sees this adaptation problem as a shared responsibility between the parties.

#### 4.5.3 Automated Operation

A functional description of the process control system which is the responsibility of the contractor, can not be finalised until the system works mechanically. Then it will be VEAS' responsibility to finalise the programming and tuning based on the contractors functional description.

#### **4.6 *Functional Testing and Acceptance Certificate***

The functional testing and issuing of acceptance certificates are fundamental contractual milestones, which document the acceptance by both parties of the fulfilment of defined stages of the project. This is a requirement before proceeding with subsequent stages. Therefore, it is essential that the functional testing is being carried out in an orderly manner. The procedure for control, testing etc. as described in the contract (Addition: Control, testing etc. pp 11 of the tender invitation) call for given lines of actions to be followed, including notification by the supplier and other obligations of the parties. From available documentation, it appears that the functional testing has been completed as required for the modified plant, and a test report has not been produced.

#### **4.7 *Time Schedule***

The contract states that keeping the time schedule will be the most critical parameter of the project, since VEAS is obliged by law to hygienize the sludge before delivering it to farmland by January 1, 1998. The conversion of filter presses is now more than half a year delayed compared to the Time Schedule of the contract. Without going in detail, the main reasons for the delays appears to be the functional problems with the first converted press, which is evident from the considerable modifications and R&D activities that took place from December 1997 to April 1998.



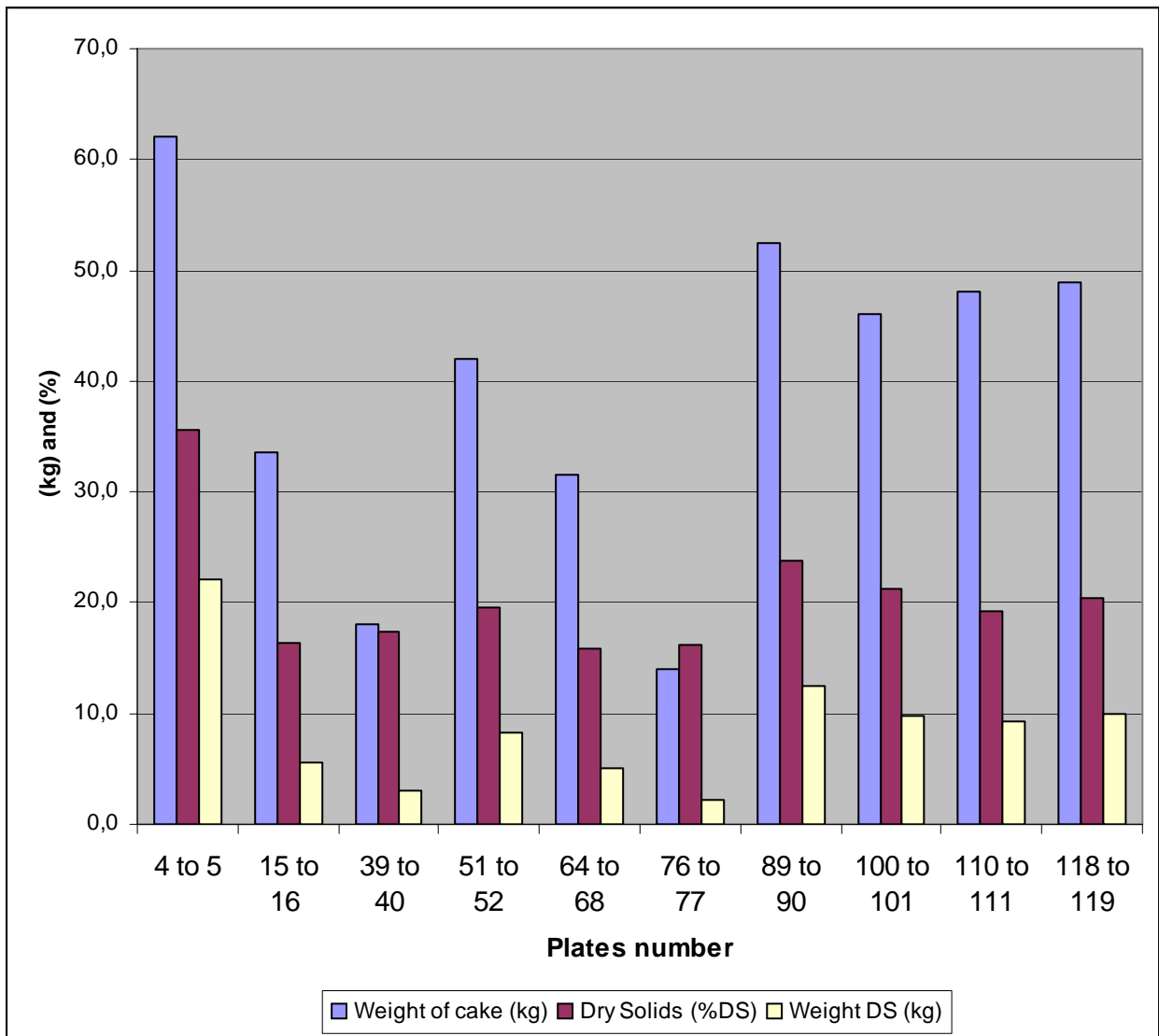
## 5. CONCLUSION

The arbitrator's conclusion on the main disputed issue related to DryVac's compliance with the terms and conditions in the contract has been based on his assessment of findings and received background material. The general conclusion on this point is that DryVac has not met the terms and conditions of the Agreement of Contract.

This conclusion implies that DryVac has not by far met all its contractual obligation which would be necessary to qualify for an affirmative reply to the key question. The conclusion has been supported by the following arguments:

- ❑ The functional testing of the first converted press has not been notified and carried out according to the contract, and acceptance certificate has not been issued;
- ❑ The responsibility and replacement issue of damaged plates has not been resolved;
- ❑ Drawings, specifications, functional descriptions have not been delivered in accordance with the converted filter press at site;
- ❑ Relevant Operating Instructions in the Norwegian language for the converted press including descriptions, drawings, control and regulating functions, troubleshooting guidance, service / maintenance routines, and spare-part requirements, has not been submitted as required;
- ❑ From available test information it is not evident that VEAS' demand for sludge drying capacity with "USEPA Class A" sludge quality will be met with, even with four presses converted to vacuum filter dryers;
- ❑ The progress of the press conversion project is more than 6 months behind schedule, mainly due to a series of technical problems facing the functioning of the first press.

**Figure1: Results from the Conventional Filter Press Test**



## Figure 2 Photos from the testing

Photo 1 Filter plate after flushing the feed pipeline into the press.



Photo 2 Washing of filter plates



Photo 3 Strapping of the plate stack

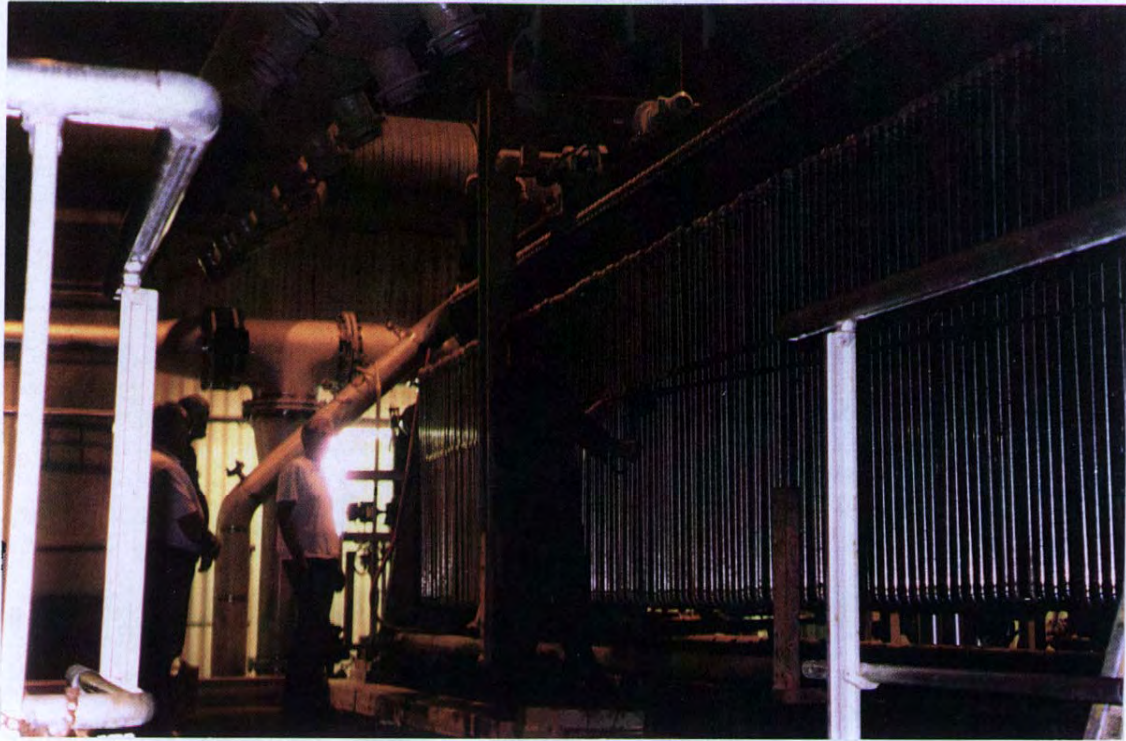


Photo 4 From the control room



Photo 5 Leakage during pressing

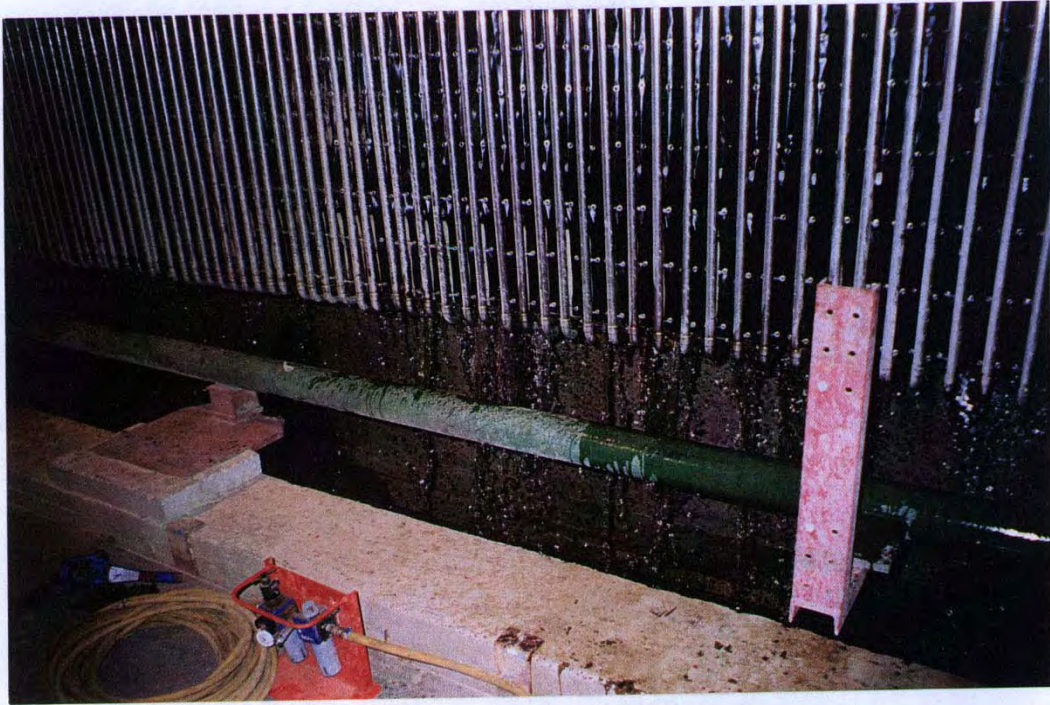


Photo 6 Sludge cake  
After conventional filtration



## **6. Attachments**

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(Arbitration Procedure and Inspection report)

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(Revised version dated August 14, 1998)

**Annex E: Letter from VEAS to the arbitrator, July 30, 1998.**  
(Test programme suggested by VEAS)

**Annex F: Letter from NIVA to the lawyers, August 10, 1998.**  
(Draft test procedure suggested by DryVac)

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(not attached to this document, but handed out to DryVac and the arbitrator)

**Annex H: Recordings from the Cold Pressing Test August 14.**

**Annex I: Copies of correspondence between the arbitrator/parties during preparations:**

- a) 3 faxes from DryVac's Lawyer, August 3, 5 and 7, 1998. (Re. Arbitration Procedure)
- b) 4 faxes from VEAS dated August 6, 7, and 10, 1998

**Annex J: Memos to the arbitrator handed over by DryVac by the end of the meeting at VEAS August 14, 1998:**

- a) Memo concerning results of the plate inspection
- b) Memo: "Capacity requirements as stated in the Contract"
- c) Memo concerning "Target values for acceptance"
- d) Memo regarding "Reason for DryVac pulling out of testing"
- e) Memo: "Events and actions of VEAS/Mr. Paul Sagberg leading to the decision to terminate our involvement in the current process"

**Annex K: Two letters from VEAS to the arbitrator August 17, 1998.**  
(Including a large number of letters, faxes and other correspondence)

***Annex A: Letter from NIVA to the lawyers of DryVac and VEAS, July 29, 1998.***

Mr. Øystein Askim  
c/o Thommessen Krefthing Greve Lund  
P.O. Box 1484 Vika  
0116 Oslo

Mr. Odd R. Tvedt  
c/o Kluge Advokatfirma  
P.O.Box 1548 Vika  
0117 Oslo

Postal address:  
P.O. Box 173 Kjelsås  
N-0411 Oslo, Norway  
Location:  
Brekkeveien 19  
Telephone +47 22 18 51 00  
Telefax +47 22 18 52 00  
Telex 72400 fotex n  
Att.: NIVA Oslo  
Postal giro account 0813 5196712  
Bank account 6094 05 11421  
Enterprise No. 855869942  
Internet: www.niva.no

*Your reference*

*Your letter*

*Our reference*

*Date*

29 July, 1998

J.No.1525/98

S.No. 98138

**CONVERSION OF 3 FILTER PRESSES TO VACUUM FILTER PRESS DRYERS AT  
VEAS – ARBITRATION PROCEDURE**

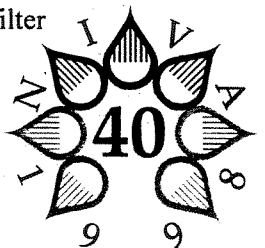
*Dear Mr. Askim and Mr. Tvedt,*

Reference is made to the meeting at VEAS July 28, 1998, in conjunction with the preparation of the arbitration process related to the contract between VEAS and DryVac. As agreed in the meeting, please find enclosed a statement of the findings from the inspection of the filter press plates and materials delivered and installed at site.

In order to deal with the technical issues of this arbitration, I propose the following approach and deadlines (all moments of time relate to Oslo time):

1. July 28, 1998: Preliminary stocktaking of filter press plates and other equipment delivered and installed by DryVac (the attached document);
2. July 30, before 14:00 hours: VEAS to submit a draft test programme to NIVA and the lawyers representing VEAS and DryVac. The programme shall include proposed performance indicators and acceptance criteria;
3. August 4, 1998, before 15:00 hours: DryVac to have finalised an inspection of the filter press plates, auxiliary materials at site in order to verify its condition and identify which plates are acceptable for permanent installation and which plates should be rejected;
4. August 5, before 09:00 hours: Dry Vac to forward their comments on the proposed test programme, in order for NIVA to take the comments into consideration when preparing the test programme;
5. August 6, before 13:00 hours: NIVA to finalise a phased programme for testing of mechanical performance and operational capacity and efficiency of the retrofitted filter press;

**Førti år i miljøets tjeneste**





6. August 10 by 09:00 hours: Preparations for testing completed by DryVac, including possible mechanical adjustments and necessary tune-up of filter press number 2;
7. August 10 – 21: Implementation of test programme with the following main stages:
- Testing of mechanical functions and press plate endurance of filter press number 2 when operated as a conventional automatic filter press,
  - Testing of de-watering capacity and efficiency of press number 2 in the conventional automatic filter press mode;
  - Testing of de-watering/drying capacity and efficiency of press number 2 operated as a filter press with vacuum drying.
8. August 21 by 16:00 hours: NIVA to present a test report and conclusions of the above testing programme.

I feel confident that this approach will be acceptable to both parties concerned, and I am looking forward to receiving a confirmation of acceptance of the outlined procedure from VEAS and DryVac before August 3, at 16:00 hours.

Yours sincerely  
**NORWEGIAN INSTITUTE FOR WATER RESEARCH**



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M.Sc. Water and Wastewater Engineering

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Cc:

Mr. Paul Sagberg, Director General, VEAS  
N-3470 Slemmestad

## CONVERSION OF 3 FILTER PRESSES TO VACUUM FILTER PRESS DRYERS AT VEAS -REPORT FROM INSPECTION JULY 28, 1998

### Report no. 1: Verification of equipment delivered by DryVac under the Agreement of Contract between DryVac and VEAS.

#### *Introduction*

The Norwegian Institute for Water Research, NIVA has been commissioned by VEAS to start preparations for arbitration between VEAS and DryVac in conjunction with the current retrofitting of 3 conventional filter presses into vacuum filter press dryers. NIVA has appointed Mr. Torbjørn Damhaug (M.Sc. Water and Sanitary Engineering) to take on this responsibility.

An introductory meeting including a site inspection was carried out at VEAS on July 28, 1998, from 12:00 to 15:00 hours. The following people were present:

Mr. Øystein Askim, Lawyer, Thommessen Krefthing Greve Lund. Representing Dry Vac  
Mr. Odd R. Tvedt, Lawyer, Kluge Advokatfirma. Representing VEAS  
Mr. Paul Sagberg, Director General VEAS  
Mr. Dag Einar Aasen, Technical Manager VEAS  
Mr. Torbjørn Damhaug, NIVA

#### *Findings*

The numbers of filter press plates delivered to the VEAS plant were found to be:

Item	Number
Filter press plates with piping and white cloth installed in filter press number 2	123
Filter press end plates installed in filter press number 2	2
<i>In</i>	6
<i>Stored in the filter hall at VEAS:</i>	
New filter press plates without cloth and piping	78
New filter press plates with piping without cloth	39
New filter press plates with piping and blue cloth	134
Used filter press plates with piping and blue cloth	94
Used filter press plates with piping and white cloth	29
Used filter press plates with cut-out pieces of plate material	4
Used filter press plates in various state of assembly	21

- A copy of an Operations and Maintenance Manual (in English) dated February 3, 1998 was borrowed by the arbitrator.
- The only rebuilt filter press (in position number 2) was not in operation at the time of inspection.
- The technical condition of the delivered plates and materials, and the mechanical and operational performance of the retrofitted filter press were not part of this inspection as this will be a task of the forthcoming test programme.

Oslo,

Yours sincerely  
NORWEGIAN INSTITUTE FOR WATER RESEARCH



Torbjørn Damhaug  
M.Sc. Water and Wastewater Engineering

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e-mail: [torbjoern.damhaug@niva.no](mailto:torbjoern.damhaug@niva.no)

Cc:  
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Kluge Advokatfirma  
P.O.Box 1548 Vika

Mr. Paul Sagberg, Director General, VEAS  
N-3470 Slemmestad

***Annex B: Letter from NIVA to DryVac's lawyer, August 6, 1998.***

NIVA



(B) 11

**NORWEGIAN INSTITUTE  
FOR WATER RESEARCH**

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Enterprise No. 855869942  
Internet: www.niva.no

*Your reference*  
Oyas-88r1004a.dof

*Your letter*  
5 August, 1998

*Our reference*  
J.No. 1525/98  
S.No. 98138

*Date*  
6 August, 1998

**CONVERSION OF 3 FILTER PRESSES TO VACUUM FILTER PRESS DRYERS AT  
VEAS – ARBITRATION PROCEDURE AND TEST PROGRAMME**

*Dear Mr. Askim*

Thank you for your fax of August 5, 1998 providing DryVac's response to my proposed amendments to the test procedure, and proposed test procedure.

I have noticed with satisfaction that DryVac has accepted the proposal, so we can go ahead with the step-wise resolution of this issue.

As regard to DryVac's proposal on desired conditioning of the sludge before de-watering and drying I have the following viewpoints:

1. I agree that it in general would be favourable to install de-ragging equipment in the sludge processing line to make the sludge more homogenous. However, the VEAS plant is operating without such sludge treatment before their existing filter presses. I understand from the contract document that installation of de-ragging equipment was not mentioned as a pre-condition for the retrofitting of the filter presses. Hence, I recommend that the planned test program shall be based on the existing situation, and that possibilities for an extended contract based on alternative process combinations should be resolved directly between VEAS and DryVac as a separate issue.
2. The chemical pre-treatment of the sludge should basically remain as per the existing operating conditions, which I understand has a positive effect on the conventional filter presses. It is not advisable to rush into other option for the forthcoming testing procedure, since time would not allow a new optimisation procedure for the sludge conditioning. Therefore, I recommend keeping the present conditions, at least for the testing of the conventional operating mode, before changing the sludge conditioning.

Regarding the preparation of the plant for the testing it is important to note that:

1. Basically the testing should be on the installed plant, after DryVac had finalised the inspection and tune-up. Major changes has to be justified before implementation.

**Førti år i miljøets tjeneste**



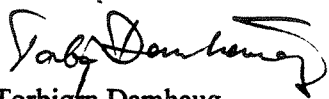
2. The sampling procedure should strive towards collection of representative samples for sludge DS. I have suggested sampling procedures in the attached test programme, which I trust would meet this requirement. This document also suggests key operating conditions for the test, based on input from both parties.
3. The proposed approach would be more suitable for a follow-up research programme to investigate process features. For the upcoming test I would recommend a overall performance approach as stated in the attached plan.

Regarding the automated operations, these will be supervised carefully, and if there are possible signs of a system failure that would lead to damage on the equipment, the test will be immediately stopped.

I trust that the proposed approach will represent a fair solution for both parties, and I am looking forward to proceed with the testing in mutual understanding with VEAS and VacDry.

Yours sincerely

**NORWEGIAN INSTITUTE FOR WATER RESEARCH**



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M.Sc. Water and Wastewater Engineering

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Cc:

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Kluge Advokatfirma  
P.O.Box 1548 Vika

Mr. Paul Sagberg, Director General, VEAS  
N-3470 Slemmestad

***Annex C: Minutes of Meeting August 11, 1998.***



# MINUTES CONVERSION OF FILTER PRESSES – ARBITRATION MEETING

Meeting no: 1/98  
Date: 11.08.98

Present: Arbitrator: Mr. T. Damhaug, NIVA  
DryVac: Mr. Ø. Askim, Lawyer, Mr. D. Simpson President, and Mr. G. Crocco, Executive Vice President  
VEAS: Mr. O.R. Tvedt, Lawyer, Mr. P. Sagberg Managing Director

Hour: 09:00-14:00

Absent: None

Chaired by: Damhaug


Minutes sent to: Participants

Reporter: Damhaug

Item	Comments	Deadline	Responsible
1.0	<p><u>Focus of the meeting</u></p> <p>The meeting was held to discuss and prepare the arbitration procedure regarding technical matters including the forthcoming verification of the scope of delivery and performance testing in relation to the fulfilment of the Agreement of Contract. The legal aspects associated with the Attachment to the legal US District Court document of July 15, 1998 was not considered part of this discussion and will be raised between the parties in a separate meeting. These minutes are not intended to record in detail all the points made during the discussion, but is merely a summary of the arbitrator's perception of the key messages from the two parties related to each issue.</p>		
	<p>The Test Programme will be amended on the basis of the input from the meeting (attached to these minutes)</p>	August 14 09:00	Arbitrator
2.0	<p><u>Reservation made by DryVac</u></p> <p>Dry Vac's lawyer stated a general reservation regarding the arbitrator's interpretation of the Agreement Contract.</p>		
3.0	<p><u>Amendments to the arbitration procedure</u></p> <p>With reference to the letters from NIVA, August 6 and 10, 1998, this item will solely record changes adopted by the arbitrator on the basis of the deliberations during the meeting.</p>		
3.1	<p><i>Comments to be prepared by DryVac</i></p> <p>DryVac announced that they will prepare their comments on the test program in writing shortly, but upon request by the arbitrator, they made their key points verbally at the meeting so that they could be discussed and considered during the meeting.</p>	August 14 13:00	DryVac



3.2	<p><i>Re.: 5. Operating conditions and methods:</i></p> <ul style="list-style-type: none"> <li>i. Item 2.3 and 3.3 will relate to a minimum sludge filling flow of 15 m<sup>3</sup>/h</li> <li>ii. Item 2.4 The remarks will read: «to be registered»</li> <li>iii. Item 3.8 will be deleted</li> <li>iv. First paragraph page 3: «... the other conventional presses ...» should read «press number 3 and 4».</li> </ul> <p>Changes to be made in the Test Program (see annex to these minutes)</p>	August 14 09:00	Arbitrator
3.3	<p><i>Additional points under section 5:</i></p> <ul style="list-style-type: none"> <li>i. DryVac's request to be allowed to remove the filter and clean the heat exchanger during the course of the tests was approved by the meeting.</li> <li>ii. VEAS agrees to undertake filter washing before the test, if found necessary by DryVac</li> </ul>	August 12- 18	DryVac
3.4	<p><i>Re.: 6. Sludge Sampling and Analysis:</i></p> <ul style="list-style-type: none"> <li>i. During the testing, the parties may take their own samples for their own purposes. However, samples that will be applicable for the arbitrator's official report will only be those taken by the arbitrator himself. The arbitrator approved to adopt DryVac's idea of collecting 10 individual cakes for weighing and DS analysis from one test cycle to become part of the official test programme. This measurement will be registered as a operational parameter under section 5.</li> <li>ii. Delete the last line «The measuring of the sludge cake ...»</li> </ul> <p>Make amendments to the Test Programme (see annex)</p>	August 14 09:00	Arbitrator
3.5	<p><i>Re.: 7. Target values for Acceptance</i></p> <ul style="list-style-type: none"> <li>i. The arbitrator noticed a general disagreement between the parties as to what should be the applicable performance targets for acceptance, as stated in the following:</li> <li>ii. Item 2.1 and 3.1: DryVac stated their reservations against the interpretation of 21.6 hours per day as the maximum time of filter press operation to reach the target production;</li> <li>iii. Item 2.2: DryVac stated their reservations against the interpretation of a fixed tonnes DS per day as a performance condition in the contract;</li> <li>iv. Item 2.3 and 3.3 will be replaced by the individual weighing of 10 cakes and transferred to section 5 to become a operating condition, rather than a target value.</li> </ul> <p>In response to the disputes about which performance criteria and conditions (above items i, ii and iii) should</p>		

	apply, the arbitrator requested both parties to furnish him with their respective documentation and own elaboration to support his assessment of the performance values in 2.1, 2.2 and 3.1.	August 18	VEAS and DryVac
3.6	<p><i>Re.: 8. Time schedule:</i></p> <p>The arbitrator agreed to extend the time for inspection of installed and stored plates. This will allow DryVac to obtain the production and quality control records for the headquarters. Meanwhile the used plates will be subject to inspection by DryVac. VEAS agreed to provide manpower assistance to handle the plates during this inspection.</p> <p>Carry out inspection and sorting of plates of acceptable/non-acceptable quality</p> <p>Inspection report</p>	<p>August 12-14</p> <p>August 18 13:00</p>	<p>DryVac/VEAS</p> <p>DryVac</p>
4.0	<p><u>Other matters</u></p> <p>i. DryVac requested if it would be possible to take video from the testing. The arbitrator will inform the parties about his decision on August 12.</p> <p>ii. The next meeting with the parties and their lawyers will be held at VEAS on August 14 at 09:00 hours.</p>	August 12	Arbitrator
	<p>Signature:</p>  <p>Torbjørn Damhaug</p>		

***Annex D: Program for Testing of Vacuum Filter Press Delivered to VEAS by DryVac.***



# **PROGRAM FOR TESTING OF VACUUM FILTER PRESS DELIVERED TO VEAS BY DRYVAC**

14/08/98

## **1. Background**

The Norwegian Institute for Water Research, NIVA has been commissioned by VEAS to start preparations for arbitration between VEAS and DryVac in conjunction with the current retrofitting of 3 conventional filter presses into vacuum filter press dryers. NIVA has appointed Mr. Torbjørn Damhaug (M.Sc. Water and Sanitary Engineering) to take on this responsibility. This test programme has been prepared on the basis of the Agreement of Contract between VEAS and DryVac and recent correspondence between NIVA and the parties involved (letters from NIVA dated July 29, and August 4 and 6, 1998, letter from VEAS dated July 30, and letters from DryVac dated August 3 and 5).

## **2. Objectives**

The objective of the test is to carry out an impartial verification of the scope of delivery, condition and quality of supplied equipment, mechanical functions, capacity and the efficiency of the retrofitted press.

## **3. Main stages of the program**

The test will be carried out in the following three stages:

1. Testing of mechanical functions, including verification of material quality, identification of plates in acceptable condition, and supplied documentation according to the contract.
2. Testing of de-watering capacity and efficiency of press number 2 in the conventional automatic filter press mode;
3. Testing of de-watering/drying capacity and efficiency of press number 2 operated as a filter press with vacuum drying.

## **4. Roles of the parties**

The arbitrator and representatives for VEAS and Dry Vac shall be present during all testing operations. The arbitrator will be responsible for directing, monitoring and recording of the test operations, sampling procedures, and analysis. VEAS will be responsible for operating the plant in the agreed mode, and provide practical assistance in sampling and related activities. DryVac will verify the condition of the equipment delivered and assist VEAS in preparing the filter press for the testing.

## 5. Operating Conditions and Methods

The table below gives the basic operational conditions and measuring methods to be used during the test. The information in the table is only guiding operational values to be used as a basis for the interpretation of the test results, and has no bearing as guaranteed conditions.

No.	Parameter	Method	Unit	Value	Remarks
<b>General conditions</b>					
0.1	Initial dry solid concentration	NS4764	%DS	(regular conditions)	From VEAS' records
0.2	Slaked lime dosage	Lime flow meter + calculations	% of solid matter	Approx. 25 (regular operations)	From VEAS' records
0.3	pH in the sludge	pH meter (dilution factor to be given)		Range: 9.5 - 12	From VEAS' records
0.4	Polymer dosage (cationic)		g/m <sup>3</sup>	Same as for regular operations	From to VEAS' records
0.5	Total volume of the filter press		m <sup>3</sup>	8	DryVac specifications
<b>Test 1: Materials, Mechanical Functions and Documentation</b>					
1.1	Automatic Operation	Observation			See Target for Acceptance
1.2	Condition of material	Inspection			See Target for Acceptance
1.3	Documentation	Observation			See Target for Acceptance
<b>Test 2: Conventional Filter Press – Automated Operation</b>					
2.1	Maximum sludge feed line pressure	In-line manometer	bar	7	According to O&M Manual
2.2	Maximum filling rate	Sludge flow meter	m <sup>3</sup> /h	70 - 80	According to O&M Manual
2.3	Initial filling of sludge per cycle (min. flow)	Flow meter	m <sup>3</sup> /h	15	
2.4	Dry solid concentration after convent. pressing	NS4764	%DS		To be mesured
2.5	Number of consecutive automated cycles per test	Observation	Number	6	According to contract
<b>Test 3. Filter Press with Vacuum Drying – Automated Operation</b>					
3.1	Maximum sludge feed line pressure	In-line manometer	bar	7	According to O&M Manual
3.2	Maximum filling rate	Sludge flow meter	m <sup>3</sup> /h	70 - 80	According to O&M Manual
3.3	Initial filling of sludge per cycle (min flow)	Flow meter	m <sup>3</sup> /h	15	
3.4	Water temperature	In line thermometer	°C	>82	According to contract
3.5	Hot water pressure	Inline manometer	bar	2	According to O&M Manual
3.6	Hot water flow (fixed pumping capacity)	Pump characteristics	m <sup>3</sup> /h	Approx. 500	According to O&M Manual
3.7	Target vacuum		bar	0.066	According to contract
3.8	Number of consecutive automated cycles per test		Number	6	According to contract

During implementation of test 2, the conventional presses number 3 and 4 shall be operated fully automated in parallel to the test press, using the same source of sludge and basic operating parameters. The results of the parallel operation will be used as a support in assessing the test results. The actual assessment parameters and limits have been given in section 7.

#### **6. Sludge Sampling and Analysis**

Sampling of de-watered and dried sludge will be taken as grab samples in equal amounts from the sludge conveyor. The dry solid concentration analysis will be based on Norwegian Standard NS 4764, and the analysis will be carried out at the VEAS laboratory with parallel analysis by NIVA/BUVA. In order to check the sludge distribution between the individual plates, 10 individual cakes will be collected for weighing and DS analysis from one test cycle. The bulk production capacity will be registered from the weight of sludge in the silo after cake drop.

## 7. Target Values for Acceptance

The target values in the table below have been partly based on information and commitments stated in the Contract of Agreement and partly on procedures given in the Operation and Maintenance Manual, prepared by DryVac. These Target values will serve as a basis for the assessments to be made in the final test report.

No.	Parameter	Method	Unit	Target	Remarks
<b>Test 1: Materials, Mechanical Functions and Documentation</b>					
1.1	Automatic closing and opening cycle of filter plates	Visual observation	n/a	Automatic functioning without manual assistance according to contract.	Test to be stopped if risk of damage arises
1.2	Condition of Materials, acceptable plates	Inspection	n/a	According to specifications	
1.3	Required Documentation	Check	n/a	According to contract	
<b>Test 2: Conventional Filter Press – Automated Operation</b>					
2.1	Maximum time of filter press operation to achieve target production		Hours/day	To be set	Interpreted from the contract. Comments from parties requested
2.2	Production capacity per day	Calculation	Tonnes DS	To be set	Need to be clarified from available documentation
2.3	Automatic process cycle	Visual observation	n/a	Automatic functioning without manual assistance according to contract	Test to be stopped if risk of damage arises
<b>Test 3. Filter Press with Vacuum Drying – Automated Operation</b>					
3.1	Maximum time of filter press operation to achieve target production		Hours/day	To be set	Interpreted from the contract. Comments from parties requested
3.2	Drying capacity of one press during drying cycle	Volume of condensate produced	kg H <sub>2</sub> O/hour	1,200	
3.3	Minimum dry solid concentration in de-watered and dried sludge		%DS	90	According to contract
3.4	Automatic process cycle	Visual observation	n/a	Automatic functioning without manual assistance according to contract	Test to be stopped if risk of damage arises

## 8. Time Schedule

Based on correspondence between the arbitrator and the two parties the following time schedule has been agreed:

- July 28, 1998: Preliminary stocktaking of filter press plates and other equipment delivered and installed by DryVac (the attached document) (done);
- July 30, before 14:00 hours: VEAS to submit a draft test programme to NIVA and the lawyers representing VEAS and DryVac. The programme shall include proposed performance indicators and acceptance criteria (done);
- August 5, before 09:00 hours: DryVac to forward their own test programme, in order for NIVA to take both parties proposals into consideration when preparing the test programme (done);
- August 6, before 13:00 hours: NIVA to finalise a phased programme for testing of mechanical performance and operational capacity and efficiency of the retrofitted filter press (this document);
- August 18, before 13:00 hours: DryVac to have finalised and reported the inspection of the installed and delivered filter press plates, auxiliary materials at site in order to verify its condition and identify which plates are acceptable for permanent installation and which plates should be rejected;
- August 11, before 16:00 hours: Mechanical adjustments and necessary tune-up of filter press number 2 so it is ready for testing;
- August 12, 09:00: Official start of the implementation of the test programme;
- August 12 – 21: Implementation of the described test programme;
- August 21 by 16:00 hours: NIVA to present a test report with findings, assessments and conclusions.



***Annex E: Letter from VEAS to the arbitrator, July 30, 1998.***

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Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

(E)

Norwegian Institute of Water Research  
Att: Thorbjørn Damhaug

TELEFAX 22 18 52 00

Bjerkås 30.07.1998  
51.400-303.98

**Suggested test program for arbitrators testing of equipment delivered from DryVac to VEAS under contract signed at Bjerkås, Norway, April 11. 1998.**

With reference to meeting at VEAS July 28.1998 with you as arbitrator and the lawyers Tvedt and Askim representing respectively VEAS and DryVac, I send the following proposal for testing within the time limit given in the meeting, July 30. at 14.00h.

1. DryVac prepare the press for testing before Aug. 10. 1998 at 09.00 and before this date supply to the arbitrator a list of all documentation, according to contract, delivered to VEAS, when it was delivered and in which language.

Criteria of acceptance are: The documentation fullfills the requirements of the contract.

2. After a declaration from DryVac on which of their delivered plates are in acceptable quality, VEAS can pick any, up to 20 of them, and DryVac shall exchange these with plates already in the press before Aug. 10. 09:00.

Criteria of success are:

At least 480 plates of acceptable quality are on site.

3. 6 consecutive cycles with conventional filterpressing shall then be started in automatic mode, in parallell with the other presses at VEAS and with the same sludge. No one are allowed to interfere with the operation. It shall run in automatic modus including cake dropping. The arbitrator shall decide on sampling methods, points, fequency and analytical methods for dry solids determination. DryVac shall in advance, in writing, give instructions concerning running parameters for flow, pressure and running time, either absolute values or values in proportion to operating parameters on press no. 4. The flow to the press is registered by in-line pressure and flow meters. The parameters and results can be compared withres to the similar results with press no 4. run in parallell. Press no. 4 has a volume of 7.7 m<sup>3</sup>.



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OSLOFJORD

**Criteria of acceptance are:**

a. That the press can run automatic without manual interference for min. 6 cycles as stated in the contract.

b. That the cakes are of equal thickness, demonstrating that plates are not damaged or deformed.

4. Provided successful completion of testing according to point 3, testing of the vacuum drying system will be started. DryVac shall, in writing, at the same time as in the paragraph above, state running parameters for a full cycle for this part of the test. VEAS shall before start demonstrate that the heat exchanger plates with screens in front on the hot water circulating system, are clean.

In this first cycle emphasis shall be put on the drying rate. VEAS supply a vacuum of 0.066 bar or better and a water temperature of 82°C or higher. The drying rate shall be determined by measuring the level of collected condensate water in the well in the cellar. The level in the well is registered by the computer, but should be manually checked by the arbitrator during operation.

**Criteria of acceptance are:**

a. That the drying rate is in average at least 1200 kg water pr. hour until 90% dry solids are achieved.

b. That the emptying of the cakes from the press occur without manual interference.

5. Provided successful testing according to point 4 the next stage of testing starts. This stage is for testing of capacity and for testing of hygienization. The same running parameters as in point 4, but 6 consecutive cycle are to be run without manual interference on the DryVac delivered equipment

The produced tonnage of sludge is determined from the difference in computer printout of silo weight before and after a full cake drop. Temperature and pressure is registered by existing in-line meters. Dry solid contents are determined from grab samples taken by arbitrator and dried at 105°C for 24 hours. The flow of sludge that is fed to the press is registered by in-line magnetic flow meters.

**Criteria of acceptance are:**

a. That randomly taken grab samples from the sludge, analyzed at a laboratory decided by the arbitrator, show that all samples comply with USEPA Class "A" biosolids.

b. That the plates have maintained their shapes and thickness.

c. That the press pr. 21.6h production time, including emptying and initialization, can produce 39 wt before vacuum drying (i.e. 117wt/3) giving a final USEPA class "A" biosolids. (VEAS claim that the 117wt in the contract are equivalent to 40.95

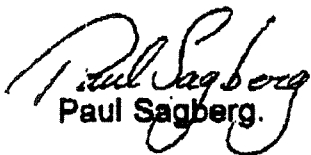
**VEAS**Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

tonnes at 100% dry solid content with reference quotation from DryVac faxed to VEAS Jan 5.1998.).

Both parties have the right to be present at site during all test stages.

On the basis of this proposal and possible comments received from the two parties concerned, we kindly ask you to prepare the final test program within the agreed deadline Aug: 6. at 13:00.

The final statement from the arbitrator on whether guaranteed results are obtained or not, shall according to the contract be given within 30 days. In this case 30 days after July 22., i.e. Aug 21.1998.



Paul Sagberg.

Copy faxed to:

Mr. Askim c/o Thommesen Krefting Greve Lund Fax 23 11 10 10  
and Mr. Tvedt c/o Kluge Fax 23 13 92 01

***Annex F: Letter from NIVA to the lawyers, August 10, 1998.***

(F)

**NORWEGIAN INSTITUTE  
FOR WATER RESEARCH**

*Postal address:*  
P.O. Box 173 Kjelsås  
N-0411 Oslo, Norway  
*Location:*  
Brekkeveien 19  
Telephone +47 22 18 51 00  
Telefax +47 22 18 52 00  
Telex 72400 fotex n  
Att.: NIVA Oslo  
Postal giro account 0813 5196712  
Bank account: 6094 05 11421  
Enterprise No. 855869942  
Internet: [www.niva.no](http://www.niva.no)

Mr. Øystein Askim  
c/o Thommessen Krefting , Greve Lund  
P.O.Box 1484 Vika 0116 Oslo  
Mr. Odd R. Tvedt  
c/o Kluge Advokatfirma  
P.O.Box 1584 Vika 0117 Oslo

*Your reference*

*Your letter*

*Various letters  
and faxes*

*Our reference*

*J.No. 1525/98  
S.No. 98138*

*Date*

*10 August, 1998*

**CONVERSION OF 3 FILTER PRESSES TO VACUUM FILTER DRYERS AT  
VEAS – ARBITRATION PROCEDURE AND TEST PROGRAMME**

Dear Mr. Askim and Mr. Tvedt

I confirm the reception of the letter from Thommessen Krefting Greve Lund to Kluge Advokatfirma, dated August 7, 1998, and copies of various requests and correspondence between the VEAS administration and the DryVac Technician at site, Mr. Fred Kogler.

I strongly appeal to the parties to comply in good faith and mutual understanding with the agreed test program stated in my letter of August 6 so that the performance tests and quality verification can take place in an objective manner. Without going into detail about all points made in the above correspondence, I would like to underline that the programme is based on the following two main approaches:

- I. Functional and performance testing of the retrofitted press which will represent the permanent solution for this contract after DryVac has made the necessary mechanical adjustments and tune-up;
- II. Verification of the quality and condition of the purchased plates and equipment in order to identify their appropriateness for permanent installation.

Regarding approach I.

On the basis of these principles I would advise that DryVac should be allowed to make all necessary changes to optimise the delivered press for the purpose preparing the test, provided that possible physical changes can be regarded as part of the permanent press. Potential experimental activities would belong under a possible follow-up programme if agreed between the parties.

To the issue of technical changes and optimisation measures raised in the written request from the DryVac Technician to VEAS dated August 7, 1998, I would advise the following:

1. Regarded as a necessary and acceptable measure which in principle should be accomplished as per DryVac's instructions;
2. Considered acceptable and should be carried out according to DryVac's instructions;
3. Considered being beyond the scope of this programme, as it appears to be an aspect of a possible process optimisation experiment;
4. Should as far as possible be accommodated in understanding with VEAS;
5. Same as 4.

Regarding co-operation and supporting services during preparations and testing, please refer to clause 4. of the Test Programme. For future records, I would advise that the services and actions requested in writing also should make a reference to the relevant clauses of the contract or the O&M manual.

Regarding approach II.

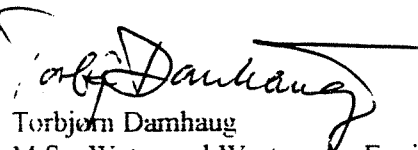
In this connection, I will emphasise the following DryVac's inspection should be stated in an inspection report. Subject to the arbitrator's decision, the suitability of the stored plates may be verified by demanding VEAS to install up to 20 arbitrarily picked plates and run test the press. Execution of such grab-test will depend on satisfactory completion of the 3 stages of the test programme.

I feel confident that these points clarify my position concerning the recent queries and correspondence related to the preparation and implementation of the test programme. I would be happy to answer any questions or discuss demands for clarification related to the test procedure during the meeting at VEAS tomorrow (August 11) at 9:00 hours.

I also kindly request the VEAS Administration to forward a copy of this fax/letter to Mr. Kogler at their earliest opportunity.

Yours sincerely

NORWEGIAN INSTITUTE FOR WATER RESEARCH



Torbjørn Damhaug  
M.Sc. Water and Wastewater Engineering

Direct telephone +47 22 18 5118  
e-mail: torbjocrn.damhaug@niva.no

Cc.: Mr. Paul Sagberg & Mr. Dag Einar Aasen, VEAS  
Mr. Fred Kogler, DryVac Technician at VEAS.

***Annex G: Compiled faxes and letters handed out to the parties by VEAS  
August 11. (not attached)***

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***Annex H: Recordings from the Cold Pressing Test, August 14.***

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# Historikvy

PR2\_FT02

MÅLING

PR2\_PT02

MÅLING



450 PR2 SLAM FT/PT

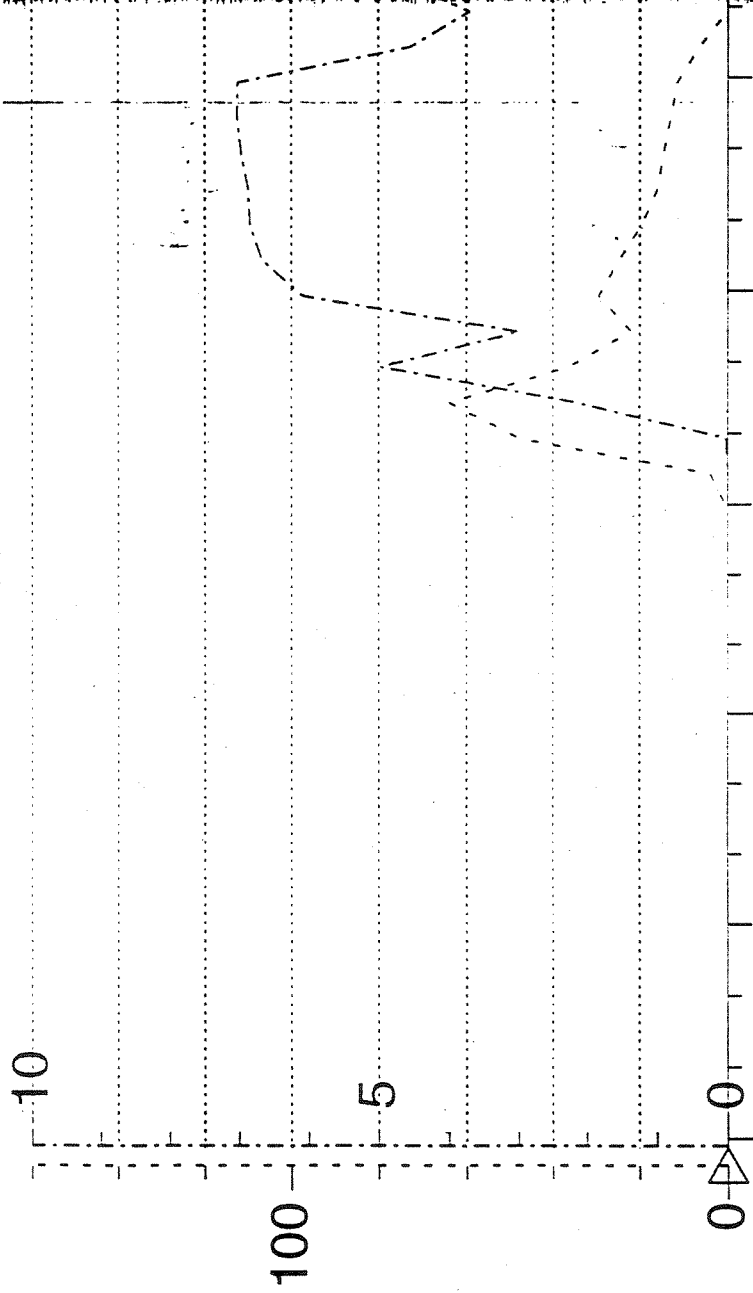
1998-08-14 14:53:43

0.0 m3/h

6.4 bar

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\*\*\*\*\*



12:00:00 13:00:00 14:00:00

98-08-14 98-08-14 98-08-14



***Annex I: Copies of correspondence between the arbitrator/parties during preparations.***

- a) 3 faxes from DryVac's Lawyer, August 3, 5 and 7, 1998. (Re. Arbitration Procedure)
  - b) 4 faxes from VEAS dated August 6, 7, and 10, 1998
-

# Thommessen Krefting Greve Lund

## TELEFAX

Torbjørn Damhaug  
Norwegian Institute for Water Research  
2218 5200

cc: advokat Odd R Tvedt  
Kluge Advokatfirma ANS  
2313 9201

Robert K Lane  
Attorney at Law  
001 510 465 2003

Dan Simpson, Dry Vac  
Environmental Inc  
001 707 374 7511

Thommessen Krefting  
Greve Lund AS  
Advokatfirma

Haakon VII's gate 10  
PO Box 1484 Vikta  
N-0116 OSLO

Tel: (+47) 23 11 11 11  
Fax: (+47) 23 11 10 10  
Email: firmapost@tkgl.no  
Enterprise Number  
NO 957423248

Number of pages: 2  
Your ref: J.No.1525/98,  
S.No.98138.  
Our ref: ovas - 88rl004a.dof  
Partner in charge: Finn Erik Lingzelius

Oslo, 5 August 1998

Dear Mr Damhaug,

## RE: VEAS - DRYVAC. ARBITRATION PROCEDURE

Reference is made to your telefax dated 29 July 1998.

Regarding the outlined arbitration procedure set forth in your telefax and letter of 29 July 1998, Dry Vac has two concerns.

### Article 3:

Dry Vac is supposed to finalise their inspection of the filter press plates, auxiliary materials at the site in order to verify its condition and identify which plates are acceptable for

# Thommessen Krefling Greve Lund

## TELEFAX

Mr. Torbjørn Damhaug  
Norwegian Institute for Water Research  
22 18 52 00

Copy:  
Advokat Odd R. Tvedt  
Kluge Advokatfirma  
23 13 92 01

Thommessen Krefling  
Greve Lund AS  
Advokatfirma

Haakon VII's gate 10  
PO Box 1484 Vika  
N-0116 OSLO

Tel: (+47) 23 11 11 11  
Fax: (+47) 23 11 10 10  
Email: firmapost@tkgl.no  
Enterprise Number  
NO 957423248

Number of pages: 3  
Your ref:  
Our ref: oyas - 88ua022a.dof  
Partner in charge: Finn Erik Engzelius

Oslo, 5 August 1998

Dear Mr. Damhaug


## DRYVAC - VEAS. ARBITRATION PROCEDURE

Reference is made to your fax of 4 August 1998.

We appreciate your modifications of the time schedule for the test procedure, and we will give our acceptance to this proposal.

Enclosed please find DryVac's draft for a test procedure.

Yours sincerely  
Thommessen Krefling Greve Lund AS

  
Øystein Askim

permanent installation and which plates should be rejected. This inspection is set for the 4 August 1998 before 1500 hours.

Dry Vac cannot physically be on the sight until the 10 August 1998. They need at least three days to make sure the process mechanics are correct. It is obvious that this inspection cannot take place at 4 August.

Dry Vac must have fair possibility to make their preparations.

Article 4:

Dry Vac is supposed to just comment upon VEAS' proposed test programme. Dry Vac will make their own draft test programme. The arbiter should review this programme and compare it to VEAS' programme. These drafts should then be the foundation for the arbiter's final test programme.

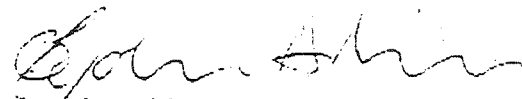
The arbiter should also take into consideration the specifications set forth in the contract.

Dry Vac has no other comments to the arbitration procedure and are looking forward to your comments about these quotations.

Please do not hesitate to contact the undersigned with any questions you may have in this matter.

Yours sincerely

Thommessen Krefling Greve Lund AS



Oystein Askim

## DRAFT FOR TEST PROCEDURE, DRYVAC

### PROCEDURE FOR TESTING

It is impossible to determine anything relating to contractual issue because the feed stream is not de-ragged and is not being pre-treated using a chemistry DryVac has seen any long term success with.

Desired feedconditioning

- 1 de-ragged and removal of hair bolls
- 2 non organic pre-treatment

TryVac has seen successful results with

addition of  $\text{FeCl}_3$  to pH .. 3.5

addition of lime Ph 9-11

Note: DryVac's experience with polymer pre-treatment has not been successful in producing a cake that maximizes the plates drying capacity.

If it is desired to gain information on the system using the existing sludge and treatment methods DryVac recommends:

Allowing DryVac a minimum of 3 days to inspect plate stack, change any damaged plates, install 10 new cloths and drain corners on ten consecutive plates. install necessary ports to monitor selective process variables. VEAS to supply temporary assistance if needed.

2. Run three press cycles making standard press cake. Drop and collect a minimum of 3 cakes from the front, middle end of the press. The cakes are to be individually weighed. The arbitrator can pull samples from these cakes for 0/0 solids analysis. DryVac will pull its own samples for its own use. VEAS to supply scale. VEAS is supplying the sludge, the chemistry, the feed equipment and has more operating data on the press than DryVac. DryVac is less qualified and does not think it is their responsibility to tell VEAS the optimum feed rate and pressures to get the best cake. DryVac does recommend fast feeding at the beginning of the cycle to minimize the possibility of hair, balls and rags plugging any feed or de-watering zones.
  
3. To determine a dry rate with the existing sludge and chemistry DryVac recommends running 3 drying runs. After blow down the cake will be dried for one hour and dropped for test 1, dried for 3 hours and dropped for test 2 and dried for 5 hours and dropped for test 3. The same sampling plan as above will be used to determine solids. The dry rate will be calculated from the difference between solids dropped at the specific times. The initial de-watered cake solids will be assumed equal to that determined in the cold testing. Feed curves and quantities will be held the same and grab samples of the feed taken for confirmation of equal 0/0 solids.

If VEAS wishes to run the system without human "intervention" DryVac will not be responsible for any damaged equipment with the existing feed and pre-treatment methods.

With operating units using identical plates the above test procedure will allow DryVac to compare results and help direct VEAS solve whatever problems they are having.



# Thommessen Krefling Greve Lund

DA11

## TELEFAX

Advokat Odd R. Tvedt  
Kluge Advokatfirma ANS  
23 13 92 01

cc:

Mr. Torbjørn Danhaug  
Norwegian Institute for Water Research  
22 18 52 00

Mr Paul Sagberg  
Managing Director VEAS  
66 79 67 55

Mr. Dan Simpson, President DryVac  
Environmental Inc.  
001 707 374 7511

Robert K. Lanc, Attorney at law  
001 510 465 2003

Thommessen Krefling  
Greve Lund AS  
Advokatfirma

Haakon VII's gate 10  
PO Box 1484 Viken  
N-0116 OSLO

Tel: (+47) 23 11 11 11

Fax: (+47) 23 11 10 10

Email: firmapost@tkgl.no

Enterprise Number  
NO 957423248

Number of pages: 2  
Your ref:  
Our ref: oyas - 88ua036a.dof  
Partner in charge: Finn Erik Engzelius

Oslo, 7 August 1998

Dear Mr. Tvedt

## RE.: DRYVAC - VEAS. TEST PROCEDURE

Reference is made to our telephone conversations yesterday and today, as well as to telefaxes from Mr. Sagberg dated 6 and 7 August, 1998.

The arbitrator, Mr. Danhaug, has outlined a time schedule in his telefax dated 6 August. The time schedule (page 7 item 8) says that DryVac can: *"identify which plates are acceptable for permanent installation and which plates should be rejected."* This operation has to be finalised within 10 August before 16.00 hours.

Thommessen Krefting Greve Lund

---

2

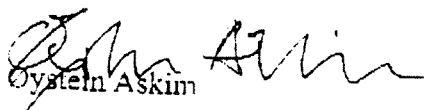
The operation represents a lot of work, and DryVac need access to the filter press during the weekend to complete their preparations. A more punctual schedule has already been delivered by the DryVac technician, Mr. Fred Koegler.

Invoicing for labour costs for required VEAS's assistance can be canalised through our firm.

The forthcoming tests trustworthiness depends upon DryVac's opportunity to carry through adjustments described in the arbitrator's arbitration procedure. We reserve the right not to use the test in any eventually proceedings if the test is not carried out with the intents set forth in the arbitration procedure.

Yours sincerely

Thommessen Krefting Greve Lund AS

  
John Askim



Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

## TELEFAX

TELEFAX NR: 66 796755

TELEFON NR: 66 798660

TIL: NIVA	FRA: SAGBERG
FAX NR: 22185200	DATO: 6/8 - 1998
ATT: DAMHAUG	ANT. SIDER INKL.DENNE: 4
VEDRØRENDE:	<input type="checkbox"/> Som avtalt <input type="checkbox"/> For godkjenning <input type="checkbox"/> For uttalelse <input checked="" type="checkbox"/> For informasjon
ANNEN INFORMASJON: <i>Oversender 3 sider kopier med fra kommunikasjon med Dryvac's stedlige representant Fred Kogler</i>	
Med hilsen, <i>Paul Sagberg</i>	

Reply to specific requests by Fred Kogler 6. aug. 1998

1. Concerning vacuum cleaner. This is a mobile vacuum cleaner owned by VEAS, not part of the DryVac system. I ask for a further explanation why it is necessary.
2. We will bring you the tools immediately.
3. We may if the job is not lasting too long and we have people available. Please give us some time to prepare for the work when you have specified the assumed manpower you need.
4. We will supply the necessary equipment even though a press ready for automatic operation will not need such equipment. Obviously!!

I have received an explanation for the wish for the vacuum cleaner. Same answer as for point 4. The vacuum cleaner will be removed after your use this week.

6/8 - 1998 kl 13<sup>47</sup>

Paul Sjoberg

Acknowledged  
Fred Kogler  
8/6/98

6 Aug 1998  
-1300-

To: Paul Sagberg Dir. VEAS

From: Fred Koller Dryvac Technician

Subj: Specific Requests

- 1) The heavy duty Vacuum Cleaner previously installed to Pull Vacuum Against the Hot Water Manifold is missing. I need to know if this provision will be restored.
- 2) I need Access to the Dryvac Tool room so that I can use the tools stored there.
- 3) Will VEAS provide the Hoist, the Lifting Arm used to Hang Plates, and one person to assist in changing plates in Press #2?
- 4) I may need the chain hoists previously provided to "Pull back" the plates for closer inspection.

Sincerely,  
Fred Koller

Fred Koller  
Dryvac Technician

6 Aug 1998

TO: Paul Sagberg

From: Fred Kogler Dryvac Technician

Subj: Additional Comment regarding  
request for vacuum cleaner.

The Vacuum Cleaner is needed as a service tool to increase the opening between \* plates. Without this aid it is not possible to get a person inbetween the plates for closer inspection.

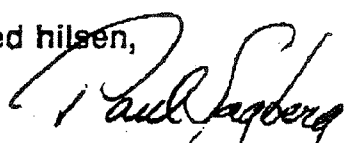
Sincerely  
Fred Kogler  
Fred Kogler  
Dryvac Technician

\* This vacuum functions to pull-back the diaphragms directly against the plate core and is a first step in getting enough room to also connect the Pull strap used to achieve maximum opening for service

**VEAS**Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD**TELEFAX**

TELEFAX NR: 66 796755

TELEFON NR: 66 798660

TIL: NIVA	FRA: SAGBERG
FAX NR: 22185200	DATO: 06.08.98
ATT: DAMHAUG	ANT. SIDER INKL.DENNE: 4
VEDRØRENDE: Arbitration DryVac - VEAS	<input checked="" type="checkbox"/> Som avtalt <input type="checkbox"/> For godkjenning <input type="checkbox"/> For uttalelse <input checked="" type="checkbox"/> For informasjon
ANNEN INFORMASJON:  VEAS comments to "Draft for test procedure, DryVac".  Copy Tvedt and Askin/Engzelius.	
Med hilsen, 	



Vestfjorden  
Avløpssekskap  
RENERE  
OSLOFJORD

Norwegian institute of Water Research  
Att: Torbjørn Damhaug

TELEFAX: 22 18 52 00

Bjerkås 06.08.1998  
51.400-309.98 PS

### Comments to "DRAFT FOR TEST PROCEDURE, DRYVAC"

VEAS call for arbitration procedure was caused among other things by statements like this from DryVac:

"We have stated that we do meet the intent and volume of the contract. We have presented the data that confirms." Fax from Dan Simpson 15.04.1998.

VEAS asked: "How and when did you do this?" Fax from Paul Sagberg 20.04.1994. DryVac has never replied.

### Conditioning of sludge.

DryVac has never brought up the question regarding use of ferric chloride as conditioning agent before this "draft for test procedure" and can not possibly have presented data with this conditioning. By the way, VEAS has several times tried ferric chloride/lime conditioning without success and have dropped this as a conditioning method. VEAS ran a lot of tests during the fall of 1987 to improve the filterability of the sludge according to the statement in the contract. "Adjustments to the document; Payment - Security and Warranty":

"2.0 7) DryVac will - together with Veas - make reasonable efforts to facilitate three presses being able to process the tonnage requirements specified in the Tender Document, clause 7.2, leaving 10% of total time available for maintenance."

The results of the test demonstrated that VEAS could reduce the filtration time on the existing presses by 50% by using one of two different cationic polymers. VEAS installed equipment, at own cost, for preparing and dosing to help DryVac achieve the tonnage requirements.

In "minute of meeting" 12.01.1998 point 5.0 the following is stated:

"DryVac asks VEAS to keep the conditions of the sludge as it is today regarding the amount of polymer which gives good dewatering conditions."

VEAS point of view is from these statements, that the test with the arbitrator should be run the way tests have been run before, which is the way DryVac must have obtained the data that according to them demonstrate that they meet the intent of the contract. The arbitrator test is not the start of a new research project for DryVac.





Vestfjorden  
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OSLOFJORD

## De-ragging

Nowhere in the contract is there any basis for this demand by DryVac. Quite contrary the contract states in call for tender page 17:

"The supplier must be able to guarantee that the plate construction will maintain its shape and thickness for at least 2 years.

The supplier must guarantee that the vital parts of the membrane plates are able to withstand the loads which can arise due to irregularities during automatic operation.

Irregularities during automatic operation can, for example, arise from an impaired releasing ability during emptying." and earlier on same page:

"VEAS will operate the presses automatically, i.e. at least 6 cycles between inspections.

I also direct attention to page 8 of the same document 5.1: "Companies presenting a tender on the basis of the invitation, must acquaint themselves with conditions at the site which may have an impact on the tender. Those presenting a tender must gather additional information if this is necessary in order to fix the price.

Failure to do this does not justify any additional remuneration, if the company making the tender has not made any reservation in writing (in the tender letter)."

And in the same document page 6 4.8: "Prior to making the tender, the company presenting the tender is obliged to acquaint itself with the information available and the local conditions for the sewage works." DryVac had their vice president Gregg Crocco at the plant for 9 days ahead of the call for tender.

## Regarding preinspection before the test point 1.

VEAS can not supply temporary assistance to DryVac if needed. VEAS is low in staff during the summer vacation and have to give priority to the daily running of the plant to achieve the results demanded by the authorities.

VEAS see no explanation for the request to install 10 new cloth and drain corners and for installing necessary ports to monitor selective process variables. Again this is not the start of a research project, but a test to see if the delivered equipment as now installed fullfills the contractual requirements.

## Regarding point 2. on operation of press.

There is no need to collect other samples from the press during the conventional pressing than selected cakes for determination of cake thickness. Deviation in cake thickness will demonstrate if the plates have maintained their shape. VEAS see no need to weigh individual cakes and will not supply a scale.

DryVac has, in their operation manual, stated the feed rate of their press to be 70-80 m<sup>3</sup>/h. In fax from Dan Simpson 23.12.1998, VEAS is accused of not letting DryVac run at low speed and did attach an operating manual from Envirotech stating: "High feed velocities should be avoided....."

**VEAS**Vestjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

After their last testing at VEAS in April 1998, DryVac asked VEAS to test operation with two pumps. VEAS installed for manual operation a second pump to be used in the early stage of filtration and reported to DryVac that the feeding of course was larger in the beginning, but much slower in the end giving no positive effect on total feed or by this cycle time/capacity.

VEAS see no reason to run with other parameters than stated in the operation manual from DryVac, but has the second pump connected for manual operation in case the arbitrator decides to have higher feeding rate. This can not be run automatic and was not tried at the time DryVac stated that they had met the intent of the contract. DryVac should advice on running parameters i.e. initial feeding rate, ramping of the feed as pressure increases, max. pressure and min. flow before stopp unless they give a written acceptance of a selection made by VEAS. Their wishes must of course be within the range of the existing equipment.

According to contract at least 6 cycles shall be run automatically between inspections. Tender document page 17.

#### **Regarding point 3 on dry rate.**

DryVac is suggesting a very complicated way of determining the drying rate as this can be directly measured from the amount of condensate in one single cycle as earlier suggested. From the final dry solids content and amount all relevant acceptance criteria can be calculated.


#### **Second last paragraph.**

DryVac states: "If VEAS wishes to run the system without human "intervention" DryVac will not be responsible for any damaged equipment with the existing feed and pre-treatment methods."

It is VEAS opinion that this statement is an acceptance of breach of contract. This will of course be further discussed in the agreed meetings between the parties on Tuesday, Aug. 11. 1998 at 09:00 at VEAS.

#### **Last paragraph.**

VEAS does not understand what is ment unless it is meant as an insult.



Paul Sagberg  
Man. dir.



Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

## TELEFAX

TELEFAX NR: 66 796755

TELEFON NR: 66 798660

TIL: NIVA	FRA: SAGBERG
FAX NR: 22185200	DATO: 6/8 - 1998
ATT: DAMHAUG	ANT. SIDER INKL.DENNE: 4
VEDRØRENDE:	<input type="checkbox"/> Som avtalt <input type="checkbox"/> For godkjenning <input type="checkbox"/> For uttalelse <input checked="" type="checkbox"/> For informasjon

ANNEN INFORMASJON:

Kopi også sendt Tvedt og Thommesen Kjefting etc.

Med hilsen,



Vestfjorden  
Avløpselskap  
RENERE  
OSLOFJORD

Bjerkås 05.08.1998  
51.400-305.98

**Rules of behavior for Fred Kogler at visit to VEAS from 05.08.1998.**

Only areas available to Mr. Kogler, at VEAS, will be the dewatering cavern and the transport tunnel, outside the dewatering cavern, with DryVac equipment stored. Entrance to the controlroom is not accepted. In addition Mr. Kogler has available an office in the reception area. Walking to and from these areas, shortest route, is allowed.

Any work Mr. Kogler wants to do, why and how, shall be stated in advance, to man. dir. Paul Sagberg, in writing, and distributed to all people in the area and to the arbitrator from NIVA, Mr. Damhaug. The arbitrator may decide that proposed work will not be allowed to take place before the testing with the arbitrator.

Any adjustments to proposed work by Mr. Kogler shall be handled in the same manner.

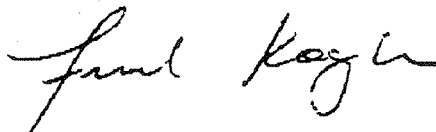
Mr. Kogler will only be allowed to stay at VEAS during normal working hours, i.e. from 08.00 to 15.30. Mr. Kogler may inquire if VEAS can provide 2 people to be present outside these hours. If this can be arranged, VEAS may accept this, against a prepayment of NOK 500,- pr. commenced hour.

Bjerkås 05.08.1998

  
Paul Sagberg

Bjerkås 05.08.1998

Read, understood and accepted.



Fred Kogler  
DryVac

Aug 5, 1998

TO: Paul Sagberg

Dir. VEAS

FROM: Fred Kobler

Dryvac Technician

Subj: Outline of specific Request for Aug 6, 1998

Paul,

I've been assigned by Dryvac to look over Filter press #2 and determine what measures need to be taken to prepare for TOT on 10 Aug 1998.

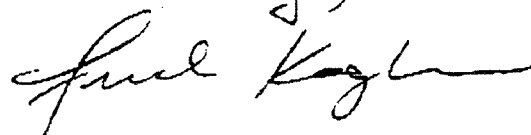
- 1) I would like 5 bar air pressure applied to Press #2 Filter chamber. I will remove Camlock hot water hose and listen for Air leaks.
- 2) After the air test I would like Press #2 opened so that I can shift plates and visually check their condition.
- 3) I would like to briefly enter the tunnel with my rental car and unload my tools and Bag of spare parts

- continued -

8/5/98

- 2 -

After my initial inspection I will  
make a written report which will  
possibly indicate which plates need to  
be replaced. I will coordinate this  
effort through DRYVAC and VETS.

Sincerely,  
  
Fred Kogler  
Dryvac Technician

Seen and accepted with reservation for point B.  
VETS can not take the job to exchange plates

6/8-1998 Paul Seberg

Copy sent Mr. Daubang, NIVA and the lawyers of the  
two firms, DryVac and VETS.



Vestjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

## TELEFAX

TELEFAX NR: 66 796755

TELEFON NR: 66 798660

TIL: NIVA	FRA: SAGBERG
FAX NR: 22 18 52 00	DATO: 07.08.98
ATT: DAMHAUG	ANT. SIDER INKL.DENNE: 8
VEDRØRENDE: <i>Dryvac's Klargjøring av presser.</i>	<input type="checkbox"/> Som avtalt <input type="checkbox"/> For godkjenning <input type="checkbox"/> For uttalelse <input checked="" type="checkbox"/> For informasjon
ANNEN INFORMASJON:  <i>For din informasjon denne dagens kommunikasjon etter lunsj.</i>	
Med hilsen,  <i>Paul Sagberg</i>	



Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

## TELEFAX

TELEFAX NR: 66 796755

TELEFON NR: 66 798660

TIL: <i>Thommeson Krefling Greve Lund</i>	FRA: <i>Paul Sagberg</i>
FAX NR: <i>23 11 1010</i>	DATO: <i>7/8-1998</i>
ATT: <i>Askim</i>	ANT. SIDER INKL.DENNE: <i>3</i>
VEDRØRENDE: <i>DryVac's klargjøring av presser.</i>	<input type="checkbox"/> Som avtalt <input type="checkbox"/> For godkjenning <input type="checkbox"/> For uttalelse <input type="checkbox"/> For informasjon

### ANNEN INFORMASJON:

Jeg viser til vedlagte kommunikasjon med  
Fred Kogler. Etter denne mottok vi deres fax.  
Det synes å fremgå at de har svært dårlig  
kunnskap om arbeidsavtaler og organisering av  
en industribedrift. Det ser også ut til at  
de har vanskeligheter med å forstå at deres  
klient ikke prioriterer/har prioritert å ha mannskap  
på stedet for å klargjøre sitt utstyr. VEAS har  
nå strudret seg virkelig langt på tross av motpartens  
manglende respekt for vår driftsorganisasjon <sup>også deres</sup>.  
De skriver: "Invoicing of labor can be canalized  
through our firm". (This is far from what you stated  
Med hilsen, to Mr. Tvedt) Vær snill å øyeblikkelig  
bekreft at de garanterer betaling.

*Paul Sagberg* Kopi Tvedt.



Fred Kogler, DryVac.

7/8-1998 13<sup>15</sup>

Dry Vac's lawyers Thommesen Krefling Greve Lund have through my lawyers Kluge informed me that they guarantee for payment for VEAS people being present during work tonight and tomorrow if VEAS is able to find volunteers at such short notice. Please inform me immediately on your wishes and we will see what we can manage.

With regards

Paul Sagberg

Per Dan Simpson, unless we can agree to allow all 10 new screens to be installed as a group at the front (Feed end) of the press, we will NOT use our "overtime payment" option.

Fred Kogler

1408 7-8-98

You are free to mount them anywhere this weekend, but VEAS reserves the right to make the arbitrator take the final decision on Monday 14<sup>10</sup> 07.08.98

P. Sagberg

Please try to arrange for appropriate personell tonight. 4 hrs Fred Kogler

0/0

I have not been able at this late hour to find ~~any~~ volunteers, I only have found one. I will myself be present for the 4 hours you have requested tonight. As you have not asked for personell saturday and sunday no one have been asked and it is now too late to arrange this. Normally the employees leave from 14:00 on fridays during summer, and at 14:05 you said you did not want any personell.

14:34 7/8-1998

Paul Sjoberg.

# Thommessen Krefting Greve Lund

## TELEFAX

Advokat Odd R. Tvedt  
Kluge Advokatfirma ANS  
23 13 92 01

cc:  
Mr. Torbjørn Danhaug  
Norwegian Institute for Water Research  
22 18 52 00

Mr Paul Sagberg  
Managing Director VEAS  
66 79 67 55

Mr. Dan Simpson, President DryVac  
Environmental Inc.  
001 707 374 7511

Robert K. Lane, Attorney at law  
001 510 465 2003

Number of pages: 2  
Your ref:  
Our ref: oyas - 88uz036a.dof  
Partner in charge: Finn Erik Engzelius

Thommessen Krefting  
Greve Lund AS  
Advokatfirma

Haakon VII's gate 10  
PO Box 1484 Vikta  
N-0116 OSLO

Tel: (+47) 23 11 11 11  
Fax: (+47) 23 11 10 10  
Email: firmapost@tkgl.no  
Enterprise Number  
NO 957423248

Oslo, 7 August 1998

Dear Mr. Tvedt

## RE.: DRYVAC - VEAS. TEST PROCEDURE

Reference is made to our telephone conversations yesterday and today, as well as to telefaxes from Mr. Sagberg dated 6 and 7 August, 1998.

The arbitrator, Mr. Danhaug, has outlined a time schedule in his telefax dated 6 August. The time schedule (page 7 item 8) says that DryVac can "identify which plates are acceptable for permanent installation and which plates should be rejected." This operation has to be finalised within 10 August before 16.00 hours.

Thommessen Krefting Greve Lund

2

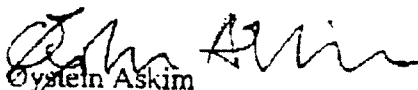
The operation represents a lot of work, and DryVac need access to the filter press during the weekend to complete their preparations. A more punctual schedule has already been delivered by the DryVac technician, Mr. Fred Koegler.

Invoicing for labour costs for required VEAS's assistance can be canalised through our firm.

The forthcoming tests trustworthiness depends upon DryVac's opportunity to carry through adjustments described in the arbitrator's arbitration procedure. We reserve the right not to use the test in any eventually proceedings if the test is not carried out with the intents set forth in the arbitration procedure.

Yours sincerely

Thommessen Krefting Greve Lund AS

  
Øystein Askim

# Thommessen Krefting Greve Lund

## TELEFAKS

Advokat Odd R. Tvedt  
Kluge Advokatfirma ANS  
23 13 92 01

Kopi:  
Adm.dir. Paul Sagberg, VEAS  
66 79 67 55

Thommessen Krefting  
Greve Lund AS  
Advokatfirma

Haakon VII's gate 10  
Postboks 1484 Vikta  
0116 OSLO

Telefon: 23 11 11 11  
Telefaks: 23 11 10 10  
Email: firmapost@tkgl.no  
Foretaksregisteret  
NO 957423248

Antall sider: 1  
Deres ref:  
Vår ref: oyas - 88oa004a.dof  
Ansvarlig advokat: Finn Erik Engzelius

Oslo, 7 august 1998

## DRYVAC - VEAS. FORBEREDELSE TIL TESTPROGRAM

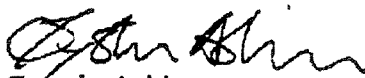
Det vises til telefaks fra adm. dir. Paul Sagberg mottatt i ettermiddag.

Vi har på vår klientkonto midler tilhørende vår klient, DryVac Environmental Inc. Disse midlene tilhører vår klient og kan ikke disponeres uten samtykke fra klienten. Vi er imidlertid villig til - i samråd med vår klient - å øremerke inntil NOK 8.000 for utbetalinger til Dem etter nærmere instruks fra vår klient i en periode på 3 måneder fra dags dato.

Vi har ikke anledning til å stille noen garanti for utgifter fakturert vår klient, men vi kan innestå for at klienten faktisk disponerer nevnte beløp i nevnte periode.

Det presiseres at denne telefaks ikke innebærer noen stillingtagen til hvem som er forpliktet til å bære VEAS' kostnader ved forberedelse til den test som er avtalt gjennomført førstkommande uke.

Med vennlig hilsen  
Thommessen Krefting Greve Lund AS

  
Øystein Askim  
advokatfullmektig



Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

## TELEFAX

TELEFAX NR: 66 796755

TELEFON NR: 66 798660

TIL: <i>Thomassen Krefling etc.</i>	FRA: <i>Paul Sagberg</i>
FAX NR: <i>23111010</i>	DATO: <i>07.08.1998</i>
ATT: <i>Askim</i>	ANT. SIDER INKL.DENNE: <i>1</i>
VEDRØRENDE:  <i>Arbitration DryVac/VEAS</i>	<input type="checkbox"/> Som avtalt <input type="checkbox"/> For godkjenning <input type="checkbox"/> For uttalelse <input checked="" type="checkbox"/> For informasjon

ANNEN INFORMASJON: *Dear Mr Askim*

*I just received your fax 7/8-1998 17:36.*

*Just to inform you that Fred Kogler finished his work at 17:30 and left VEAS. One of the operators and myself was available until 19:30 but he did not want to do any more work. We have not any shimping ref point 2 of their request and our answer. DryVac do not want to work this weekend and we can do no more.*

*I talked to Mr. Tvedt and am sorry to transmit that he feels being tricked. You promised him a guarantee for payment for VEAS being present outside normal working hours. What you now are stating is so far from a guarantee for payment or VEAS offer*

*Med hilsen, in "rules of behavior" 05.08.1998 demanding prepayment that I have lost confidence in you as a person.*

*Paul Sagberg*



Vestjorden  
Aviøpsselskap  
RENERE  
OSLOFJORD

## TELEFAX

TELEFAX NR: 66 796755

TELEFON NR: 66 798660

TIL: NIVA	FRA: SAGBERG
FAX NR: 22 18 52 00	DATO: 07.08.98
ATT: DAMHAUG	ANT. SIDER INKL.DENNE: 6
VEDRØRENDE: <i>Arbitration DryVac/VEAS</i>	<input type="checkbox"/> Som avtalt <input type="checkbox"/> For godkjenning <input type="checkbox"/> For uttalelse <input checked="" type="checkbox"/> For informasjon

### ANNEN INFORMASJON:

*For the sake of good practice I fax a copy  
of today's communication with the site  
representative of DryVac, Fred Kogler*

*Copy sent ~~Mr. Damhaug~~ Mr. Engelius/Askim Thomsen etc  
Mr. Tvedt, KLUGE*

Med hilsen,

*Paul Sagberg*

P-1A

AUG 7, 1998  
9:20

TO: FRED KOGLER, DRYVAC AT VEAS  
FROM: PAUL SAGBERG, VEAS.

COMMENTS TO WRITTEN REQUEST RECEIVED at 08:00

VEAS has tried to get in contact with the arbitrator immediately after receiving this request as you were informed yesterday the arbitrator is away today and during the weekend. We deeply regret that you did not present a ~~full~~ complete program for your work at VEAS yesterday or the day before.

1. Plate manufacturers strongly advise against using different screens on the same press as this can cause differential pressures. You have left the press with a very different kind of cloth on the last four plates and are now asking to possibly introduce 10 more screens of a possible different filterability. We advise against your action. To avoid bias we suggest that you put 5 screens of the new type with center pocket in feed end and 5 screens towards the end close to the 4 white screens. This partial acceptance may be overruled by the arbitrator, so you should be prepared to put the screens back in. We advise you to wash all screens before start of test.
2. You ask to replace temporary shims attached to various pucks and staybass positions.



VEAS opposes this. You have not stated anything about this in your "Operation and Maintenance Manual". These pucks are not part of the rest of your delivery. Actually they look and act as a panic test solution. We will not refuse what you ask for, but raise the question to the arbitrator ~~who~~ if all pucks should be removed before start of test.

3. We will not allow you to put in new equipment as the plate drain corners. We shall now start testing of delivered equipment, not start new research work. The final decision is of course left for the arbitrator, but we will not allow this work done before we have his approval.

4 & 5 Please abide by the "Rules of behavior for Fred Kogler at visit to VEAS from 05.08.1998.

If you request long hours at VEAS you will have to prepay for the hours requested. We can not have people on stand by for you. Please state exactly which hours you ask me to provide people on site and we will check if this is possible. Please have payment ready as no prolonged working period will start before the money is in our hands.

With regards,  
Paul Sjoberg

Rec'd  
Fred Kogler  
0924  
8/7/98

AUG 7, 1998

TO: PAUL SAGBERG DIR. VEAS

FROM: FRED KEGLER DYKAL TECHNICIAN

SUBJ: Written Requests

- 1) I wish to replace the Filter Screens ON THE FIRST 10 PLATES AS COUNTED FROM FEED END OF PRESS. THIS IS A CONTROL MEASURE TO VERIFY IF THE EXISTING SCREENS ARE BLINDED
- 2) I wish to replace the temporary shims attached to various PUCKS AND STABOS positions with durable permanent Neoprene shims. These shims serve to stabilize the plates AGAINST possible differential pressures.
- 3) I wish to attach factory Authorized Plate Drain corner covers to A MINIMUM OF 20 PLATES. Doing this to A SMALL NUMBER OF PLATES SHOULD VERIFY THEIR EFFECT ON DEWATERING. 3
- 4) Items 1, 2, & 3 represent a lot of work. I am by myself and wish to work today until 2000 hours.

AUG 7, 1998

- 2 -

- 5) In the event I am not able to complete my work today, I kindly ASK THAT you arrange my access to UETS SATURDAY 8 AUG 1998 AT 0800 AND ALLOW me to work UNTIL 2000 HOURS.

Sincerely,

Fred Kogler

FRED KOGLER

DRYUMC TECHNICIAN

Received 08:00  
Paul Sjoberg.

**VEAS**Vestfjorden  
Avløpselskap  
RENERE  
OSLOFJORD

Bjerkås 7/8

Confirmation of conversation.

Fred Kogler was at 09:40 informed that if he wanted people on site tonight and tomorrow, VEAS should be informed within 30 min. His answer was he didn't have any money. On question if he had US\$300,- for work tonight, his answer was he had, but he was not sure Dan Simpson would want this. VEAS informed that they would immediately stop work to get people for this evening and tomorrow.

Confirmed 7/8-98 09:45

and I ~~do not~~ ~~do not~~ do not want people to exchange plates today. If I do I want people for ... hours from:

Fred Kogler  
Fred Kogler



Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

## TELEFAX

TELEFAX NR: 66 796755

TELEFON NR: 66 798660

TIL: NIVA	FRA: SAGBERG
FAX NR: 22 18 52 00	DATO: 10.08.98
ATT: DAMHAUG	ANT. SIDER INKL.DENNE: 4
VEDRØRENDE:  <i>Arbitration DryVac/VEAS</i>	<input type="checkbox"/> Som avtalt <input type="checkbox"/> For godkjenning <input type="checkbox"/> For uttalelse <input checked="" type="checkbox"/> For informasjon
ANNEN INFORMASJON:  <i>3 sider fra idag Jeg er i vare i en begravelse idag fra kl 11<sup>00</sup>-16<sup>00</sup> Ved behov for kontakt er tekn. sjef Dag Einar Aasen kontaktperson.</i>	
Med hilsen,  <i>Paul Sagberg</i>	



Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

Bjerkås 10.08.1998  
51.400-311.98

**Rules of behavior for Dan Simpson and Gregg Crocco at visit to VEAS from 10.08.1998.**

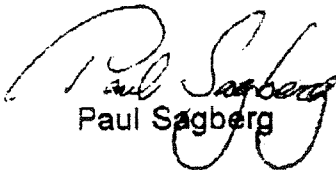
Only areas available to Mr. Simpson and Mr. Crocco, DryVac, at VEAS, will be the dewatering cavern and the transport tunnel, outside the dewatering cavern, with DryVac equipment stored. Entrance to the controlroom is not accepted. In addition they have available together with Mr. Kogler, also DryVac, an office in the reception area. Walking to and from these areas, shortest route, is allowed. Other areas may be available together with VEAS managing director or the arbitrator from NIVA, Mr. Damhaug.

Any work Mr. Simpson, Mr. Crocco or Mr. Kogler wants to do, why and how, shall be stated in advance, to man. dir. Paul Sagberg, in writing, and distributed to all people in the area and to the arbitrator from NIVA, Mr. Damhaug. The arbitrator may decide that proposed work will not be allowed to take place before the testing with the arbitrator.

Any adjustments to proposed work by DryVac shall be handled in the same manner.

Representatives of DryVac will only be allowed to stay at VEAS during normal working hours, i.e. from 08.00 to 15.30. DryVac may inquire if VEAS can provide 2 people to be present outside these hours. If this can be arranged, VEAS may accept this, against a prepayment of NOK 500.- pr. commenced hour.


Bjerkås 10.08.1998

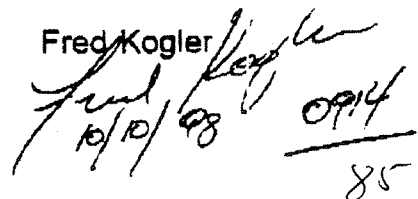
  
Paul Sagberg

Bjerkås 05.08.1998

Read, understood and accepted.

  
Dan Simpson  
in protest

  
Gregg Crocco  
in protest

Fred Kogler  
  
10/10/98 09:14  
85

Monday '8-10

work to be done by Dry Vac  
on Monday

1 As per letter by Paul Sagberg  
Dry Vac will be replacing temporary  
shims.

2. Inspection of cloths to determine  
if VEAS should clean them or  
not.

3.

Paul Sagberg  
Dry Vac Environmental  
Greg Cross

As for #1 I have to cite my letter to your  
local representative at VEAS last week, Fred Kogler:

"You ask to replace temporary shims attached to  
various pucks and starboss positions. VEAS opposes  
this. You have not stated anything about this in your  
"Operation and Maintenance Manual" These pucks are not  
part of the rest of your delivery. Actually they look  
and act as a panic ~~the~~ test solution. We will not  
refuse what you ask for, but raise the question  
to the arbitrator if all pucks should be removed."

before the start of the test."

We are still of the same opinion.

As n° 2, DEAS will of course clean them with our automatic washing machine on your request if your equipment is in such a shape that this is possible. Please do a thorough investigation on the hanging plates and the stocked plates before 10:00 hours today.

A.36-1 Paul Jørgensen



***Annex J: Memos to the arbitrator handed over by DryVac by the end of the meeting at VEAS August 14, 1998.***

- a) Memo concerning results of the plate inspection
- b) Memo: "Capacity requirements as stated in the Contract"
- c) Memo concerning "Target values for acceptance"
- d) Memo regarding "Reason for DryVac pulling out of testing"
- e) Memo: "Events and actions of VEAS/Mr. Paul Sagberg leading to the decision to terminate our involvement in the current process"

(i)

Fax to: Mr. Torbjorn Damhaug

From: Mr. Gregg Crocco, V.P. Engineering  
DryVac Environmental, Inc.

14  
8-16-98 14:00


Regarding potentially damaged plates, there were about 70 to 100 that have been damaged by pressure differential during various tests at Veas. We have a log that gives the exact number and I believe the dates with serial numbers when this major change came about they were removed. That log has been prepared by our chief of field service, Mr. Jim Shewmaker. Mr. Shewmaker is camping in the Sierra's with his family and will return on the twentieth of August, 1998.

DryVac Environmental, Inc., with the concurrence and advice of Mr. Sagberg elected to convert press number two over to bottom feed. The press plate was designed to be top corner feed. It was decided that since we had to change all the hangers on 121 plates that it made good sense to start with plates that were fresh and also didn't have hangers already mounted on them. One set had been delivered as spares. Since the change over the plate stacks have been cleaned up and somewhat moved around, making it hard to see and count damaged plates.

In addition to the 360 plates shipped for presses 1,2,&3, we delivered 120 as security and 40 for possible problems that might arise. This plate was designed and manufactured with no time for R&D before shipping. All parties were aware that we were all breaking new ground.

Per the contract in section 8,9 regarding "payment-security and warranty" the actual number of plates is to be determined after functional testing is complete. At this time DryVac Environmental, Inc., has also supplied over four additional sets of screens for testing of different materials. This was done before we knew of the plants long existing rag and hair problem.

Very Truly Yours,

  
Gregg A. Crocco, EVP/Engineering  
DryVac Environmental, Inc.

11  
22

## NOTAT

TIL: Mr. Torbjorn Damhaug  
 FRA: Gregg Crocco DryVac Environmental  
 DATO: Oslo, 14 august 1998

Subject: Capacity requirements as stated in the contract

DryVac has no problem accepting that the Veas plant produces 39 dry tons / day. The tender requires 117 wet tons to be dried to 90% solids. DryVac took exception to the 90% solids requirement and stated so in attachment 1A of the contract. What attachment 1A says is that if the sludge is properly conditioned, then the DryVac press would dry at a rate of 1200 kg./hr. The tender also contained a table in section 7.42 that DryVac filled out showing how long it would take to dry to 90% solids for various initial cake solids.

Remember, the size of the press is fixed. DryVac put the maximum number of plates of the largest capacity into the existing R&B frames. At the time the contract was negotiated, Veas and DryVac did not know how long the new plates would take to dewater or to what % solids they would dewater to. What is clear is that nobody knew exactly how many cycles would have to be run / day because this was dependent on the pretreatment chemistry Veas was developing at the time. So as it applies to capacity the only thing that DryVac is held to in the contract is **the dry rate**. This dry rate requires the sludge to be properly conditioned and porous.

DryVac was willing to share some of this risk from having a lot of unknowns just in case the feed times turned out to be long, or the dewatered cake solids turned out to be low, or Veas could not lower the lime content of the sludge. DryVac gave Veas the option to convert press 4 to DryVac plates at ¼ cost as long as Veas worked in good faith to try and make the system work with 3 presses. All of the contract language about "capacity" and "down time for maintenance" contained in section Payment Security and Warranty of the contract is dealing with this 4th press option.

VEAS request before the test to have the support pieces removed from the plates ( pucks) knowing full well that with the current sludge conditioning the entire stack of new plates would be destroyed without them.

Except for the ten new cloths DryVac brought and installed on the press the entire stack had blinded cloths to start the test with. The cloths were still blinded even after washing. VEAS tried to stop DryVac from installing any new cloths. VEAS also tried to prevent the use of a vacuum on the diaphragms that would allow space for the cloth washer to be run.

During testing filtrate valve found manually closed when previously it was open.

Press feed pump goes out of control and over pressurises press.

Thin cake from aborted run feels slimey and appears to be way over dosed with polymer

Most of the test criteria is based on interpretation of the contract that is in dispute between DryVac and VEAS.

DryVac feels that through there in action to correct known problems and through there deliberate actions to limit the performance of the DryVac system, VEAS is clearly interfering with DryVac's ability to perform.

Very Truly Yours



Gregg A. Crocco, V.P. Engineering

DryVac Environmental, Inc.

Comments  
under 31 of  
minutes 11/8-98

iii

Fax to: Mr. Torbjorn Damhaug

From: Mr. Gregg Crocco, V.P. Engineering  
DryVac Environmental, Inc.

<sup>14</sup>  
8-10-98 21:00

DryVac Environmental, Inc.

Target Values for acceptance.

2.1 Time to achieve production (21.6hrs) The 21.6hrs was used in reference to criteria to determine if Veas would be allowed to purchase the fourth set of plates at the reduced agreed upon price, rather than the full cost. It was never agreed upon that the DryVac plates would produce any given fixed volume of material. The DryVac plates were produced to fill an existing filter press frame and could only have the volume allotted in that preexisting space. Reference page 15 of tender, (capacity Data) then refer to Payment Security and warranty, section 7, be sure to read the last paragraph talking about the ability to take the fourth set of plates, with no further refundability, then go to addendum section 4.1 / 2.0 (7) The 10% mentioned is our way of making it easier for Paul to purchase the fourth set of plates as he felt they would be needed.

2.2 Production capacity (39)

See attached letter.

2.3

2.4

The contract does not call for DryVac to perfect automatic running. It simply says that VEAS will operate in automatic. During negotiations the concern was that the cake when dried would not fall off the screens or it would hang up in sections and that would cause the press to not be able to close properly, leaving vacuum leaks. This has been proven to be an unwarranted worry.

Refer to page 17, tender 7.5 performance bond. ---Cake release concerns for membrane plates.

VEAS now wants to interpret this statement to mean that anything that may inhibit auto operation is to be DryVacs responsibility. DryVac Environmental, Inc., supplied only the plates, screens and plate plumbing.

3.1

Minimum time to achieve the assumed target production rate.

If you read the contract with the fourth press option language removed you see that it is not a requirement. The contract states the units must be run a minimum of four times daily. The only thing in this contract that has been guaranteed by DryVac is the dry rate of 1200kg per hour, with properly conditioned sludge. See page 15, 7.43 on DryVac letterhead, attachment 1a. 3/5/97.

DryVac would like to state that from a technical point of view that we feel strongly that the performance (dewatering ability, the holding shape, and cake uniformity, drying rate & ability to run in automatic) of the DryVac Environmental, Inc. plate is severely affected by the rag & hair ball problem that currently exists at the VEAS facility. The current plate was never designed to withstand the differential pressures created by a sludge of this type. It is obviously a separate issue as to whether the contract requires the plate to do so.

The use of a polymer does in fact improve the dewatering aspect of this sludge, but our experience is that it in turn lowers the dry rate substantially. Please again refer to attachment 1a. (exception.) The guaranteed dry rate is dependant on having a porous cake. Using a polymer doesn't constitute " Properly conditioned sludge". We would suggest and have seen good results with the use of non organic flocculants. The current polymer based feed has not worked well and will not adequately show the performance.

3.2

**Drying Capacity**

DryVac feels strongly that the dry rate should be based on the difference between the wet and the dry cate, not the amount of condensate water collected.

3.3

The method of manufacture and the materials of construction of the DryVac plate are such that they are not machined like the current types of filter plates available. There can and usually are variances that will exist between chambers. We have over the years, seen these same deviations in standard plastic plates, even when surface machined.

Very Truly Yours,

  
Gregg A. Crocco, EVP/Engineering  
DryVac Environmental, Inc.

8/14/98

Dear Mr. Damhaug

SUBJECT: Reason for DryVac pulling out of testing.

#### Introduction

DryVac supplied plates with hangers. DryVac provided conceptual design for the heat and vacuum system that VEAS built. That is all.

It was VEAS's responsibility to condition the slurry to maximise the performance of the DryVac equipment.

Throughout the testing and start-up phase of the equipment it was evident that the condition of the sludge caused major performance problems of the system. DryVac made many expensive modifications to help minimise the problems that was resulting in extensive damage of the DryVac plates. It is important to note that the problems and resulting damage is not unique to just the DryVac plates but would occur with any plastic filterpress plate. Even after the modifications DryVac made we felt that unless changes were made to the sludge, the system would either have to be operated at reduced performance levels or risk damage to the system. This was the status of the system as of April 3, 1998. VEAS committed to make changes to the sludge so that the system could run at maximum performance conditions during a meeting on that date. Also during that meeting VEAS told DryVac that the contract conditions were met and they would release some monies of the deposit. This was later modified in a letter to DryVac on April 13, 1998 that said DryVac met the contract conditions except that the system would not run in automatic so the money would not be released. The reason given for non-automatic operation was hair balls and rags stuck in the feed lines. This was not a problem DryVac could fix or was responsible for.

#### Reasons for stopping testing for arbitration:

VEAS is requiring performance testing to determine if the DryVac equipment meets the contract. The results of the aborted dewatering test conducted on Aug. 12 were inspected by DryVac the morning of Aug. 13. It was clear VEAS had done nothing to the sludge to reduce the differential pressure and rag plugging problems. This left DryVac with two options:

1. Run the testing at reduced pressures and thus severely limit performance
2. Run the testing at normal pressures and risk destroying the new stack of plates installed Mar. 1998.

#### EITHER OPTION DRYVAC LOSES

#### DRYVAC IS FORCED TO BACK OUT OF THE TEST

With the total reversal of contractual compliance that occurred between Apr. 1998 and Aug. 1998 DryVac feels the sole purpose of calling for the test was to allow VEAS to have the DryVac equipment removed so that a competitors equipment could be brought in. Some of the actions by VEAS in addition to occurrences during the testing that also factored into DryVac's decision to pull out were:

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Fax to: Mr. Torbjorn Damhaug

From: Mr. Daniel J. Simpson, President  
DryVac Environmental, Inc  
8/13/98 18:00

DryVac Environmental, Inc.

Events and actions of VEAS / Mr. Paul Sagberg leading to the decision to terminate our involvement in the current arbitration.

As everyone is aware Mr. Sagberg has done his best to make it difficult for DryVac personnel to operate, within the walls of VEAS. It appears be very personal. First it is very hard to ask employees to work where they are fearful. In today's world it seems odd to even think this way, but our experiences with Mr. Sagberg getting extremely angry and menacing has created a atmosphere where Mr. Kogler and Mr. Crocco felt threatened. I myself felt it unnerving to have Mr. Sagberg get in my face and with his look and scold me as if I were a criminal. What ever his reasoning is, it is not to be tolerated.

Besides the incidence's of yesterday, when we arrived this morning Paul was running the wash water system into the press. This may seem like nothing, but it changed the entire picture that we would receive upon opening the press. It will disperse some of the feed port material and rehydrate the cake in the press, as the diaphragms have not been pressurized. The press was pressurized with water and spraying water out. Mr. Sagberg Explained that the computer would not let him turn off the water, how can we run in auto if the computer doesn't function. It was the computer that spiked the feed pump to 8.3 bar pressure.

When we started operating the press yesterday, we looked to see if valves were closed and they all looked open to me. Obviously one either wasn't open and I couldn't tell or it magically closed itself. The dumping of the press witch should have taken only a short time, turned into a four hour incident. Normally the conveyor runs while you are dumping, quite often on this type of equipment if you dump the whole press load on the conveyor it will not have the horse power to operate. This time was no exception. When we tried to wash the computer became a challenge again. You know it is frustrating to be told that we are supposed to operate the plate in automatic ( not our responsibility) and VEAS can't make the computer program function.

Greg was working hard with the two VEAS men to inspect the potentially broken plates. At one point, he found four badly deformed plates and he told the men to put the plates on the stack of defective plates this would take them a few minutes. Gregg then decided to take a quick break to speak with me about how things were going. Paul came up and began yelling that we had no wright to ask his people to inspect plates and that he had pulled them off the job. He then stormed off, before we could explain.

The press was obviously blinded from previous runs that Paul made over the past weeks. He won't tell us how many runs they made or what the results were. He new yesterday that if we put the new screens in it would show what had already happened to the screens. The new screens dropped cake that looked great, even with the high polymer rate they had dewatered and looked like what you would see coming out of the other presses. The old screens had blinded and needed to be acid washed. VEAS needs to acid wash there screens on a regular basis. The new (first ten) screens produced good solid cake, by the time you got to see them they had been hosed down several times. The screens currently on the press are 4 to 6 cfm, the screens on the other presses are approximately 90cfm or 30 times larger flow rate. It obviously will take more time for that larger size to blind. They also would generally respond better to standard washing, because of the larger opening.



The amount of polymer that was in that sludge made it appear more like rubber than a bio sludge.

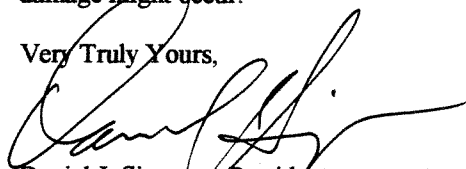
Again, it is not nor ever was the responsibility of DryVac to solve VEAS's chemistry problems. We have shown them what works and they choose to not use it.

Please refer to the contract, it is a contract for us to supply plates and clothes (screens) only. Veas elected to supply all other material, equipment and labor. We are to assist Veas in other matters and have been trying to do just that.

The condition of the feed sludge, the lack of control in operational mode of the feed pumps, and the attitude and atmosphere are dangerous to the equipment and potentially to our personnel.

We felt it necessary to leave at a point when the equipment was in good running order before unneeded damage might occur.

Very Truly Yours,



Daniel J. Simpson, President  
DryVac Environmental, Inc.

***Annex K: Two letters from VEAS (including attachments) to the arbitrator  
August 17, 1998.***

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Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

Torbjørn Damhaug, NIVA

Bjerkås 17.08.1998

### **Vedr. oppmannsoppdraget i kontrakten mellom DryVac Environmental og VEAS.**

Det vises til din oppfordring til partene om skriftlig å gi deg en nærmere redegjørelse for våre oppfatninger. Nå som DryVac har trukket sin deltakelse fra oppmannsvurderingen og det er relativt kort tid jeg har til rådighet til å gi mine kommentarer foretrekker jeg å gi dem på norsk.

Først spørsmålet om kapasitet, det sendes et eget brev med uttalelser om en rekke andre spørsmål:

Systemets oppnådde kapasitet er behandlet i vedlagte fax fra VEAS 20.04.98 hvor det konkluderes med at utstyret ikke har vist mer enn 42% av "contractual capacity" for 3 presser med endel angitte forutsetninger. I faxen inviteres DryVac til å kommentere beregningen og svarer i fax datert 21.04.98: "In reviewing your letter of April 20, 1998 to Dan I'm in agreement with your math and methods used."

De forutsetninger VEAS la til grunn var innmating av 50 m<sup>3</sup> slam i den konvensjonelle delen av pressesyklus, dette er den mengden en har observert at det er mulig å få inn med helt nye duker. Det er også forutsatt at tørkehastigheten er 1200 kg/h.

Disse forutsetningene ser ut til å være alt for optimistiske. Sammen med oppmannen har vi bare observert innmating av 25 m<sup>3</sup> slam, noe som krever dobbelt så mange sykluser. Hver syklus ville i tillegg vare lenger som følge av at de inneholder mer vann initielt. Under slike forhold ville det ikke oppnås mer enn i størrelsesorden 20% av "contractual capacity". Kanskje kan det være noe i de synspunktene DryVac i den senere tid har fremmet om at de svært tette dukene, som de på eget initiativ valgte å montere i mars 98, krever hyppig vasking og syrevask. I såfall spiser disse aktiviteter av kapasiteten. En vask tar ca. 1,5 timer. En syrevask tar ca. 18 timer. DryVac hadde ikke forutsatt syrevask og svært sjelden høytrykksvask 1-4 ganger pr. år. Dette kan vi føre vitner om. Utstyr for syrevask inngår ikke i beskrivelsen av anlegget i "Invitation of tender 03.02.1997" Syrevask er ikke nevnt i "DryVac's Operation and Maintenance Manual 02-03-98"

VEAS har i faxen datert 20.04.98 lagt til grunn at tørkehastigheten er 1200 kg/h, men har samtidig dokumentert overfor DryVac i fax av 23.04.98 at den observerte tørkehastigheten er under en tredjedel av dette. Med en slik tørkehastighet og 50 m<sup>3</sup> slaminmating ville tre presser bare oppnå 10-15% av "contractual capacity".

Dersom slaminnmatingen er mindre enn 50 m<sup>3</sup> eller brutto syklustid lengre som følge av hyppig vask ville kapasiteten være enda lavere.

Sammen med oppmannen har vi ikke kunnet observere tørkehastigheten fordi DryVac trakk seg fra utprøvingen. Innmatingen i den konvensjonelle delen av pressingen var 25 m<sup>3</sup> som er mindre enn de 30 m<sup>3</sup> som DryVac har satt som et minimum i "Operation & Maintenance Manual 02-03-98" dersom vakuums tørking skal kunne startes. Hadde DryVac vært tilstede ville jeg ha bedt oppmannen om å be DryVac fjerne noen av avstandsstykkene (pucker/chims) slik at syrevask kunne gjennomføres. En ville da fått se effekten av denne slik at dette kunne tas med i vurderingene og forhåpentligvis fått inn så mye slam at en tørketest kunne gjennomføres.

VEAS har ikke i ovennevnte beregninger lagt inn tiltak for å sikre at hygieniseringskravet USEPA Class A oppnås. I fax fra VEAS 20.04.98 side 2 står det angitt tørketid under forutsetning av at: "Lycing is not required to achieve USEPA class A sludge. Av fax fra DryVac 03.05.98 fremgår det at det må antas at at forsøk på å oppnå dette hygieniseringskravet ytterligere vil redusere kapasiteten i forhold "contractual capacity".

Med "contractual capacity" mener jeg 40.95 tonn tørrstoff med et tørrstoffinnhold på 90% pr. døgn og med en hygieniseringsgrad som tilfredstiller kravet USEPA Class A og med 10% av tiden til vedlikehold. Selv om det mangler et tall for tørrstoff i de 117 wt i "Invitation of Tender" datert 03.02.1997, fremgår det av DryVac's tilbudsbrief av 05.01.97, før offisiell anbudskonkurranse, at de er kjent med dette og i DryVac's markedsføringsmaterieill etter at kontrakt er inngått faxet til VEAS 26.08.1997, fremgår det samme, "It [VEAS] produces approximately 40 dry tons/day of solids from the treatment of municipal waste. I brev til oppmannen datert 14.08.98, etter at DryVac hadde trukket seg fra prøvingen, skriver de også: "DryVac has no problem accepting that the VEAS plant produces 39 dry tons / day."

DryVac hevder at de ikke har noen kapasitetskrav de skal oppfylle fordi de har reservert seg mot dette i et dokument betegnet "3/5/97 Attachment 1a Page 15" som er endel av kontrakten:

"The total dry rate guarantee is only based on 150 kg pr. cubic meter of plate volume assuming porous cake. The actual dry rate is expected to be 25% higher but this is not part of this guarantee. DryVac is taking exception to the 90% solids in a four hour dry rate. The calculated dry rates at the specified percent beginning solids is shown in section 7.42"

VEAS har hele tiden forstått dette utsagnet som en reservasjon når det gjelder de 25% ekstra tørkekapasitet.

VEAS er av den oppfatning at denne fortolkningen fra DryVac er et forsøk på rent lureri. En innfører et begrep porøs kake som en ikke definerer slik at det vil være umulig å etterprøve.

Tørkehastighetene det refereres til i 7.42 fremgår av enkel aritmetikk å være nettopp 1200 kg/h. Mange henvisninger ellers i kontrakten blir meningsløse hvis en skulle akseptere den fortolkning DryVac her legger til grunn. F.eks. i dokumentet:

"Adjustments to the document; Payment - Security and Warranty 2.0 7)": "the tonnage requirements".

I dokumentet "Payment - Security and Warranty 8)": "The surplus plates (for warranty spare parts and fourth press [if needed] shall be the security for the performance of the contract subsequent to acceptance of the three press installation. If a fourth press is required to achieve the tonnage specified, the contract.....".

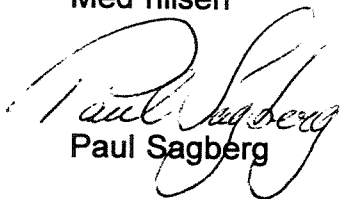
I dokumentet "Payment - Security and Warranty 9)": "If the contract performance specification is met with three presses, the surplus plates (120) for the fourth press will be returned at the end of the warranty period net of those required to meet the warranty and any plates that are added to the three press regime to meet performance..... VEAS and DryVac will agree to the dryness test methods to be used for the performance acceptance."

I dokumentet "Payment - Security and Warranty 11)": "If the contract specifications cannot be met within three months of December 5th 1997 after all three presses have been installed and tested, then VEAS will have the right to require the fourth press be converted. At the time the fourth press is required for performance,....."

Alle disse kontraktformuleringene blir helt meningsløse med den fortolkningen DryVac her fremkommer med.

Det denne sammenstillingen viser er at DryVac's utstyr bare har vist at det oppnår en liten brøkdelen av den kapasitet VEAS måtte kunne forvente med tre presser installert. Bildet forandres ikke vesentlig om også en fjerde presse skulle vært i drift. For at VEAS skal kunne oppfylle myndighetenes krav må utstyret straks fjernes slik at utstyr med tilstrekkelig kapasitet kan bli montert.

Med hilsen



Paul Sagberg

Bilagene for begge brevene er lagt kronologisk.



Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

Torbjørn Damhaug, NIVA

Bjerkås 17.08.1998

## **Vedr. oppmannsoppdraget i kontrakten mellom DryVac Environmental og VEAS.**

Det vises til din oppfordring til partene om skriftlig å gi deg en nærmere redegjørelse for våre oppfatninger. En rekke problemstillinger ble tatt opp før oppmannsprøvingen, mens oppmannsprøvingen pågikk og i brev fra DryVac dagen etter at de hadde trukket seg fra deltakelse i oppmannsprøvingen. Jeg vil kort gi mine kommentarer til i alle fall endel av disse.

1. Tonen mellom partene. I første møte med med partene og deres advokater, påpekte VEAS at tonen var mindre god som følge av skriftlig bruk av ord som: Malicious, oppressive, fraudulent, deceitful og reckless. Jeg registrerer at DryVac skriver at de følte seg behandlet som kriminelle. Dette virker oppkonstruert. Hvis de ønsket kunne de løpende tatt dette opp med oppmannen som et problem. Jeg kunne ikke registrere at noen av partene hadde problemer med kommunikasjonen med oppmannen. Begge parter viste respekt for oppmannen og fulgte de anvisninger som ble gitt så langt jeg kunne observere.

2. Duker. Jeg registrer at du som oppmann tok jeg den beslutning at DryVac fikk sette inn 10 nye duker ved inntakssiden av pressen før oppstart av uttestingen. VEAS hevdet at dette var å starte ny uttesting, ikke utprøving av levert utstyr. I tillegg var det å sette inn nye duker og ha 4 duker av en helt annen type i den andre enden av pressen i strid med DryVacs driftsinstruks for å forhindre differensetrykk. Strengt tatt burde testingen foregå med det utstyret som var montert på det tidspunktet DryVac erklærte at de hadde oppfylt kontrakten, men VEAS overlot til oppmannen å ta denne avgjørelsen.

3. Pucker og chims. DryVac ønsket før start å fore ut(chim) avstandsstykkene(pucks) de hadde montert i lommer i filterduken. VEAS påpekte at DryVac ikke har beskrevet hva kriteriet for å fore ut var og at VEAS derfor ikke selv kunne ha gjort dette og heller ikke hadde fått utstyr til å gjøre det. VEAS aksepterte at du som oppmann besluttet å la DryVac få justere avstandsstykkene som de ønsket. Prøvingen synes å vise at det ble satt inn alt for store avstandsstykker slik at platene ikke forsegle i ytterkant, filtratvannet sprutet ut under pressing og dette umuliggjorde en eventuell syrevask. VEAS vet fortsatt ikke kriteriene for å gjøre en slik justering og det synes ikke som om DryVac gjør det heller.



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4. Hjørnestykker. DryVac ønsket å montere hjørnestykker på noen plater. De hevdet at det ikke hadde vært tid til å montere disse før testingen i slutten av mars 1998. Som oppmann avgjorde du at dette måtte være å betrakte som oppstart av nye utprøvinger. Som det fremgår av vedlagte fax fra 06.03.1998 fikk DryVac tilbud om at avstandsstykkene kunne være på plass for de kom til testingen i slutten av mars 1998. De ønsket ikke dette.

5. Vask av pressene. VEAS tilbød DryVac å vaske pressene med den automatiske høytrykks dukvaskeren før pressing ble startet. DryVac hadde ikke bedt om dette, men aksepterte tilbudet. Vaskingen stoppet snart opp fordi platene tok opp for mye plass til at vaskemaskinen kunne operere. Vasken ble gjennomført ved at platene ble holdt i posisjon ved hjelp av stropper og jekketaljer.

6. Antall sykluser kjørt. DryVac hevder i brev etter at de har trukket seg fra utprøvingen at de ikke får opplyst hvor mange sykluser som hadde vært kjørt på pressene etter at de hadde forlatt VEAS i begynnelsen av april. Oppmannen har ikke tatt opp spørsmålet med meg, han ville umiddelbart ha fått svar.

7. Kondisjonering av slam. DryVac bad før prøvingen om at VEAS skulle legge om kondisjoneringen fra polymer/kalk til kalk/jernklorid. Å installere ny kjemikaliedosering og optimere denne er en kostbar og tidkrevende affære som ville kreve mange ukers arbeid og det er det ikke rom for under denne prøvingen. Som oppmann avviste du ønsket. Gjennomgang av all korrespondanse med DryVac viser at DryVac i januar 98, i "minute of meeting 12.01.1998" eksplisitt har bedt om at VEAS benyttet blandingen av kalk og polymer, og frem til DryVac forlot VEAS i begynnelsen av april ikke har bedt om noe annet.

8. Automatisk drift/støvsuger. Det har totalt sett vært kjørt få tester som har gjort det mulig å luke ut alle feil på et meget komplisert dataprogram som er skrevet for automatisk drift. I denne perioden er programmet vesentlig justert flere ganger i all hast under drift bl.a som følge av nye ønsker fra DryVac. Når det blir bedt om unormal og ikke forberedt drift er det relativt vanlig at det oppdages mindre feil som krever justering. At slikt oppstår ved bruk av en vaskemaskin som ikke har vært prøvet etter full ombygging av pressen er forventet. Det tok dessverre 30 min å finne feilen og rette den. Når utstyret ikke har fungert automatisk har det bare vært å fortsette driften ved manuell inngripen. VEAS har hatt en manuell støvsuger tilknyttet varmtvannsmanifolden for å kunne suge membranene inntil kjernen av platene når varmtvannet ikke var i manifolden. Som oppmann avgjorde du at DryVac fikk anmode om start av denne når de ønsket mot VEAS uttalte ønsker. Det fremgår ikke av noe av dokumentasjonen fra DryVac eller fra korrespondansen mellom partene frem til 12.04.1998 at DryVac har bedt om eller ønsket denne funksjonen. VEAS aksepterte din avgjørelse. VEAS har laget en full sammenstilling av all korrespondanse mellom partene som stilles til din disposisjon for etterprøving av dette spørsmålet og andre som er tatt opp.

9. De-ragging/siling. DryVac har etter at prøving ble avsluttet i begynnelsen av april 98, hevdet at VEAS må installere fillepeller/de-ragger på slamtilførselen for at utstyret deres skal kunne fungere. Det er ikke noen hjemmel for et slikt krav i



kontrakten. Kravet er heller ikke fremsatt før de erklærte at utstyret deres oppfylte kontraktens vilkår.

10. Pumpekapasitet. DryVac ba initielt om at det skulle pumpes slam med stor hastighet inn i pressen ved begynnelsen av syklusen. VEAS tilbød seg å kjøre en pumpe til i manuell i startfasen. Pumpen var koplet opp og krevet bare trykk på en bryter. De valgte å starte med 70-80 m<sup>3</sup>/h som spesifisert i driftsmanual. I fax fra DryVac 23.12.1998, som DryVac i møte 14.01.1998 lovet de skulle trekke tilbake, anklager de VEAS for å hindre dem i å kjøre med liten mengde i starten!!!

11. Syrevask. DryVac har i brev etter at de trakk seg ut av prøvingen hevdet at dukene trengte syrevask. Dette spørsmålet ble aldri tatt opp med VEAS eller oppmannen mens DryVac deltok ved prøvingen. Det er ikke nevnt muligheter for syrevask i anbudsforespørselen, er ikke nevnt i driftsinstruksen og har ikke vært tatt opp med VEAS i noe av korrespondansen mellom partene. Det er i kontrakten bare satt av 10% av driftstiden til vedlikehold på pressene. Dette vedlikeholdet må inkludere vask syrevask og annet mekanisk vedlikehold. Syrevask må i såfall skje svært sjelden. Jeg drøftet med deg, etter at brevet var lestmottatt og det var kjørt en syklus konvensjonell pressing om det skulle foretas syrevask. Min vurdering var at syrevask neppe ville la seg gjennomføre med de store lekkasjene som ble observert fra pressen under konvensjonell pressing. Saltsyren ville rent ut like fort som den ble dosert.

12. Spørsmål om sabotasje på en ventil. I følge DryVac lukket en manuell ventil seg under den første kjøringen. Denne ventilen står på et av de to øvre filtratvannsrørene. I følge Gregg Crocco, DryVac, oppdaget han dette når han tok seg en tur ut til pressen på slutten av syklusen. Like før hadde en representant for den leverandøren som har lagt opp rørsystemet gått over alle ventilene for å sjekke om de var åpne siden det rant så voldsomt fra pressen. Alle var åpne. Som oppmann underkjente du denne kjøringen. Du ble enig med partene om at pressen skulle tømmes neste dag og vaskes før ny prøving skulle starte. Fred Kogler, DryVac tilbød seg å komme neste morgen kl. 07.00 for å starte opp dette og jeg tok imot tilbudet og erklærte at jeg ville komme å jobbe sammen med ham.. Slammet, karakterisert som "slush" av DryVac skulle ikke ledes til slamsilo, men tømmes ut på gulvet bakveien og ledes til renseanleggets innløp. Hva Gregg Crocco i det hele tatt snakker om i denne forbindelse i brev til deg er helt ubegripelig. Til nedspyling av dette slammet fra bunker til gulv trenges det nødvendigvis store mengder vann, slammet skal ut gjennom veldig små hull i bakplaten. Partene erklærte at oppmannen ikke behøvde å være tilstede da det ikke skulle tas prøver eller foretas observasjoner. Det er et vesentlig avvik mellom dette og de påstander som fremsettes av DryVac etter at de har trukket seg fra prøvingen. Det er riktig at jeg gjorde en feil med en bryter da jeg sto sammen med DryVac og skulle åpne pressen. Jeg ventet ikke lenge nok før jeg avlastet trykket på sylindren slik at tilbakespylingsvannet sprutet ut. Alt skulle etter avtalen spyles vekk så dette er fullstendig irrelevant. Da du kom tilstede ca. 09.30 tok ikke DryVac's representanter opp med deg at de hadde noen innvendinger/ kommentarer.



13. Valg av duktype. Det synes å fremgå av DryVac's brev til deg at de dukene som er på pressen har bare 1/ 30 av gjennomstrømningshastigheten i forhold til de dukene VEAS ellers bruker. Dette sier de fører til at de lettere tetter og har vanskeligere for å vaskes. Av fax fra DryVac 27.01.1998, 03.02.1998, neste også 03.02.1998 og 02.03.1998 fremgår det at det er DryVac som ønsker å skifte duker til de svært fine 3-5cfm som er på presse 2 idag. Det fremgår ikke at disse dukene vil kreve ekstra vasking eller syrevask.

14. Inspeksjon av lagrede plater. Da en stor del av leveransen fra DryVac lå lagret i tunellen utenfor pressehallen og bestod av ubrukte plater med og uten varmtvannsrør og brukte plater delvis hele og delvis ødelagte ba du som oppmann om at DryVac ved Gregg Crocco foretok en vareopptelling med angivelse av tilstand. VEAS ble bedt om å stille med to håndtlangere for å løfte platene ned av stablene. Jeg ble mens jeg sammen med Fred Kogler og vasket platene på presse 2 informert av min formann på stedet, Jan Cederholm om at VEAS personell sto alene og vurderte platene. Jeg forlot raskt vaskingen av pressen og fant mine folk alene med plateinspeksjonen. Du hadde ennå ikke ankommet VEAS. Jeg fant DryVac's Gregg Crocco utenfor kontrollrommet og sa at dette var stikk i strid med avtalen om å stille to mann til rådighet bare som håndtlangere. Jeg løp deretter rett tilbake til vaskingen av pressene. Gregg Crocco gjenopptok sitt arbeid med de to operatørene fra VEAS. Jeg informerte deg om hendelsen straks du ankom uten å be om noe tiltak fra din side. DryVac tok ikke saken opp med meg eller deg. En dag etter at de har trukket seg fra prøvingen bruker de dette som argument. Jeg har ingen problemer med å beklage hendelsen dersom den skyldes språklige misforståelser mellom VEAS-operatørene og Gregg Crocco.

15. Testing av hygieniseringsgrad. Kontrakten stiller krav om at alt vakuomtørket slam skal tilfredstille en amerikansk standard USEPA ClassA. Dette er et vanskelig krav å oppnå. Det krever at det ikke finnes deler av slamkaken som ikke er hygienisert og derved vil kontaminere resten av slamproduksjonen. Jeg registrerte at du som oppmann var tilbakeholdende med å legge en slik testing inn i ditt program. Analysene er dyre og tidkrevende og hvis det er tvil om slammet er godt hygienisert vil det være fullstendig bortkastet å gjøre dette. Det er typisk et krav en først vil undersøke når alt annet er sjekket og funnet i orden og spesielle tiltak er iverksatt for å hindre kontaminering. Som det fremgår av mitt andre brev om kapasitet vil oppfyllelse av dette kravet kreve spesielle driftsstrategier som reduserer kapasiteten på utstyret.

16. Fremdriften med ombygging av presse 2. VEAS varslet DryVac i fax av 01.12.1997: "We are, as you understand, in a situation were cold pressing is not possible and further rebuilding of the press can not take place until the first press can give sludge of acceptable quality..... This gives us trouble as the sludge has to be hygienized to go to farmland after 31.12.1997. What is you suggestions to reduce these negative effects?" Deretter følger noen faxer som viser at DryVac prøvde ut diverse hypoteser på pressen på VEAS. Forsøkene mislyktes.



Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

I brev fra VEAS av 23.12.1998 ble DryVac varslet om at de ikke følger kontraktens fremdriftplan og at utstyret ikke oppfyller kontraktens krav. Fordi DryVac etter kontrakten også kan gjøres ansvarlig for følgeskader stilte VEAS følgende spørsmål til DryVac: "VEAS hereby asks DryVac what to do to reduce the increasing costs from Jan 1. 1998. Please instruct us, in writing, whether or not VEAS should start the design of alternative hygienization equipment in order, as soon as possible, to reduce the additional costs from January."

De følgende faxer fra 23.12.1998 viser at DryVac fullstendig bestemmer hva som skal gjøres med gjentatte justeringer, forandringer, ombygging av pressen til testpresse for 45 plater, hjørnestykker av forskjellige typer, forskjellige duktyper, bakduker osv. til de tilslutt i fax av 02.03.1998 varsler total ombygging med avstandsstykker i lommer i duker av en helt ny type, som er nesten tette i vevingen. Det fremgår av dokumentasjonen at en samlet plan for arbeidet som VEAS flere ganger etterlyste aldri kom. DryVac erklærte gang på gang at de nå hadde funnet løsningen på problemene. Jeg vil gjennomgå hele dokumentasjonen med deg idag, for denne perioden, og gi deg de kopier du ønsker. Jeg prøvde underveis så langt jeg kunne/evnet å bidra med forslag. VEAS måtte stadig gjøre endringer på sitt utstyr etter forslag fra DryVac. I tillegg ble firmaet Birger Boldvik på vegne av DryVac engasjert til å utføre arbeid på instruks fra DryVac for å redusere kostnadene i forhold til å sende folk fra USA. Timeprisen ble såvidt jeg husker avtalt mellom Jim Shewmaker som repr. for DryVac og innehaver av firmaet. DryVac avgjorde om det skulle brukes overtid eller ikke. Arbeidet er ikke ennå fakturert DryVac og de har derfor heller ikke betalt dette.

Med hilsen



Paul Sagberg

BY FAX 011 47 66 79 67 55

January 2, 1997

Mr. Paul Sarberg, Managing Director  
VEAS  
Vestfjorden Avleppselskap  
Bjerkasholmen 125, 3470  
Slernmestad, Norway

Dear Paul:

I hope you and your family have had a very merry Christmas. I want to thank you again for the hospitality everyone gave me. You really made me feel part of the family (only shorter) during my stay.

The attached report is a summary of the main items regarding the conversion of your three presses to DryVac. Detailed process flow diagrams for the energy systems will follow with copies to Oyvind. One of the ideas I'm considering is recompressing a portion of the vapors on each press using smaller and more easily available vacuum pumps. There are several manufacturers of 75 kW vacuum pumps with whom I am familiar; I am in the process of obtaining information on pricing and availability on several.

If you need further details to start the ball rolling or if you have any questions please feel free to fax or call.

Very truly yours,

  
Gregg Crocco



Revolutionizing Filter Press Technology

## VEAS WWT Plant Design for DryVac Retrofit

### Summary- Plant Visit Findings

Each press will hold 120 DryVac plates and will have an approximate capacity of 8 m<sup>3</sup>. Each press will run on a 6-hour total cycle for a total of 12 drops per day for all three presses. Each cycle will have a 3 to 4 hour drying period to target for a percent solids of above 90% and pathogen reduction meeting USEPA Class "A" biosolids.

The proposal is to retrofit the three existing R & B standard presses with 1,500 mm DryVac plates. DryVac will license VEAS to build the licensed heating and vacuum systems according to DryVac specifications. DryVac under the license agreement will assume no startup or warranty responsibility's, but will be available under a per day contract to assist, in everyway possible.

The expected dry rate for each press is 1,200 kg/hr during the dry cycle. In addition, approximately 25% of the total water removed during the drying period is from mechanical means and results in a high toc liquid stream. The dry rate is based on the plates being supplied with 82.2°C water at 68 liter/min. per plate and a vacuum of .066 bar.

Using the above dry rate and a basis of 117 wt tons/day (dewatered but undried) the biosolids trucked from the VEAS Plant should be reduced to 45.5 tons/day at 90% solids. This assumes the lime dose can be reduced to 25%.

Energy consumption is approximately equal to the dry rate. At the dry rate of 1,200 kg/hr for each press during the drying period, the heat load to the hot water system would be 790 Kw. Drying each load to completion (100%) represents an average of 1,550 Kw for all three presses on a 24-hour basis. The energy is supplied to the Dry Vac plates as 82.2°C water.

Oyvind Nilsen of Techno Consult is working on various energy designs to best utilize the available energy in the VEAS Plant along with several hear recovery methods. As a minimum, enough heat can be recovered to heat all of the ammonia stripper feed water to 40°C with a direct contact condensor on the press vapor lines.

### Plates

The DryVac plates will be the "HD municipal" style utilizing a top corner fee. Each plate will be 1,500 mm x 1,500 mm x 70 mm with a cake thickness of 38 mm. The plate

capacity will be .067 m<sup>3</sup>. The hot water inlet and outlet piping will be 25 mm and will be routed to the top of the plate to accommodate the existing cloth washer. The plates will also be built to accept the existing hangers and washer indexing bar. The plates are rated at 7 bar feed pressure and 2 bar hot water diaphragm pressure.

#### Cost

1,500 mm HD municipal style DryVac plate  
with hot water piping and top hanger brackets \$ 6,890.00/ea

Price is FOB Rio Vista, California.

The plates are guaranteed for one year,  
as per DryVac's standard warranty.

In lieu of an extended warranty, DryVac has agreed to allow DEAS to purchase any future replacement plates at the price of \$2,995.00. FOB Rio Vista, California. This arrangement will continue for a period not to exceed sixty months from the date of first start up.

No taxes have been shown nor included but will be charged where required, all taxes are the responsibility of the purchaser.

All freight is the responsibility of the customer, however DryVac will act as agent for the customer in the customers best interest and will not charge a fee or a markup to the cost. We estimate one 45' and one 20' container. It would be wise to figure two 45' containers.

This quotation is good for thirty (30) days from date of issue.

Terms are fifty percent (50%) with the purchase order, twenty five percent (25%) upon proof of shipment, fifteen percent (15%) thirty days after receipt, and ten percent fifteen days after acceptance.

All prices are in U.S. Dollars.

Very Truly Yours



Gregg A. Crocco, Executive Vice President  
DryVac Environmental, Inc.

DRY VAC ENVIRONMENTAL, 101 N. FRONT STREET, RIO VISTA, CA, 94571



FAX

Date: 26 Aug 97  
 Number of pages including cover sheet: 3

To: Hr. Paul Sagberg  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Phone: \_\_\_\_\_  
 Fax phone: 472 6679 6755

From: **JANICE COOPER**  
 \_\_\_\_\_  
 101 N. Front Street  
 \_\_\_\_\_  
 Rio Vista, Ca. 94571  
 \_\_\_\_\_  
 Phone: (707) 374-7500  
 Fax phone: (707) 374-7505

REMARKS:  Urgent  For your review  Reply ASAP  Please comment

mange tak for hjælpen!  
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*Revolutionizing Filter Press Technology*

**For Immediate Release**

**Contact: (800) 992-9113**

### **DryVac Ships Waste Water Treatment System to Norway**

August 26, 1997 -- DryVac Environmental of Rio Vista, CA, announces today that it is shipping its patent pending waste water treatment system to Oslo, Norway for use in Oslo's municipal waste water treatment system (VEAS). Dry Vac's revolutionary filter press technology will be added to VEAS's existing waste water treatment plant which serves Oslo (Norway's capital) and three surrounding communities. The plant is an 80 MGD plant with anaerobic digestion. It produces approximately 40 dry tons / day of biosolids from the treatment of municipal waste.

Dan Simpson, DryVac President, says, "We are very pleased to be completing this sale to VEAS. Oslo has one of the most advanced water treatment systems in the world; we are proud that our California-based equipment and technology will become part of that system. The successful completion of this order demonstrates DryVac's ability to manufacture very large systems and opens up many new markets for us." Gregg Crocco, Executive Vice President, added, "The VEAS plant is a recognized leader in sewage plant design and operation. Thousands of technical visitors tour the Oslo plant each year; they will soon be able to see DryVac equipment in operation."

DryVac's technology was selected among several competing technologies, including thermal hydrolysis. DryVac's filter presses will remove most of the water from the sludge, kill any pathogens, and produce a dry cake which can then be used for fertilizer. DryVac's bid was successful because it offered the right technology at an attractive price. Paul Sagberg, Director of the VEAS plant, says, "DryVac's filter press technology will help us meet our goals of hygienization of the waste product and quantity reduction. We are looking forward to reducing our costs and increasing our plant's efficiency."

(Continued)

09/20/87 10E 10.00 FAX 707/974120

## DryVac Ships/Page 2

DryVac is shipping 231 filter plates from Rio Vista today. Two additional shipments will take place in the coming weeks, with installation to begin in late September. VEAS is building the related heating and vacuum equipment to DryVac's engineered design and specifications. The new filter press system is scheduled to be fully operational before the end of the year.

DryVac Chief Financial Officer Jim Salisbury arranged financing for this transaction through the State Bank of India (California), based in San Jose, California. DryVac's portion of this plant retrofit is valued at \$3.0 million. State Bank of India (California) Assistant Vice President Vimal Bhutani says, "We are pleased to be involved in this transaction and look forward to participating in DryVac's continued growth and success."

For further information, contact Janice Cooper at (800) 992-9113.

###

12





Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

## TELEFAX

December 1. 1997

To: Dan Simpson and Gregg Crocco  
DryVac 001 707 374 7505

From: Paul Sagberg  
VEAS 011 47 66 796755

Dear Dan and Gregg

We have again rebuilt the carrier hooks and the plate hooks after consultations with both R&B and Lenser. The plates are, however, not yet straight so all hooks do not connect properly. We think that the system will work without further adjustments if the plates straighten as you have said they will after a few cycles as drier press. Time will show. The washmachine can now wash half the stack before it stops.

We have made a very good sludge as a combination of lime, seawater and polymer conditioning. The polymer is added flowproportional to the combined flow to all presses on the pipe leaving the conditioning tank.

Our existing membrane filter press from R&B, press no 4, with a volume of 7.7 m<sup>3</sup> works very well as attached diagram shows. 68 m<sup>3</sup> was fed to the press in 81 minutes with a flow of 26 m<sup>3</sup>/h at the end at 6.2 bar. This press is being fed by an eccentre screw pump with a max pressure of 8 bars.

Press no 1 is beeing fed with the same sludge with a ball membrane pump working up to 15 bars. Steel plates, press volume 9.2 m<sup>3</sup>, and cycle time 140 min give acceptable results.

Press no 2 with DryVac plates has been fed the same sludge at the same time. See attached diagram with the same scale on both x and y axis. After only 53 m<sup>3</sup> the pumped stopped caused by overheating at a flow of 14 m<sup>3</sup>/h and 7 bars. Some cakes were thick some cakes were thin, some with liquid in the centre of the cake.

On releaving the closing pressure on the press, the plate stack expanded so much that the plates tilted, but the shifter worked. The quality of the cakes was unacceptable and they did only partially drop from the press. Why your press works so much poorer than the R&B press, even with its somewhat larger volume,



Vestfjorden  
Avløpsselskap  
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OSLOFJORD

is difficult for us to understand. We are, as you understand, in a situation where cold pressing is not possible and further rebuilding of the presses can not take place until the first press can give sludge of acceptable quality. The vacuum and drying system follows the time schedule, so we hope to have it in operation, for the first press, by Dec. 15., two weeks ahead of contractual date, if we are lucky. But the total project is delayed. This gives us trouble as the sludge has to be hygienized to go to farmland after 31.12.1997.

What are your suggestions to reduce these negative effects?

With regards

  
Paul Sagberg

*Attached two curves*

# Historikvy

PR2\_FT02  
PR2\_PT02

MÅLING  
MÅLING



000

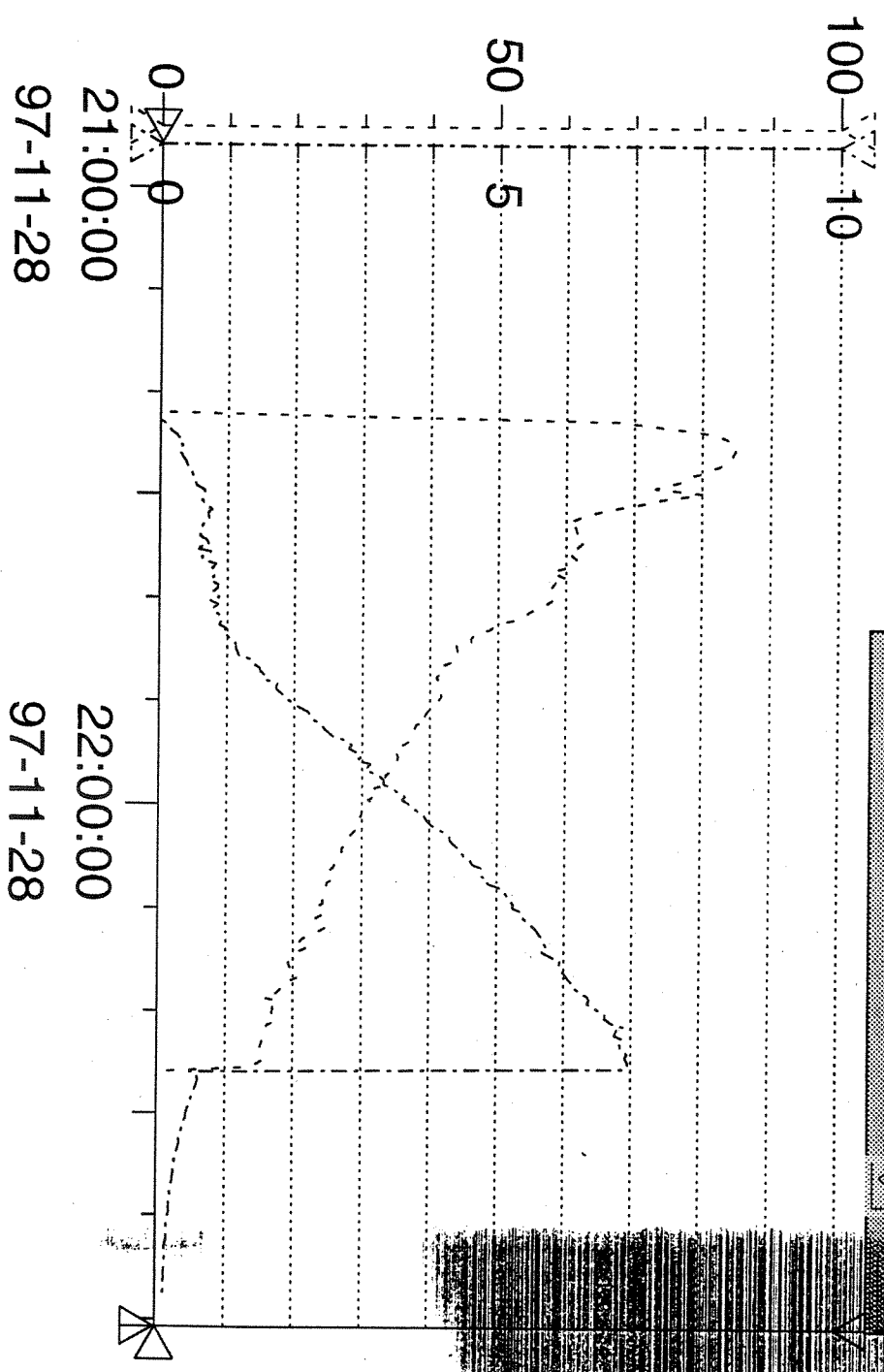
1997-11-28-22:50:40

0.0 m3/h

0.1 bar

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\*\*\*\*\*



21:00:00  
97-11-28

22:00:00  
97-11-28



# Historikvy

- PR4\_FT01 MÅLING
- PR4\_FT02 MÅLING
- PR4\_PT03 MÅLING



414 PRESSE 4 FT/PT



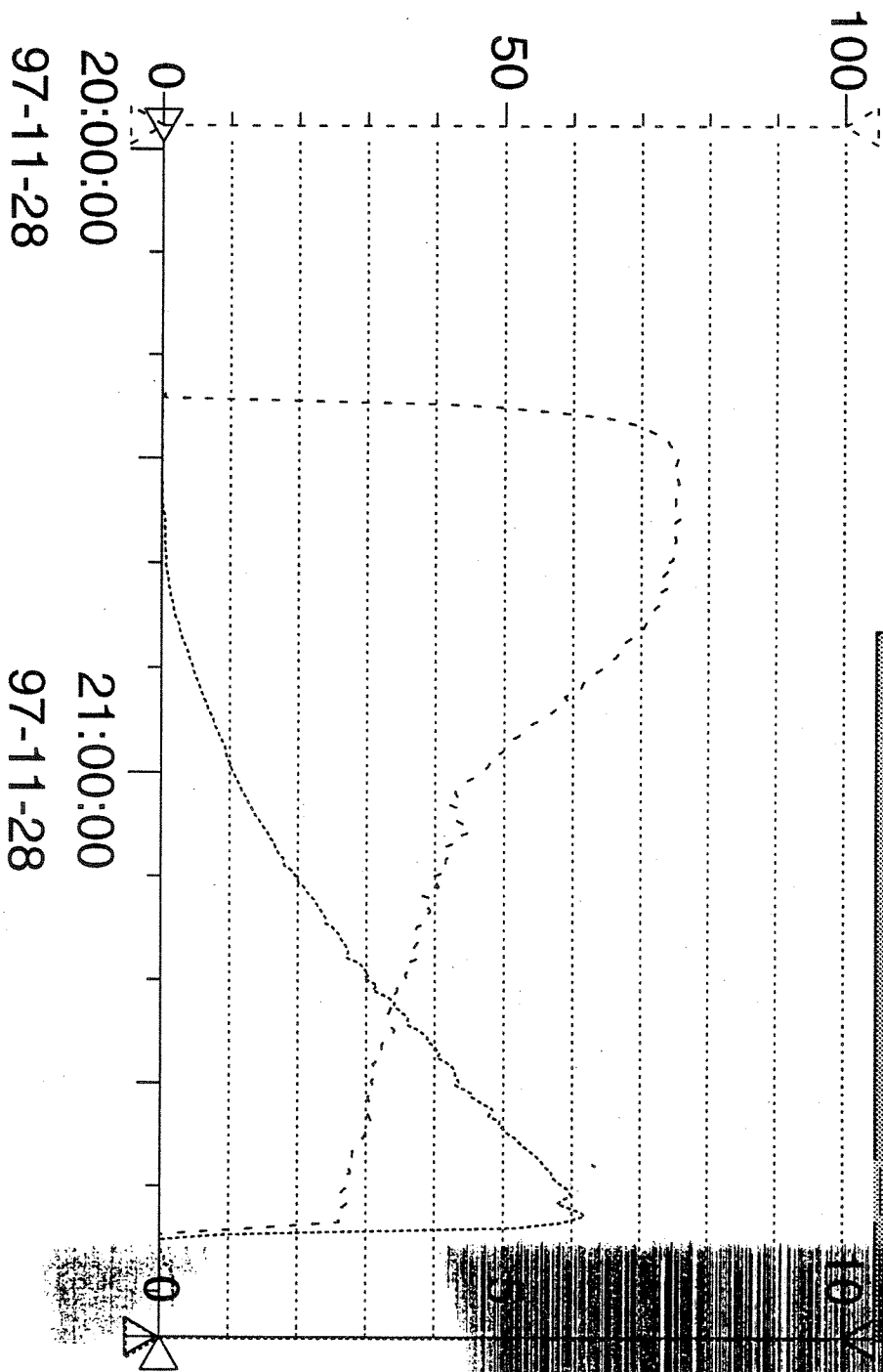
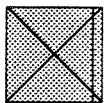
1997-11-28-21:54:19

0.0 m3/h

\*\*\*\*\*

0.2 bar

\*\*\*\*\*



20:00:00  
97-11-28

21:00:00  
97-11-28



101 North Front St., Rio Vista, CA 94571  
Phone: 707-374-7500 / Fax: 707-374-7505

**DryVac™  
Environmental**

# Fax

**To:** Paul Sagberg -VEAS                      **From:** Dennis Bentley

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**Fax:** 011-47-66-796755                      **Pages:** 1, inc cover

---

**Phone:** 011-47-66-798660                      **Date:** December 1, 1997

---

**Re:** Response to Fax, dated 01/12/97                      **CC:** Dan Simpson

---

**Urgent**     **For Review**     **Please Comment**     **Please Reply**     **Please Recycle**

• **Comments:**

Paul,

The fax raises many questions in regards to the operation of the press but several initial questions need to be answered to recommend the proper course of action. Please provide the following information as quickly as possible:

1. Where in the stack did the thin cakes exist? The feed end or the hydraulic end?
2. How many chambers had thin cakes?
3. Which cakes had liquid in the center of the cake? The thin or thick cakes?
4. Why do you say that "the quality of the cakes was unacceptable...?"
5. Why did the cakes "only partially drop from the press?"
6. Why did the pump stop on overheating? Is this normal that the pump would stop under the stated conditions?



Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

## TELEFAX

December 2. 1997

To: Dan Simpson and Gregg Crocco  
DryVac 001 707 374 7505

From: Paul Sagberg  
VEAS 011 47 66 796755

**Dear Dan and Gregg**

I have received a fax from Dennis Bentley and had a telephone talk with Gregg today.

Here are the short answers to the questions raised by Mr. Bentley:

To 1. The thin cakes were all over the press. Some plates were thin all over, some only thin in part of the cake. Mainly, but not allways thick at the bottom and thin at the top.

To 2. At least half of the cakes were thin partly or totally.

To 3. The thick cakes had liquid centers!!!!

To 4. Because sludge was splashing everywhere. Put the two curves you received on top of each other and look for yourself.

To 5. Who knows? I guess the cakes didn't drop because the force of gravity was less than the adherence to the cloth. With partial dropping this was the situation for only part of the cake. The adherence is probably higher when and where the cake is wet.

To 6. For this pump, this is normal under this pressure and flow.

After helping the stuck cakes to fall the total weight of sludge was only 7.2 tonns and should at 25% DS been 9.0 tonns if the volume of the press is 8m<sup>3</sup> as you have said earlier.

With regards

  
Paul Sagberg



Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

## TELEFAX

December 3. 1997

To: Dan Simpson and Gregg Crocco  
DryVac 001 707 374 7505

From: Paul Sagberg  
VEAS 011 47 66 796755

**Dear Dan and Gregg**

A short feedback to the telephone conversation with Gregg yesterday.

I checked the perforated plastic pieces riveted to the filter cloth around the filtrate outlet holes on plate no 40 from the piston side. After only two pressing cycles, the plastic has broken into pieces and is lost from all 6 corners. Only very small pieces remain. No doubt filter cloth is pressed by the sludge into fully or partial closing of the filtrate holes. What will you do with this? Testing of vacuum drying is scheduled to start Dec. 15. I see no reason to go ahead with this before the filling problems are solved.

We have under installation a new pump to run lower flows at higher pressure. This should have been unnecessary as we see from the performance of press no 4. Even 4 presses could not give the necessary capacity as press no 2 works today. As stated in the contract, more than one press can not be out of operation at a time and further rebuilding is awaiting solutions of the encountered problems.

We have now loosened all the caps on the hot water pipe on one side of the press. Thursday we will run another cold cycle to see how the cake thickness is influenced by this change. I have hard to understand how a thin cake with nob pattern on both sides could be produced unless the cold thick membrane is so stiff and deformed that it creates a smaller volume than anticipated, but could this also be true at a feeding pressure of 6 bar? If the membrane snaps back at a higher pressure this would also give very uneven cake dryness. This could explain the partial breaking of the cakes.

With regards

  
Paul Sagberg

I miss a written feedback from Dan on contractual matters.



Vestfjorden  
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RENERE  
OSLOFJORD

## TELEFAX

December 6. 1997

To: Dan Simpson and Gregg Crocco  
DryVac 001 707 374 7505

From: Paul Sagberg  
VEAS 011 47 66 796755

**Dear Dan and Gregg**

Thank you for your fax, even though I am still missing some feedback on contractual matters. They should however have priority after solving the current technical problems.

I have used some time today studying the problem after a night's sleep over it.

You suggest it is the gasket or the seem? creating the problem. I do not quite agree. Actually when you have the seem located on top of two knobs, as I have shown on the drawing, the seem itself is stiff enough to prevent the cloth from coming into the filtrate tunnel. From the impression marks on the cloth, where I have studied it, it is the filter cloth itself that stretches into the filtrate channel. With a sludge pressure of 7 bar, it should not come as a surprise, that the cake will press the cloth into this channel, making a good plug. In addition the edge around the filtrate channel is standing up a little bit, actually functioning as a gasket to prevent water flowing underneath the cloth from the side. The problem of course increases with the feeding pressure.

Could small cuts in the plastic, in the positions I have marked with an arrow, help?

I forgot one factor to consider when choosing the right material. It should in addition to hydrochloric acid, slaked lime, hot water, 8 bar pressure and vacuum tolerate ammonia.

I mentioned a possibility to use a spring material. Springs can be made of a lot of materials and tapered in one end. They could be easy to mount with simple tools. If they have a diameter slightly larger than the filtrate tube, on stretching they can slide in and on relieving the stretch they fix themselves in the pipe. The end should be carefully made so it does not harm the cloth.

With regards

  
Paul Sagberg





Revolutionizing Drying Technology

*Sent on 12:4:97 @ 3:30 AM*  
*ReSent 12:5:97 @ 9:05 AM*

12-4-97  
Fax : Mr. Paul Sagberg

From: Dan Simpson, President  
DryVac Environmental, Inc.

Dear Paul,

Your fax gives me great concern. Cake thickness dictates cycle time. We have designed your plate to fit your current volume need as closely as is possible under the given circumstance of the existing frame sizes. It is thicker, to give you the performance desired under the DryVac diaphragm drying mode. It was never meant to be optimal for standard filter plates. We can however certainly improve its current performance.

It is also possible and it does appear that the gasket design is potentially causing a problem by blocking the drain holes. If this is the case I'm sure that the simple installation of vacuum tubes will solve that problem. We have not used this gasket design on this type of plate yet as it was designed for your plant at your request. The design is good, but it may require breather tubes or some other mechanism to allow for drainage. We have adapted the sewn in gasket on other plate sizes and in the last several days installed breather tubes on them with good results, we see improved performance.

We are trying several designs along with one we have used for improved vacuum disbursement before. As soon as we have the best design decided, we will build them and have someone on a plane in the next two days.

I am in the plant working on this problem now and will have a decision today.

Best Regards,

Dan Simpson



Revolutionizing Drying Technology

12-7-97

Mr. Paul Sagberg  
VEAS

SETT	VEAS	SETT
556	- 8 DEC. 1997	
	MAPPE 51.400	PS KLB

Dear Paul,

I have not sent any additional comments on the contract because it seems that it will serve no purpose at this time. We have instead been spending all possible time working on ways to improve the flow area for the 1500mm plates.

We have designed several fix's for the problem and put them into production today. We will try to have Jim on a plane by Wednesday 12-10-97. We tend to agree with your line of thinking and have several items that will do what is needed. We will start on a mold tomorrow that should be a good addition, it will plug right into the drain holes and be a very good fix. Only time and testing will tell. I'm not entirely shocked that we have found a new problem with a new design and a bigger plate. We all knew this plate had not been run before, and the most important thing should be that you have a supplier who is capable of solving the problems as they appear. I know you most know how important the success of this job is to Gregg and I along with fifty other employees who's Christmas and futures depend on DryVac going forward.

We know how to fix the problem, and we are doing everything that can be done at this time.

Best Regards,

Dan Simpson

12/12-97

DRY VAC ENVIRONMENTAL, 101 N. FRONT STREET, RIO VISTA, CA, 94571



# FAX

Date: \_\_\_\_\_

Number of pages including cover sheet: \_\_\_\_\_

To: Paul Sagberg

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Phone: \_\_\_\_\_

Fax phone: \_\_\_\_\_

From: **GREGG CROCCO**

\_\_\_\_\_

101 N. Front Street

\_\_\_\_\_

Rio Vista, Ca. 94571

\_\_\_\_\_

Phone: (707) 374-7500

\_\_\_\_\_

Fax phone: (707) 374-7505

\_\_\_\_\_

REMARKS:  Urgent  For your review  Reply ASAP  Please comment

Paul - I'm sorry about the delay. Every day since Monday the nylon tee's were going to arrive that day. We are working a crew tonight & Saturday to get them ready by Sunday. Attached is our flight schedule. Jim & I will be prepared to work through the night Monday after we arrive that afternoon.

*Gregg*



# Rio Vista Travel

8 No. Front Street - Rio Vista, California 94571 (707) 374-5797

SALES PERSON: 50 ITINERARY/INVOICE NO. 0013899  
GWPEWP

DATE: 12 DEC 97  
PAGE: 01

TO: RIO VISTA TRAVEL  
8 N FRONT ST  
RIO VISTA, CA, 94571

THANK YOU FOR FAVORING US  
WITH YOUR TRAVEL BUSINESS.  
WE MUST PAY THE AIRLINES  
EACH WEEK FOR ALL TICKETS  
ISSUED. WE WILL APPRECIATE  
RECEIVING PAYMENT FOR YOUR  
TICKETS PROMPTLY.  
PLEASE REMIT FROM THIS INVOICE.

FOR: CROCCO/GREGG  
SHEWMAKER/JAMES

14 DEC 97 - SUNDAY  
AIR UNITED AIRLINES FLT: 960 ECONOMY LUNCH  
LV SAN FRANCISCO 200P EQP: BOEING 767 300  
DEPART: INTERNATIONAL TERMINAL

5 DEC 97 - MONDAY  
AR PARIS DE GAULLE 1000A NON-STOP  
ARRIVE: AEROGARE 1  
AIR SCANDINAVIAN SAS FLT: 562 ECONOMY COLD MEAL  
LV PARIS DE GAULLE 1140A EQP: MD-80  
DEPART: AEROGARE 1  
AR OSLO FORNEBU 150P NON-STOP

21 DEC 97 - SUNDAY  
AIR SCANDINAVIAN SAS FLT: 1513 ECONOMY COLD MEAL  
LV OSLO FORNEBU 1125A EQP: MD-80  
AR LONDON HEATHROW 1245P NON-STOP  
ARRIVE: TERMINAL 3  
AIR SCANDINAVIAN SAS FLT: 3917 ECONOMY SNACK/BRUNCH  
LONDON HEATHROW-SAN FRANCISCO OPERATED BY UNITED AIRLINES  
LV LONDON HEATHROW 225P EQP: BOEING 777  
DEPART: TERMINAL 3  
AR SAN FRANCISCO 520P NON-STOP  
ARRIVE: INTERNATIONAL TERMINAL  
CROCCO/GREGG SEAT-40C  
SHEWMAKER/JAMES SEAT-40D

AIR TICKET	UA8609082114	CROCCO GREGG	
		BILLED TO MC5282097390922866	1,735.20*
IR TICKET	UA8609082115	SHEWMAKER JAMES	
		BILLED TO MC5282097390922866	1,735.20*
		SUB TOTAL	3,470.40
		NET CC BILLING	3,470.40*
		TOTAL AMOUNT DUE	0.00

CONTINUED ON PAGE 2

FILE COPY



Vestfjorden  
Avløpselskap  
RENERE  
OSLOFJORD

## TELEFAX

TELEFAX NR: 66 796755

TELEFON NR: 66 798660

TIL: DRYVAC	FRA: PAUL SAGBERG
FAX NR: 0017073747505	DATO: 27/2-1997
ATT: DAN SIMPSON	ANT. SIDER INKL.DENNE: /
VEDRØRENDE: Vacuum on filtrate water line.	<input type="checkbox"/> Som avtalt <input type="checkbox"/> For godkjenning <input type="checkbox"/> For uttalelse <input type="checkbox"/> For informasjon
ANNEN INFORMASJON: We have discussed your suggestion to apply vacuum to the filtrate water line. The dimensions of the filtrate water pipes are 10" so we will not be able to keep a hanging water string in the system even if it is connected to the bottom of the filtrate water tank. We have to remove the <del>water</del> air from the pipeline by a separate ejector system. We are ordering this system now for installation in the beginning of January. Please give written instructions that this is what you want and that it will not increase the problems with differential pressure. Med hilsen, With regards Paul.	



*Revolutionizing Filter Press Technology*

12-22-97

Fax to Veas,  
Mr. Paul Sagberg

From Dan Simpson

Regarding your fax of today the 22second of December, our discussion on pumping the filtrate was just a suggestion of various things that might assist in a difficult filtration situation.

I was not suggesting that you do a project. In most applications it is relatively easy to insert a pump on the filtrate line to test this assumption. It is obviously not that simple in your case. DryVac is not asking you to add any extra equipment.

Gregg has asked that we give you a time table and list of things that we intend to do. We have spent most of today debriefing both Jim and Gregg. Something's appear to be obvious, such as the cloth and gasket problem, but we need to do some testing to even be sure about that. It is a relative certainty that we are dealing with a pressure differential problem, but even that can be misleading when we were not present during most of the runs on this group of plates. We are working to develop a method to test for these and any other potential problems. We will have more to report tomorrow.



Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

UTBYGGING 1991 - 1996

DryVac Environmental Inc.  
101 North Front Street  
Rio Vista, California 94571  
USA

*Att.: Mr. Daniel Simpson*

Deres ref. Your ref.

Vår ref. Our ref.

Dato Date

Des. 23.rd.1997

## Conversion of Filter Presses to Vacuum Filterpress Driers - Present situation

Dear Dan, it is with regret that VEAS ascertains that DryVac has not replied regarding a detailed plan with a timeschedule what you intend to do to solve the problem with the non working system delivered by DryVac. In the meeting on Friday, 19. th. Gregg Crocco promised to send us from US, Monday, a detailed plan telling us what you intended to do to solve the problems ahead of our project meeting at VEAS today.

VEAS regrets to remind you that DryVac has not been able to deliver the equipment stated in the contract in due time, according to the timeschedule in the contract.

VEAS regrets to remind you that DryVac have not, yet been able to deliver equipment to satisfy the contract.

From the first of January 1998 VEAS is, by Norwegian law, obliged to hygienize the sludge before delivering it at farmland, otherwise the sludge must be delivered at a deposit plant and deposit fee has to be paid for.

Accordingly the lack of working equipment with the lack of sludgedrying, maintains VEAS transport costs at a high cost. VEAS had estimated that the cost of transport of sludge would be reduced from January 1998.

VEAS hereby asks DryVac what to do to reduce the increasing costs from January 1. 1998. Please, instruct us, in writing, whether or not VEAS should start the design of alternative hygienization equipment in order, as soon as possible, to reduce the additional costs from January.

VEAS asks DryVac to fulfill the spoken promisses regarding a detailed activity list related to a time schedule telling VEAS what and how DryVac intends to solve the problems with the non working delivered equipment.

VEAS asks DryVac to instruct VEAS, in writing, if you want VEAS to do any additional works on the press/presses, such as removing destroyed plates. If so, VEAS must run

another cycle to state which of the plates are broken. Only 6 cycle altogether have been run on the press.

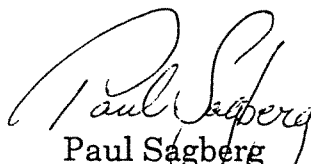
VEAS wants an answer whether or not DryVac intends to deliver other types of filter cloths, and/or back cloths. With the time needed, as said by Gregg Crocco in our meeting, VEAS is of the opinion that new cloths and backcloth should be delivered and tested within January 15. th. 1998. Please, tell us.

VEAS also want to see DryVac`s alternatives if other cloths does not solve the problems. VEAS is of the opinion that the problems regarding the delivered equipments should be solved within January 1998.

VEAS feels sorry about this situation, but we feel that we have been trying and doing all we can to solve the problems.

In spite all this we wish you all a Merry Christmas and, hopefully a Good New Year.

Best regards **VEAS**

  
Paul Sagberg  
Managing Director

  
Rune Vogt  
Project Manager





*Revolutionizing Drying Technology*

*McHatt*

*24/12*

*57.400*

12-23-97

Fax transmission to : Mr. Rune Vogt and Mr. Paul Sagberg.

Dear Paul,

It is difficult to not send this fax in anger, it sometimes appears to us that you do not wish this project to succeed. We get the feeling that you wish to put road blocks up. I certainly hope I am mistaken. However faxes like the one of this morning tend to make us feel that way. I have been reluctant to speak fearing that we would get even less co-operation. I could have given you a calendar schedule, but it could not be accurate. It is the holidays and many people are not at work. The factory that makes the cloth that we would choose for your application is shut down and can get us a rush order by the first of February, then we can work day and night to get your clothes made and get them to you around the first week in march. Is this what you want us to report to you or would you like us to get on the phone around the world until we find something that will work and report back to you that we can be there in a reasonable time. We have provided you with the cloth you have specified, there was certainly no way for you or us to know it could create the current problem, or contribute to it. You seem to want to provide a message to some one that we are not doing our part to respond to this problem. You know that is not true, we have been working very hard to make the DryVac plates do what you wish them to do. However the reason that you chose our technology in the first place was because of its DryVac Capabilities, not its ability to imitate the old inferior technology that you wish to replace. You chose a very ambitious schedule that we both had to live to and this schedule assumed no problems in your areas of responsibility or in DryVac's. The current problem is a simple differential pressure problem caused by the nylon screen and gasket combination, and or the polymer sludge blinding the plates. This can be fixed by several methods. We are doing long hours to determine the best options. When we have chosen the methods and materials for the new screens we will give you a schedule that you can depend on. My best estimate at this time would be to shoot for the 5<sup>th</sup> of January 1998. Assuming that we can all agree on the major issues.

What have we been doing?? We have designed a corner adapter plate, that will allow for much better out flow of filtrate. Although at this point I don't believe it is the plate drainage that is at fault, we have tested drainage and it exceeds any potential flow requirement. We first built a prototype mold for the corner drain advancement and have today finished a ten part production mold. We are testing the first units now and will have enough to retrofit the first press in about ten days.

We did pressure differential failure testing today and we are very pleased because we had great success with the first crack occurring around the sixteen to eighteen psi point. Most plastic diaphragm plates are damaged at around ten psi. We feel we have a method to



*Revolutionizing Drying Technology*

more than triple that pressure number on future plates. The current plate design certainly appears to be more than adequate for the service it is in. It would appear that there was a catastrophic failure caused by some operation we are not yet aware of, during your functional testing of all the filterpresses for the change over to the new polymer, you experienced difficult operation in your existing units, you instructed us to wait and suggested that we not allow another bad load of sludge to be pumped into our unit. Is it not possible that a bad load could have blinded the plate causing differential pressure? We have had many conversations discussing why we do not recommend the normal use of polymers with bio sludge's. It does now appear that you have your polymer chemistry under control and it should benefit the DryVac unit. However we now need to back up and determine the perimeters that the unit can be run under. This was not done while Gregg was their last week due to the damage that had been done previously. The damage to the plates was done by a pressure differential, caused by either a blinding problem or filtrate drain blockage, feed rate problem and or a combination of all of these. We are not aware of any plastic membrane plate manufacture who does not void there warranty when pressure differential is present. Our plates are covered under our warranty.

Now with the change in screen design we can begin again with a most certain success. We will need to start fresh with new plates and the protocol for testing that we commonly use at most start ups that we supervise. We are also developing methods to measure pressure differential during operation to assist you in determining your operational conditions. We would like to be able to run with a short stack and that will require a blanking plate. One of your cast iron half plates could possibly be used. We will have at least three screen options to try. One will be the nylon without the sewn gasket. This nylon screen will have a method for tightening, when needed to stop the creep problem. We are confident that we can put the press into DryVac mode of operation with very little or no problems after we modify or replace the current screens.

DryVac has delivered in a timely manner, to the contract and the intent of what you asked and agreed to. DryVac feels that it is being asked to meet the performance of a moving target. This is reflected in things such as time lost during plate shifter problems that were not caused or effected by DryVac but seem to be taken out of our time to perform. DryVac's contract calls for being able to meet a vacuum test, however when VEAS was unable to provide Vacuum, proper payment timing was simply ignored. Now that the unit has passed its vacuum test, payment has still been ignored.

DryVac would certainly be disappointed if VEAS elected to not startup the DryVac units and went to alternative technology. This would be especially shortsighted as VEAS has not given DryVac a fair startup opportunity. Also during your meeting with Gregg you resisted any form of testing at less than full rate of feed. You can't start a new unit out at full blast and not expect to have potential problems.



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It appears to DryVac that if you were truly worried about the cost of disposal, you would be doing all you possibly could to co-operate with getting the units on line. During your last meeting with Gregg Crocco, you refused to listen to any suggestion that he offered to try and move this project forward. That is our interpretation of your saying No, No.

We feel that we are living to the contract and the agreements. From our point of view, you have not followed the contract payment schedule's starting with a timely deposits of the down payment. Then our being forced to provide a standby letter of credit. Then not making the current payments. We would appreciate this matter being cleaned up. We need to come to some agreement that will leave you comfortable and satisfy our payment requirements.

We look forward to discussing and working out a solution to all matters and the day that we will all be able to celebrate your successful DryVac startup.

Very Truly Yours

*[Signature]*  
Daniel J. Simpson, President  
DryVac Environmental, Inc.

*PS. I have included two pages from the SIMCO Tech Book.*

ENVIROTECH MOLDED PRODUCTS



## OPERATING GUIDE FOR RECESS FILTER PLATES

### D. GENERAL INFORMATION, Continued

7. When using two or three way valves or spigots, they should not be turned so the discharge port is completely closed to any filtrate drainage. Filtrate should either be allowed to discharge internally through the eye or externally through the valve or spigot.
8. When using thermoplastic recess plates, a pressure compensated closing device is required to keep a constant closing force on the plate stack. Do not mechanically lock plates into position after closing, plates can be damaged by thermal expansion.
9. When using recess plates ported for a washing/air blow application, make sure the pressure and wash plates are in the correct position (do not put two wash or pressure plates adjacent to each other), plate damage can occur due to unbalanced pressures and poor wash performance will result.
10. Refer to the Pressure-Temperature Guide for minimum recommended closing force for thermoplastic filter plates.
11. Gradual increase of closing force is not required when using thermoplastic plates.
- 12. Unbalanced pressures which can occur during the operation of the filter press can cause damage to the recess plates and should be avoided. Adherence to the following items will help prevent unbalanced pressures from forming in the plate stack.
  - a. Filter cloth should be regularly maintained.
  - b. Cloths should fit well, sagging or stretching of cloth can block eyes and cause wrinkles in the sealing area which can result in unbalanced pressures.
  - c. Filter cloths should not be scraped or cleaned with sharp or pointed instruments.
  - d. Only one style of cloth should be used in the same plate stack.
  - e. Do not mix new or used cloth in the same stack of plates. Filter cloths should all be cleaned or replaced at the same time to reduce the problem of having different permeability rates in the press and to assure proper cake formation.
  - f. Make sure that cloth permeability is the same for all filter cloths in the stack. When individual cloths become more blinded than the others in the plate stack, the cloths should be cleaned or replaced.

ISSUED 2/7/92REPLACES 5/24/89SHT 4 OF 5

ENVIROTECH

MOLDED PRODUCTS

OPERATING GUIDE FOR  
RECESS FILTER PLATES

## D. GENERAL INFORMATION, Continued

- g. Cloths with holes should be replaced immediately.
- h. High feed velocities should be avoided. Where fast filling of the plate stack is required, feed velocities should be increased gradually. Contact Envirotech Molded Products Company for recommendations.
- i. The filtration cycle should not be interrupted and started again.
- j. Pressure spikes and vibrations in the feed line must be avoided.
- k. Slurry must be consistent and homogeneous throughout the cycle. Slurries that are stored in tanks should be agitated.
- l. To achieve optimum cake formation, moisture reduction and cake discharge, all chambers should be filled prior to discharging cake. Wet or sloppy cake is an indication that proper filling is not taking place and this can lead to unbalanced pressures and possible plate damage. (To assure proper filling of the plate stack, it is recommended that the lower discharge eyes be closed off until the press is full of slurry and the filtrate begins to run out of the top two discharge eyes. The bottom eyes can then be opened for the balance of the filtration cycle.)

ISSUED 2/7/92REPLACES 5/24/89SHT 5 OF 5

SETT	VEAS	SETT
535	30 DES. 1997	
12-29-97	MAPPE 51,400	25 SV

✓ Rune Vogt  
 ✓ cc. Paul Sagberg

DryVac still believes the problem with the dewatering is the cloth selection. We are prepared to arrive in Oslo on January 5. Our goal is to help determine the cause of the differential pressure. We will want to run thirty plates with a different selection of both cloth and backing screens. As Dan said in his previous FAX we have tested the plates for differential pressure and the results were even higher than the design of .7 bar. We will have the ability to measure the internal pressure vs feed rate.

In order to help resolve this cloth problem DryVac is requesting the following assistance .

1. Remove 30 plates from the press.
2. Install a Blanking plate so that a test can be run with only 30 plates. This plate can be one of your cast iron end plates turned around. If this can not be done please let us know.
3. Have the assistance of a minimum of 2 people to help DryVac recloth , install drainage pieces, and remount plates.
4. Supply the caps to blank off the remaining 90 plates so that a dry test can be preformed. If you no longer have the caps please let us know.

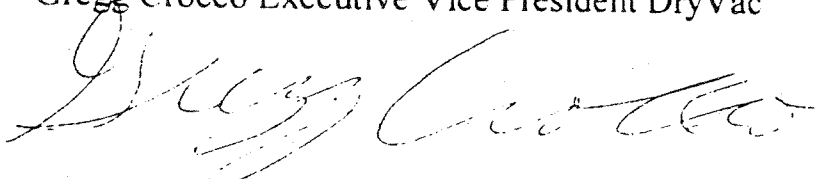
Please check if the feed pump has a turn down ratio to properly test 30 plates. Please advise what the lower limit of the feed pump is. The start feed rate will be about 15 -20 cubic meters/hr. DryVac is limited by our stock in hand of filter cloth to do the complete stack. We are trying to work in a critical path and not delay the project with indecision.

Once the start- up science is complete and a solution to the cloth problem is resolved, DryVac can implement the solution to the remaining stack.

DryVac would also like to show VEAS the known drying capabilities of the plates. We would hope the vacuum problems could be resolved by then.

We will FAX you our exact travel schedules. If any of the above is not acceptable please let us know.

Gregg Crocco Executive Vice President DryVac



SETT	VEAS	SETT
585	30 DEC. 1997	PS
12-29-97	MAPPE 51,400	PS RV

✓ Rune Vogt  
 ✓ cc. Paul Sagberg

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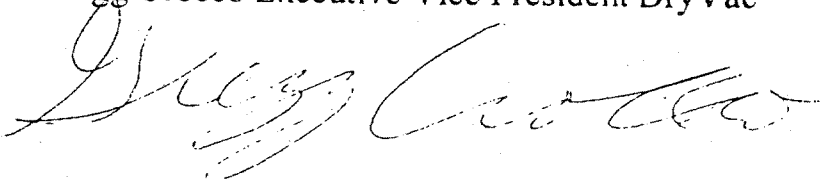
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Gregg Crocco Executive Vice President DryVac





Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

## TELEFAX

December 30. 1997

To: Dan Simpson and Gregg Crocco  
DryVac 001 707 374 7505

From: Paul Sagberg  
VEAS 011 47 66 796755

51.400-536.97

**Dear Dan Simpson and Gregg Crocco**

I returned to work today after a flu during the Christmas week and found two faxes, one from Dan and one from Gregg.


As my immediate comment to the first, I would say that it does not promote business. I urge you to read through the call for tender and the following correspondance once more. I will leave the rest of correspondance concerning contractual matters to my project organisation.

Concerning requests from Gregg:

We have requested 3 people from Birger Boldvik to assist with your tests. Monday morning they will start removing 30 plates and install a cast iron end plate with a blanking plate. We have the caps.

Pumping small volumes will be a problem. We run 68 m<sup>3</sup>/h at 68 Hz without counter pressure down to 8 Hz at 7 bars. This means that with a stack of 121 plates, at the filtration rate we had, we were using the full range of the pump. There is no problem running 15-20 m<sup>3</sup>/h as the start feed rate at approx. 17 Hz, but the pump will soon stop as the pressure builds up. We will start looking at options for pumping smaller amounts, but this will take some time.

With regards,

  
Paul Sagberg  
Managing director





Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

## TELEFAX

January 02- 1998

To: Dan Simpson and Gregg Crocco  
DryVac 001 707 374 7505

From: Paul Sagberg  
VEAS 011 47 66 796755

601.98  
51.400-536.97

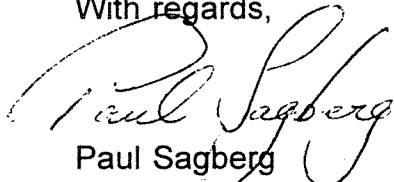
**Dear Dan Simpson and Gregg Crocco**

Coming on a visit to the plant Friday night at 21.45 I found your fax 1-2-98.  
(Your fax machine by the way dates the fax to Aug-19-01 09:38A)

You are creating some problems now as we have been working hard to get a pump that could serve a press with 30 plates. We have been able to collect all parts to rebuild a pump that could work in the full range from 17 m<sup>3</sup>/h at 1 bar to 3 m<sup>3</sup>/h at 8 bar.

Please give us a decision that we will have in house at monday morning 08:00 our time on the number of plates your are sure to have screens for. We will then reduce the number of plates to get as close to optimal performance as we can depending on which parts it is possible to get for a new pump. We will make our final decition at 10:00 monday morning to be able to get ahead.

With regards,



Paul Sagberg  
Managing director



Revolutionizing Drying Technology

SETT	VEAS	SETT
002	- 5 JAN. 1998	
	MAPPE 51 H00	

1-2-98

Fax Transmission to : Mr. Rune Vogt and Mr. Paul Sagberg.

Gentlemen,

It is difficult to interpret and read between the lines when you are nine hours away from the problem. I have reread my last fax to you several times now and see areas that certainly were not fair statements, or worded properly.

Thank you for making three men available to help. On Monday the 5<sup>th</sup> it would be helpful if they can remove the first fifty plates from the feed end, and remove the clothes. They can also remove the clothes from sixty new plates. Please ask them to not pick the plates up by the tubing/plumbing. The blanking plate should be installed at plate number 46.

We were unable to get reservations for the 5<sup>th</sup>, so Fred Kogler (Mgr. Of the clothe Div.) and Jim Shewmaker will depart on Tuesday the 6<sup>th</sup>, Gregg and I will depart on the 7<sup>th</sup>.

We should be ready to start the break-in and test protocol on the 8<sup>th</sup>, assuming all work is completed. Step one will be to condition the new plates and screens. Then to run the stack at partial loads increasing with each fill to their maximum. Some of these initial steps can be done without full vacuum, but it would be more productive if we have full vacuum available.

I 'm attempting to increase the number of screens we will be able to bring for the test. We are hoping to have at least 45. We will attempt to be able to test with between 45 and 60 plates, this should eliminate the need to go to a different pump for feeding. We should be able to turn down the existing pump enough to allow for the initial break-in. I will look forward to meeting and working with you next week.

Very Truly Yours

Daniel J. Simpson, President  
DryVac Environmental, Inc.



Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

## TELEFAX

January 05- 1998

To: Dan Simpson and Gregg Crocco  
DryVac 001 707 374 7505

From: Paul Sagberg  
VEAS 011 47 66 796755

51.400-002.98

**Dear Dan Simpson and Gregg Crocco**

We have had a meeting with the technical staff this morning. We have decided to make a bypass/feedback on the existing pump with a manual regulating valve in order to be able manually to regulate any flow you would want for the press. This means that we can test any number of new plates you would want.

We have a lot of questions regarding what you have asked us to do and ask you to give a feedback that we can have by tomorrow morning:

1. Mounting of blanking plate. We will use one of the R&B end plates with a straight steel plate attached to it to secure a smooth surface. This will close both the feeding line and the filtrate water lines. As a consequence we will not be able to core blow or blow water out of the membranes via the manifolds to the equilibration tank. Is this the way you want to test the system? We will await the mounting of the blanking plate until final number of new plates is fixed.
2. The blanking of the hot water hoses. You want us to put caps on all hoses going to plates without new screens. Assuming 45 new screens this means removing 152 elbows and mounting the caps on the end of each of the hoses. Please confirm that this is what you want to be done.
3. Removing old and mounting new plates. We loosen the hot water hoses and remove the distance pieces and strip the screens from 45 plates and remove them. Then we mount 45 new plates with screens and strip the screens when they are hanging. Then we mount the distance pieces and the hot water hoses and wait for the new screens to arrive? If we receive request for handling more than 45 plates this way BB will be asked to do so.



Vestfjorden  
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RENERE  
OSLOFJORD

4. In what manner have you planned to straighten the new plates in order to have the shifting hooks work properly? How long time do you expect this to take?

5. You say that Fred and Jim will leave on Tuesday the 6th and you two on Wednesday the 7th. I assume that this means that you will arrive after normal working hours Wednesday the 7th and Thursday the 8th. What are your expectations these days? As I see it, we have only one full normal workingday for you here this week and I myself has the agenda mostly filled. I have called for a meeting with the project team Friday the 9th at 10:00 where I am able to attend.

Waiting for a quick reply,

Yours

  
Paul Sagberg



Revolutionizing Drying Technology

SETT	VEAS	SETT
003	- 6 JAN. 1996	
	MAPPE 51.400	PS RV

Dear Paul,

By adding Screens we are just trying to be helpful, but it would still be nice to have a wider range of turn-down on the pump, but just incase we can't have that available we are preparing additional screens. I still need the men to pull the 50 plates.

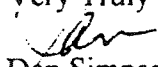
We would like to re-stress some of the things we know you are probably aware of, but may not consider important yet. During the initial startup of the plates it is critical that you have at least a partial (half or more) load of material in the chambers before you turn on the hot water. When the hot water is turned on we need to be able to regulate it starting down around one or two psi. then be able to increase it only after the intire stack is up to temperature. This procedure needs to be repeated two or three times with the pressure being gradually cycled up and down ten to twenty times. This procedure allows the plates to break completely free of the core's, and take a set. The bigger the plate the more critical it is to make sure this is done on initial startup. If we experience infant mortality on some plates during the break-in, it is critical to remove those plates before the next loading. Although in testing we can inflate these plates out to approximately eight inches thick, or way beyond what can be achieved in a closed press, it is wise to avoid expanding the diaphragm with nothing in the chamber. This practice can void the warranty. Once plates go through this break-in procedure it is rare that they would break except in a extreme pressure differential situation.

In order to run a complete test, we need to have the vacuum, at least up to twenty eight inches, preferably at twenty eight / five. Obviously higher would even be better. Gregg reported that the vacuum pumps were loaded with water, possibly due to the level in the reservoir?? Can you tell me at this time if that has been fixed or can be by Wednesday the 7<sup>th</sup>. Obviously, if it isn't we will just have to wait.

Is it possible to regulate the temperature of the hot water plus ten to twenty degrees f? I would be very interested in being able to increase my delta T and see what time does.

Jim will be travelling on Sunday and arrive Monday night. He will be alone and ready to start work on Tuesday morning.

Very Truly Yours

  
Dan Simpson



Revolutionizing Drying Technology

Fax to: Mr. Paul Sagberg

From: Dan Simpson

SETT	VEAS	SETT
004	- 8 JAN. 1996	
	MAPPE 51.400	PS RV

Dear Paul,

Thank you for the manual by-pass valve, that should be very helpful.

Blanking Plate-I know that it is not ideal, because of the blow down, but we need to be able to work out this screen problem without using the full stack. You will not need to wait on the mounting as we can add or subtract plates from in front off or from behind. Jim arrives tonight and is probably in your plant or on his way as you read this. We will mount the screens and the corner accessories before hanging the plates.

Hot water hoses. - whether it is done on the hose or at the manifold probably doesn't matter to me work this out with Jim. I'm personally not familiar with what the distance pieces are. Jim can work with you on that. I arrive on Wednesday afternoon and would like to be able to look at the equipment before going to dinner. I hope we can start our testing on Thursday morning?

Thank you, for scheduling a meeting, I know your time is limited, and hopefully we will be well on our way to solving the problems by Friday. Is it possible for Jim and I to be able to work on Saturday and Sunday??, If needed.

Jim will be contacting us on his arrival tonight, and I will update him on my arrival times. I will call the plant at about three PM tomorrow to see how things are going plus make arrangements to bring any other needed items.

In the past three days I have run several temperature tests on the nylon 11 material. The nylon has several very interesting characteristics, mainly that it expands with cold and contracts with heat. We feel we may be able to use this to our advantage, now that we are aware of it. The clothes that Jim has with him are set up to be stretched very tightly, and should stay tight during the operation. We have also sent clothes that are poly and of heavier material. We are very confident that these will work if we cannot make the nylon 11 that we know you prefer, to function. Jim also has some backing material.

Paul, I know you are very busy, would it be helpful to spend sometime talking on Wednesday night. I will certainly be available whenever it is good for you. I am sorry I didn't get this right when it came in. My Fax is 374-7500

Very Truly Yours

**MINUTE OF MEETING**

**Project :** Conversion of 3 Filter Presses to Vacuum Filterpress Driers

**Type of meeting :** Existing problems related to the DryVac delivery

**Place, Time :** VEAS, Monday 12. th of January 1998

**Participants :**

Daniel Simpson	DryVac
Jim Shewmaker	"
Paul Sagberg	Veas
Odd Tvedt	"
Rune Vogt	"

**Distribution :** The participants

**Reporter :** Rune Vogt

**Action/ No. Description**  
**Limit**

**0.0 Generally**

The purpose of the meeting was to ask for DryVac's plan to solve the existing problems with the first converted press with DryVac delivered plates and filtercloths

**1.0 The existing problems**

So far the first converted press is not in operation due to problems which DryVac must solve, if necessary with assistance from VEAS

**2.0 Activity list and time schedule**

**DryVac** VEAS wants DryVac to set up an activitylist with a time schedule telling what they plan to do, when and how long they estimate it will take to solve the problems with the first converted press so that VEAS can start the conversion of the next press,

**3.0 First stage**

**DryVac** Monday, if necessary Tuesday and Wednesday, DryVac will do a final testing with a limited number of plates, in site, before returning to US.

The test will be with one cycle with sludge and hot water

**VEAS** VEAS will assist with manpower

Action/ Limit	No.	Description
DryVac	4.0	<b>Next testing</b> Within 2 weeks, i.e. in week no. 5 DryVac will return with sufficient and authorized personnel to continue testing with other filtercloths and whatever suggested in the above mentioned activitylist until they succeed within "reasonabel time" to be aged upon by VEAS.
	5.0	<b>Existing conditions</b> DryVac asks VEAS to keep the conditions of the sludge as it is today regarding the amount of polymer which gives good dewatering conditions
DryVac	6.0	<b>VEAS tasks the next 2 weeks</b> DryVac will report back to VEAS if there is any activities they want VEAS to do before DryVac returns in week no. 5,
DryVac	7.0	<b>Operational Manual</b> VEAS will need an operational manual to operate the plates and the filtercloths delivered by DryVac. The manual must tell what to do when replacing plates, and if necessary cloths, with new ones. How to fill the plates with hot water, how to fill the press with sludge, how to empty the plates and the press, and so on, all to avoid problems during running and maintenance of the DryVac-delivered equipment.
	8.0	<b>Contractual matters</b> A meeting concerning contractual matters will be held at VEAS on Wednesday the 14. th of January at 1200 a.m.

Veas 14. January 1998

Rune Vogt



# Historikvy

- PR2\_FT02 FEED FLOW MÅLING
- PR2\_PT02 FEED PRESSURE MÅLING
- PR2\_PT01 CLOSING PRESSURE MÅLING
- PR\_LT05 MÅLING

000

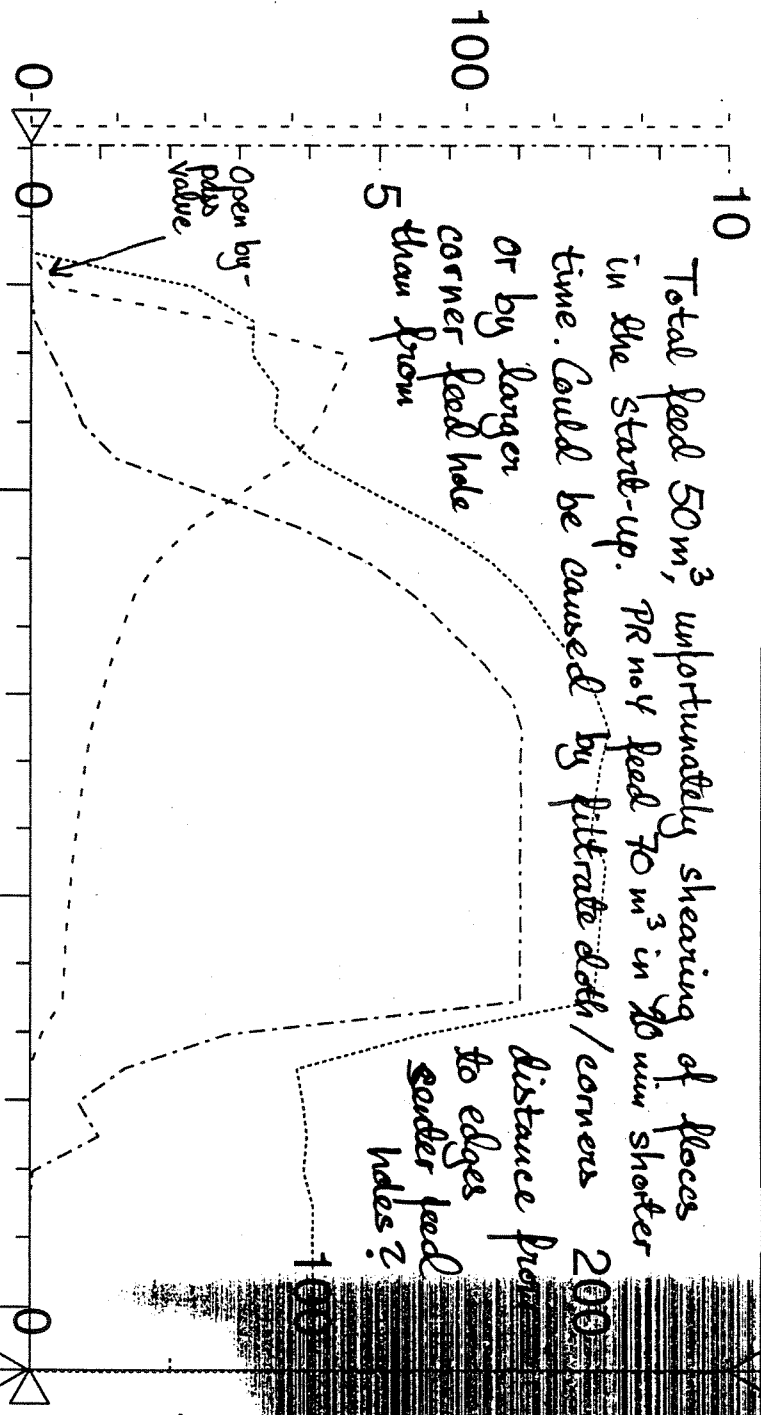
1998-01-16-15:09:14

0.0 m<sup>3</sup>/h

0.0 bar

100.6 bar

\*\*\*\*\*



13:00:00 14:00:00 15:00:00

98-01-16 98-01-16 98-01-16



*Drying occurs later tonight*



DRY VAC ENVIRONMENTAL, 101 N. FRONT STREET, RIO VISTA, CA, 94571



FAX

Date: 1-16-98

Number of pages including cover sheet: 2

SETT	VEAS	SETT
2.7	19 JAN 1998	PS
	MADE 51.400	PS

To: Mr. Paul Sagbert.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Phone: \_\_\_\_\_

Fax phone: \_\_\_\_\_

From: Dan Simpson

101 N. Front Street

Rio Vista, Ca. 94571

Phone: (707) 374-7500

Fax phone: (707) 374-7511

REMARKS:  Urgent  For your review  Reply ASAP  Please comment

Paul,

I will TRY TO REACH YOU BY PHONE. THE PROBLEM WITH THE LATEX CAN BE CURED BY TAKING SOME MATERIAL SUCH AS FINE DIRT OR TALCUM POWDER AND RUBBING IT ON THE LATEX PARTS. I HAVE NEVER SEEN THIS HAPPEN TO THE (EXTENT) DEGREE THAT IT HAS WITH YOUR CLOTHES. I WILL INVESTIGATE FURTHER.

Dan.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

## TELEFAX

January 19- 1998

To: Dan Simpson and Gregg Crocco  
DryVac 001 707 374 7505

From: Paul Sagberg  
VEAS 011 47 66 796755

51.400-025.98

**Dear Dan Simpson and Gregg Crocco**

I have done some testing, some observations and some thinking.

1. Why are the feeding holes on the top of the press and not at the bottom? If you want to avoid differential pressure over the press I would think bottom feeding was a good safety action. I would have investigated this further before going to a 2.5 x 3 meter press. (By the way I have checked with another press installation with plastic plates in Norway and they rebuilt their installation to bottom feed.)
2. I tested the effect of opening and closing the bottom filtration valves during feeding. I can not see any major difference whether they are open or closed. Whether I open them rapidly or slowly has no effect. We will therefore install on/off valves, not regulation valves.
3. In the program we will move the feedhole backwashing and blowing to the step after the heating of cake but up front of vacuum. If testing proves it necessary we will split the vacuum drying in two and put in a feedhole washing after a selected time of vacuumdrying.
4. Emptying of the press is a nightmare. The platestack moves as far apart as the hooks allow and expand further at the bottom so the plates are tilted to the extent where the travelling hook gets stuck. We hope the problem can be reduced when we install a closing valve on the air vents of the hot water loop, but we do not feel confident that this is the solution. We have not yet been able to get the talcum and the latex still glues the plates together.

Best wishes Paul

I include yesterdays graphs.

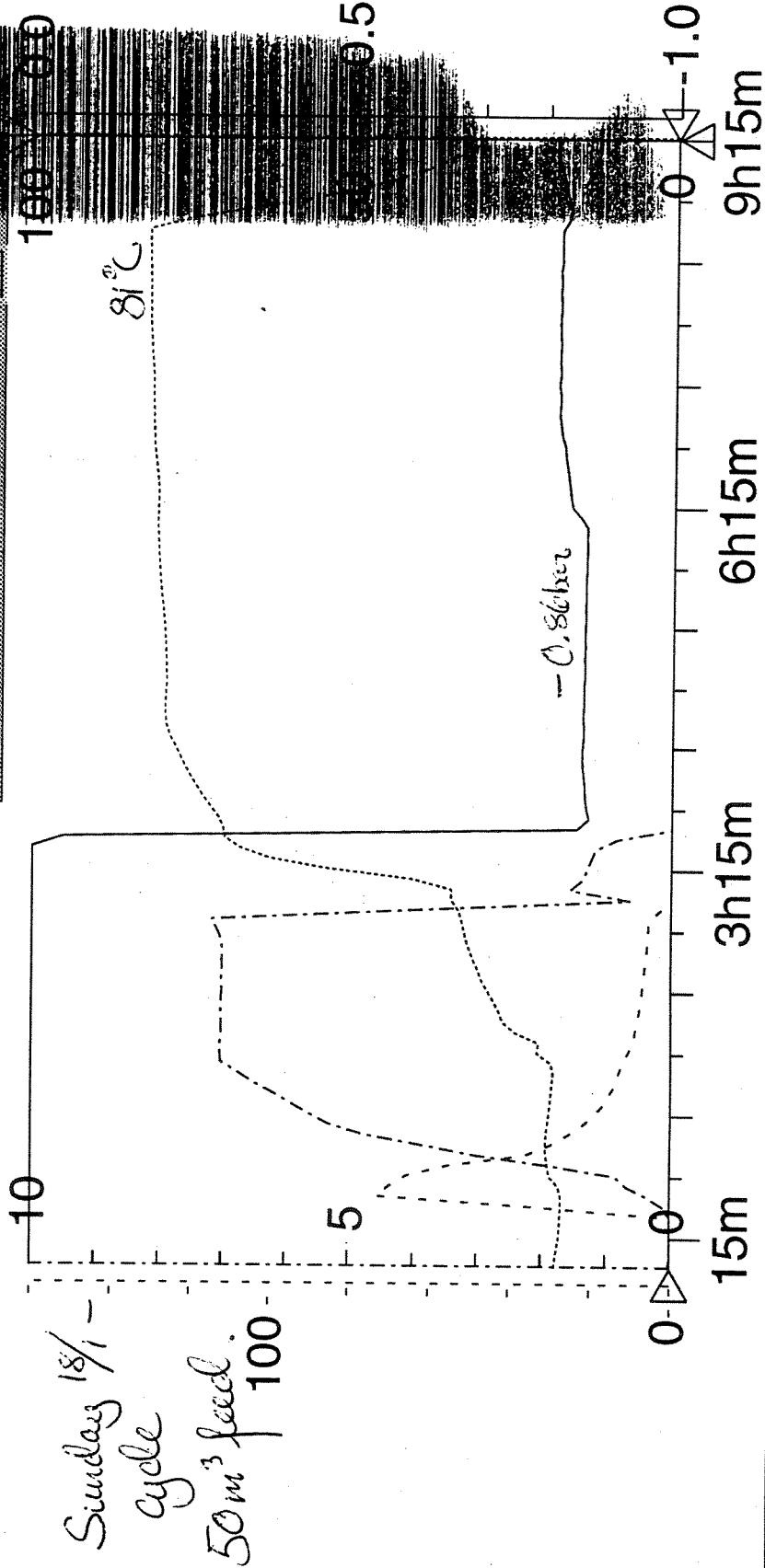
# Historikvvy

- PR2\_FT02 MÅLING
- PR2\_PT02 MÅLING
- PR2\_TT01 MÅLING
- PR\_PT01 MÅLING

070 PAUL 1

9h15m

- 0d
- 0d
- 0d
- 0d



1998-01-18 16:00:00



Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

## TELEFAX

January 21- 1998

To: Dan Simpson and Gregg Crocco  
DryVac c/o Holliday Inn 001 305 358 4061

From: Paul Sagberg  
VEAS 011 47 66 796755

51.400-028.98

**Dear Dan Simpson and Gregg Crocco**

Here are the graphs from the two last runs. As you see, I have had some trouble with the programming of the vacuum sequence. We are now down to a vacuum of -0.913 bar and expect to reach -0.935 within a week.

They have had problems with the startup of the gasmotor so we still are a little low in hot water.

The cakes are very uneven in thickness after drying ranging from 3 mm to 60 mm and with very different cake dryness as a result.

We can only feed 50 m<sup>3</sup>/cycle regardless of feedrate at the start.

The corner pieces just arrived and BB's people will start to mount all upper corner pieces tomorrow morning. I will run one trial and then put in corner pieces in one of the lower corners and run a new trial and finally put the in the last corners and run a new trial. We will put in screens of the old type instead of the latex treated screens after the last of these trials and I would have liked to exchange those few plates which cause the extreme thick cakes. What is your comment to this agenda?

  
Paul

Paul

YES CHANGING THE RAY PLATES IS  
A GOOD IDEA! - THANK YOU FOR  
INFORMATION. I WILL BE BACK IN  
TOMORROW LATE. WILL CALL YOU  
3 PM OR AT HOME. VACUUM

Don

1470 Sherman Rd. TR 65 70 05 60 70 05 70 05 70 05



Vestfjorden  
Avløpselskap  
RENERE  
OSLOFJORD

## TELEFAX

January 22- 1998

To: Dan Simpson and Gregg Crocco  
DryVac c/o Holliday Inn 001 ~~305-358-4061~~  
707 374 7511

From: Paul Sagberg  
VEAS 011 47 66 796755

51.400-033.98

**Dear Dan Simpson and Gregg Crocco**

BB's people put in 168 corner pieces today and we started filtration this afternoon. To my disappointment the filtration did not work any better, this time we only succeeded in filling 58 m<sup>3</sup> before the pump stopped after 140 min. Unfortunately some computer problems prevents <sup>us</sup> we from sending the graphs from yesterday and today. From the excessive leaks during start-up it is easy to see that the filling starts with the first chambers and that it takes a very long time before the last chambers are filled.

We only have have 32 corner pieces left so mounting in one of the lower corners has to wait.

With regards

  
Paul





Vestfjorden  
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RENERE  
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## TELEFAX

January 23- 1998

To: Dan Simpson  
DryVac 001 707 374 7511

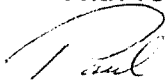
From: Paul Sagberg  
VEAS 011 47 66 796755

51.400-040.98

**Dear Dan Simpson**

I went down to the plant tonight to open the press after yesterdays run. It was a sad sight. It was almost impossible to empty the press alone and I had to give up after emptying some 60 chambers. Many of the cakes were extremely thick ranging from 4 mm to 120 mm. As you understand I have not seen the 60 cakes from the feeding side. The cakes push the plates so hard that it is almost impossible to get room. I had to open and close the press 5 times to get as far as i did. This was after 7 hours drying time at 82 oC but at -0.82- -0.86bars. The thin cakes are dust but the thickest have a soft core in some places. Some of the cakes are very uneven in thickness. Actually I dont know where to go at this point. Do you have any advice? Should we continue as discussed mounting corner pieces one corner position at a time and then change all plates that we see produce severe deviation in thickness?

With regards



Paul

1-23-98

VEAS

Fax to: Mr. Paul Sagberg

From Dan Simpson

Dear Paul,

The corner piece has to help, therefore it is most likely the screen imbedding itself in the plate that is slowing down the feed time. The major difference between the cast iron plate and the DryVac is the backing screen. I hope we will see an improvement in the input at that time. I feel the flow problem is in the screen, not having the backing screen.

I was typing this when your fax came in. I probably feel about the same as you, and won't sleep good tonight. But on the good side we know that it is caused by Diff pressure, and we just don't know why it choose now to happen. We had a couple that were 160mm on the first bad batch. My guess would be that there must be some residence to filling in some chambers or we have weak plates from the previous problem and they have gotten worse. Remember that we felt that we needed to change some of the bad plates. They may have just finished failing. I would suggest changing as many plates as you feel have been damaged. We can set them aside and look at them later when we have spare time. I am already making plans to make some new plates to send your way, but I don't want to rush until we have time to learn more. When I send additional plates I want them to be the best they can be.

We should also look at the feed rate for this load?? I will give this many hours of thought, but I don't think this is something that will continue once we solve the feeding plan. Try to have a good weekend I will call and try to reach you.

1-24-98

VEAS

Fax to: Mr. Paul Sagberg

From Dan Simpson

Dear Paul,

When we were working on the plates I noticed that we were experiencing a fair amount of extrusion of sludge through the screens. It must also happen on the cast iron plates, but they get washed quite often. We should take a good look at the drain areas of the plates that were very thin. My guess is that we will find that they have partially blinded the drain areas. Also the same thing can cause the material to build up on the face of the plates allowing the screens to make contact with the face and reducing the flow of filtrate out for that plate.



Vestfjorden  
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RENERE  
OSLOFJORD

## TELEFAX

January 25- 1998

To: Dan Simpson  
DryVac 001 707 374 7511

From: Paul Sagberg  
VEAS 011 47 66 796755

51.400-041.98

Dear Dan Simpson

I have had the historical data program in the computer fixed. At least I could get printouts of the 5 min average values from feed flow and feed pressure from the last three runs. Be aware that the different cycles did not start at the same time within a five minute period.

Flow m <sup>3</sup> /h	Flow m <sup>3</sup> /h	Flow m <sup>3</sup> /h	Feed pressure in bar	Feed pressure in bar	Feed pressure in bar
20.01	21.01	22.01	20.01	21.01	22.01
1.1	10.9	1.0	0.0	0.0	0.0
47.4	49.9	50.3	0.1	0.2	0.1
51.7	50.7	58.2	0.3	0.3	0.3
49.6	48.7	53.4	0.4	0.5	0.5
47.8	47.1	50.4	0.5	0.5	0.6
47.0	46.7	47.0	0.6	0.6	0.9
41.7	42.5	37.9	1.1	1.0	1.7
35.0	36.3	32.0	2.2	1.8	2.7
29.2	31.7	27.4	3.3	2.8	3.6
24.1	27.6	24.0	4.3	3.5	4.4
21.0	24.3	20.9	5.0	4.2	4.9
18.4	22.2	18.5	5.4	4.6	5.5



Vestfjorden  
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16.5	20.7	16.4	5.9	5.0	5.9
14.9	18.9	14.9	6.3	5.4	6.2
13.4	16.9	14.0	6.7	5.8	6.5
11.9	15.6	12.9	7.0	6.1	6.9
10.2	14.3	11.7	7.0	6.4	7.0

By the way it is not easy to find where the broken plates are located. As soon as I manage to relieve the pressure on the hooks several cakes drop at the same time from different locations along the press. It will take some time to locate all, but we will do our best. I will instruct my people to empty the rest of the press tomorrow morning and have BB's people mounting new corner pieces. I myself will not be able to attend any work on monday and tuesday.

With regards

Paul.

21  
1-21-98  
VEAS

Fax to: Mr. Paul Sagberg

From Dan Simpson

Dear Paul,

We had a strange happening today, the 800mm press at Rio with the nylon12 screens broke two plates. We have never ever broken a 800mm plate before. When we pulled the broken plates and removed the nylon screens the inside of the plates were coated with dried sludge that had pasted through the screen. The material had even built up around the discharge holes and several appeared to be blocked.

I suspect that if we choose to use the nylon that we will need to wash the plates the same as you do now. The big difference in operation is that your screens get washed at least once a day and sometimes more.

Nothing can be proven from this finding but it sure is suspicious.

I will bring Jim with me on this trip, we arrive on the morning of the 9<sup>th</sup>.

(7)



Vestfjorden  
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## TELEFAX

February 02.02- 1998

To: Dan Simpson  
DryVac 001 707 374 7511

From: Paul Sagberg  
VEAS 011 47 66 796755

51.400-025.98

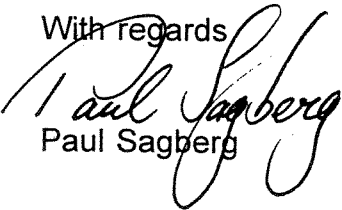
**Dear Dan Simpson**

I just returned to the plant after meetings in the city. I met some rather confused people from BB. I had told them to mount backing screens with included safety pins as soon as they arrived at the plant. They had arrived just after noon, but the package only included 12 backing screens and no safety pins. Have I misunderstood something?

In addition the package included a large number of filter cloth with attached backing screens, but all the filtercloth were without holes for the filtrate water channels.

Could you please advice on what BB should do?

With regards

  
Paul Sagberg



Vestfjorden  
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## TELEFAX

February 03.02- 1998

To: Dan Simpson  
DryVac 001 707 374 7511

From: Paul Sagberg  
VEAS 011 47 66 796755

51.400-060.98

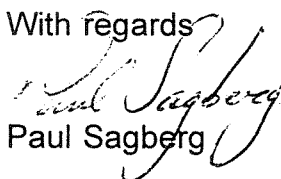
**Dear Dan Simpson**

The support screens arrived today.

BB's people have started to mount the screens, but they were without centerholes, so they were asked to cut them out and to burn the edges to avoid the material to break up.

Tomorrow will be used for for testing the new computer program and no mounting of support screens will take place.

With regards

  
Paul Sagberg



2-3-98

~~1-3-98~~

Fax to: Mr. Paul Sagberg

From Dan Simpson

Jim will be coming on Sunday, we have severe flooding and are suffering some setbacks. I will try to make it on Sunday also, if we get things under control. I don't expect to have to delay my arrival by more than two days.

We are being forced to remove the nylon screens from the Rio Vista press. It may still work for you with the washer, but we are having to install 5cfm screens. That is what we had on previously. I have ordered material to make a set for you so we can experiment if needed.

INTERNNR.	<b>VEAS</b>	SETT
= 4. FEB. 1998		
KOPI	ARKIVNR. 51,400	TIL PS



Revolutionizing Drying Technology

INTERNR.	<b>VEAS</b>	SETT
4. FEB. 1998		
KOPI	AKSIOR.	TIL
	57.4/60	PS

2-3-98  
 Fax to : Mr. Paul Sagberg

From : Dan Simpson

Dear Paul,

I know you have been extremely busy, and certainly have not wanted to have to sort out problems. However we are certain that our differential pressure problems have been as we originally expected, caused by the use of the nylon 12 screens. We have been able to confirm this as a reality through our tests at Rio Vista's plant these past two weeks. There is no doubt that the extrusion of material through the larger nylon clothes has given us a layer of sludge that seals off the screen from the inside of the plate. This is less evident when there is a backing screen present. But even with a backing screen such as those on your cast iron plates it quickly starts to impede the flow of filtrate water out of the plate. While I was working in your plant it appeared that you would occasionally have to wash the plates next to our machine as often as every third run. I know you only plan to wash every tenth run, but it is obvious that the pass through of material to the inside surface of the plate was giving your equipment a problem also. The build up of the sludge on the underside of the press is slowing the filtering ability of the units. We found that by using the tighter screen we did not experience any increase in cycle time. I mentioned in a previous fax that I have taken the liberty to order the tighter clothes and we will have a set available soon. This is the same clothe we have used in all of our previous sludge tests, and what we would have chosen to supply for this application, if the opportunity to use the nylon had not had such great promise. Gregg and I firmly believe this is the right direction to pursue.

The problems experienced were not the problem of the plate design. They were in fact the result of a normal common filter press problem caused by a combination of screen material, design and polymer extrusion. Extrusion as I know you are aware can be managed by pressure ramping and weave size. I would guess that you may not want to take the time to ramp, so we will adjust the weave size down and find a clothe that will give you the results you desire, and need.

We, Veas & DryVac have been exploring new ground, it has been full of surprise's. It has been good for DryVac to have a partner such as yourself to help us find the answers. I'm confident that our team is going to make a difference in the way waste water solids are perceived in the future. Despite our start up problems, I'm quite sure that we are writing the book of the future. Turning what used to be thought of as a waste into a wonderful useful product. We are looking forward to a very productive week, making a small but significant difference in the worlds use of its assets. Thanks to the foresight of VEAS and Paul Sagberg the World will soon get to see what can be done.

Your Friends,  
 DryVac - Dan & Gregg



Vestfjorden  
Avløpselskap  
RENERE  
OSLOFJORD

## TELEFAX

February 06.02- 1998

To: Dan Simpson  
DryVac 001 707 374 7511

From: Paul Sagberg  
VEAS 011 47 66 796755

51.400-025.98

**Dear Dan Simpson**

Just as a comment to your last fax.

The washing of plates on the other three presses, i.e. once a day unless special incidents occur, has been the same whether we use lime conditioning, lime/seawater conditioning, lime polymer I conditioning or lime polymer II conditioning. Of course this does not exclude that you are right in your assumptions.

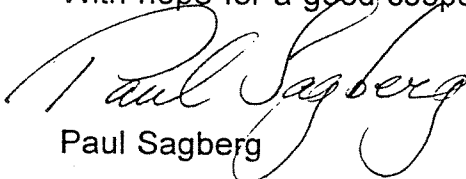
We are unfortunately delayed on our side. We have had activities that had to be given priority and I have not been much at the plant caused by political activities in the city of Oslo.

BB's people have burnt holes in the backing screens, but they are not mounted. The new computer program has been tested on one cycle but it is far from possible to empty the press automatically.

I seem to have better time next week unless the political activities explode again.

Please avoid paragraphs like the last in your fax of 03.02. I don't like them.

With hope for a good cooperation next week

  
Paul Sagberg

09 FEB 1998

PS

2-5-98

Fax to : Mr. Paul Sagberg

From : Dan Simpson

Dear Paul,

It appears that I will be able to leave on time, and will arrive on Monday as planned. We have things as under control as can be expected. Gregg will stay here and be in charge of flood control. How is the work progressing?

Your Friends,

DryVac - Dan & Gregg

Phone no. : + 47 2 66 79 86 60

Fax : + 47 2 66 79 67 55

**TELEFAX COVER LETTER**Please deliver the following  
pages to:

NAME: DRYVAC

COMPANY: DRYVAG

FAX NO.: 0017073747505

OUR REF.: DAG EINAR AASEN

NO OF PAGES 1  
INCL. THIS: .....

DATE: 27/2-98

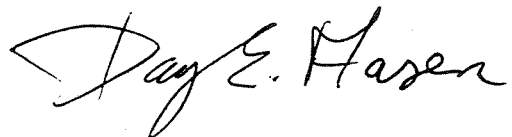
**MESSAGE:**

I try to answer our questions:

Hose, outer diameter : 3.8 mm  
-||- inner -||- 25 mm (but difficult to find exact measure)

Length of hose, longest 87 cm.

-||- shortest 80 cm.

-----  
Signature



Vestfjorden  
Avløpselskap  
RENERE  
OSLOFJORD

**TELEFAX**

*March 2.*

~~February~~ **02.03- 1998**

To: Dan Simpson  
DryVac 001 707 374 7511

From: Paul Sagberg  
VEAS 011 47 66 796755

51.400-095.98


**Re. plan for rebuilding of press no. 2 and workforce requirements.**

I just arrived at the works this morning after a week of absence as I told you in our telephone conversation February 18 th. You promised a plan with detailed drawings on what you wanted done on the presses and a timeschedule on fax within 48 hours, i.e. long before I should leave. I am sad observing that no written instructions had arrived before I left and still have not arrived.

I had asked the BB-firm to have people ready on a two shift basis to start any rebuilding today to be able to do the job at maximum speed, having everything that could be done in advance ready, before new parts arrive next week as forecasted by you . As I have not received any written instructions from you, work will not start. I can not be responsible for having people sitting here without work and have to call off the reservation of their workforce.

We still await instructions and will, when they arrive, give a feedback on when any workforce you may want can be available.

With regards

  
Paul Sagberg  
Man. dir.

DRY VAC ENVIRONMENTAL, 101 N. FRONT STREET, RIO VISTA, CA, 94571



FAX

Date: 3-2-98

Number of pages including cover sheet: 4

To: SUEIN c/o  
VEAS

011-47-

Phone: 66-79-86-60

Fax phone: 66-79-67-55

INR <u>109</u>	<b>VEAS</b>	SETT
KOPI	- 3. MAR. 1998	TIL
ARKIV NR	<u>51400</u>	<u>5/2</u> <u>5/2</u>

From: Jim Strawmacker

101 N. Front Street  
Rio Vista, Ca. 94571

Phone: (707) 374-7500

Fax phone: (707) 374-7505

REMARKS:  Urgent  For your review  Reply ASAP  Please comment

SUEIN,

HERE IS AN EXPLANATION AND DRAWINGS  
OF WHAT WE NEED TO DO ON OUR NEXT  
VISIT. IF YOU HAVE ANY QUESTIONS PLEASE  
LET US KNOW.

(AM I SPELLING YOUR NAME CORRECTLY?)

Jim

Dear Svein,

We are in the process of preparing to return to VEAS. As it stands now, myself and Fred Kogler will be arriving on or about the 16<sup>th</sup> or 17<sup>th</sup> of this month. Our plans are as follows.

- Remove all 121 plates from press #2.
- Change the feed line to a bottom feed.
- Modify the plate plumbing, hanger, and roller for feeding from the bottom.
- Change the screens to a 3-5 cfm polypropylene screen.
- Add puck stay bosses
- Install a clean out device to the feed line.

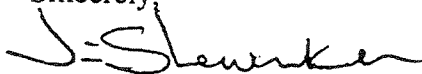
We will need assistance from the B.B. workers to expedite the work. All of the plates that are now in the press must be removed. Before our arrival, please have the B.B. men remove the plates and take the roller assemblies out of the press. We will not reuse these plates at this time. They can be moved away from the area. Fred and I will prepare the new plates for installation. We will require a B.B. man to weld the extensions on the hangers and rollers (see drawing #1). As Fred and I produce plates, we will need two (2) B.B. men to hang and screen the plates in the press.

The feed line needs to be moved to the filtrate hole directly below it (see drawing #2). The plastic liner plate must be turned 90 degrees to accommodate the feed line (see drawing #3). The changes to the liner plate and feed line can be started by the B.B. personnel before we arrive.

We will also be adding cam locks to the hot water hoses coming from the outlet plumbing side of the plates. I need to know if you have hose available for this or will it need to be purchased in Oslo? The hose for press #3 can be used if it is available.

I have tried several times to talk to you by telephone but I have been unsuccessful. I will correspond by fax for the time being and try to talk to you by phone at a later date. Your assistance is greatly appreciated.

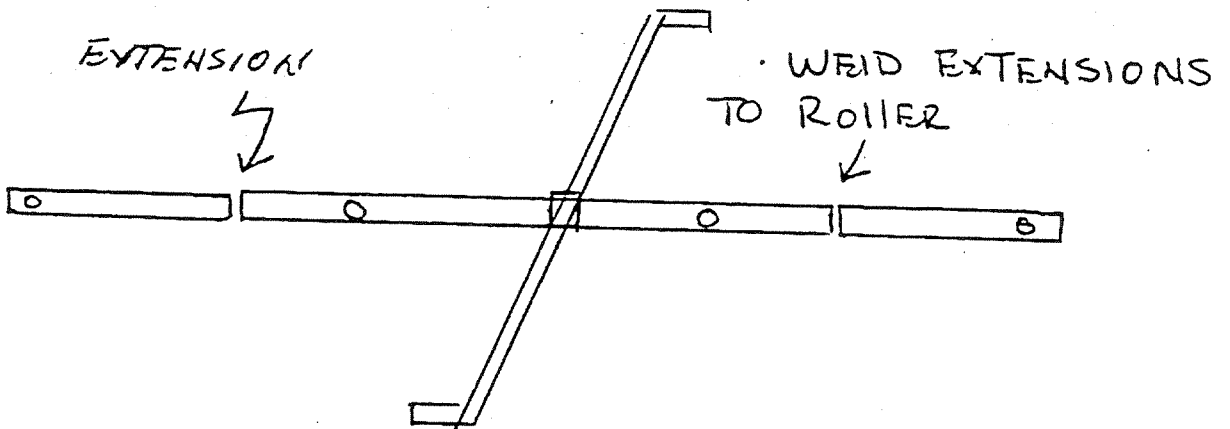
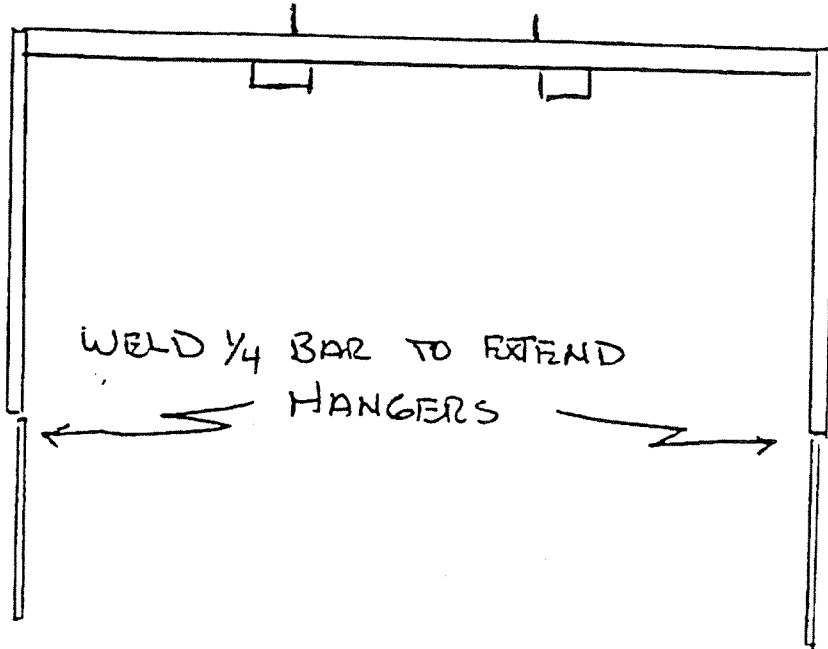
Sincerely,



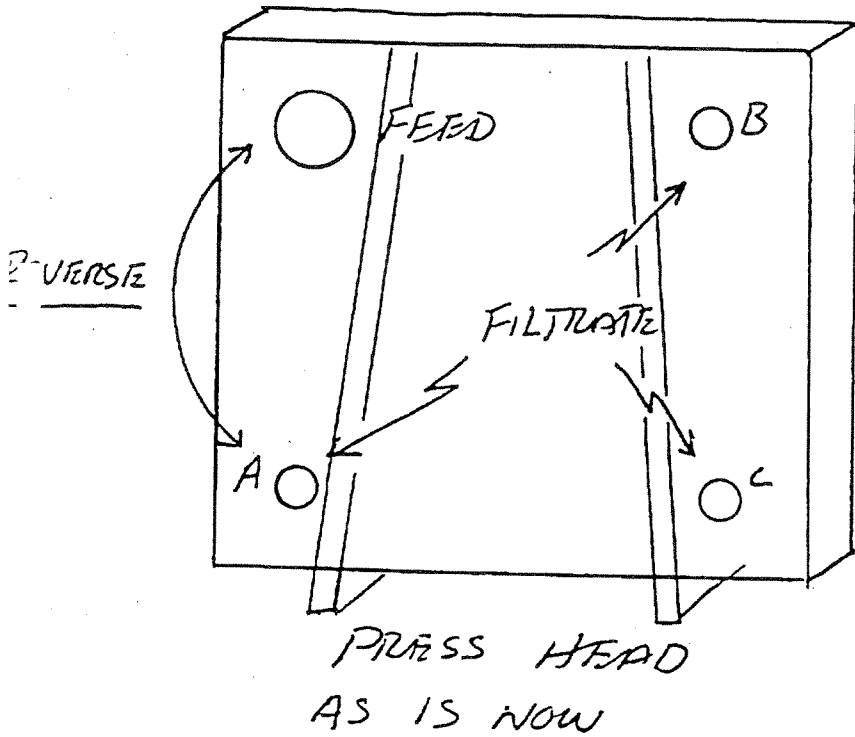
Jim Shewmaker,  
Dry Vac Environmental  
jcs



DRAWING 1  
WE ARE SUPPLYING THESE PARTS



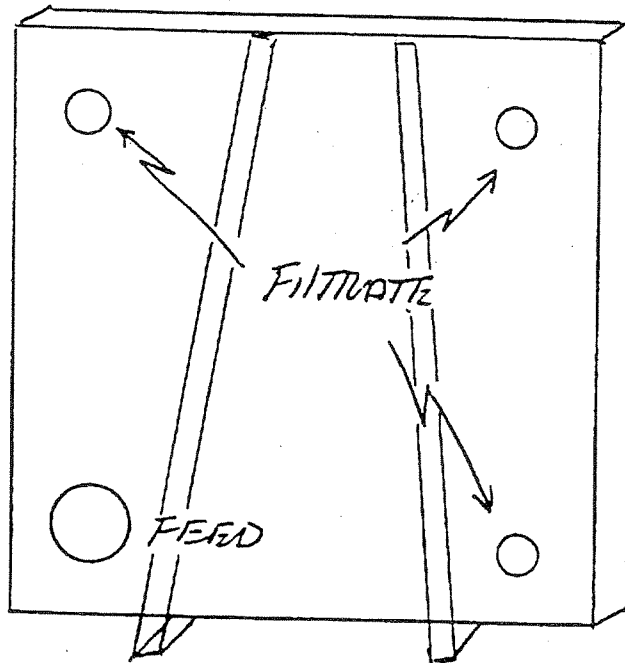
### DRAWING # 2



FEED LINE NEEDS TO BE WHERE FILTRATE "A" IS NOW

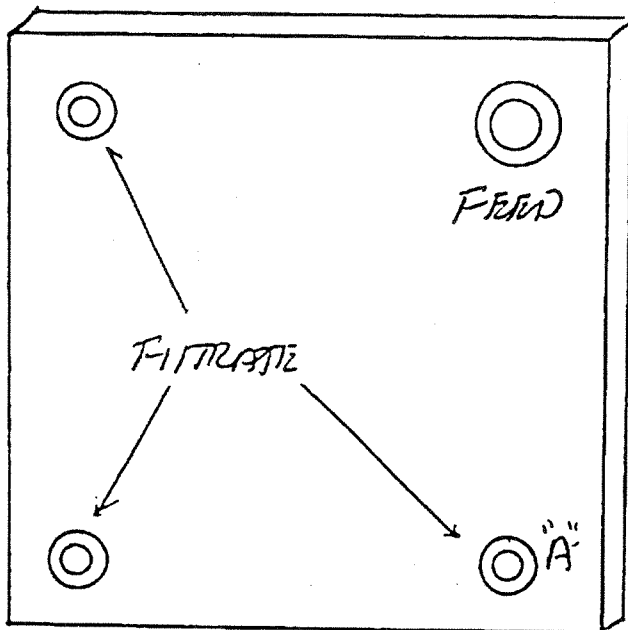
FILTRATE LINE "A" GOES TO FEED LINE.

FILTRATE LINE "B" + "C" REMAIN THE SAME.



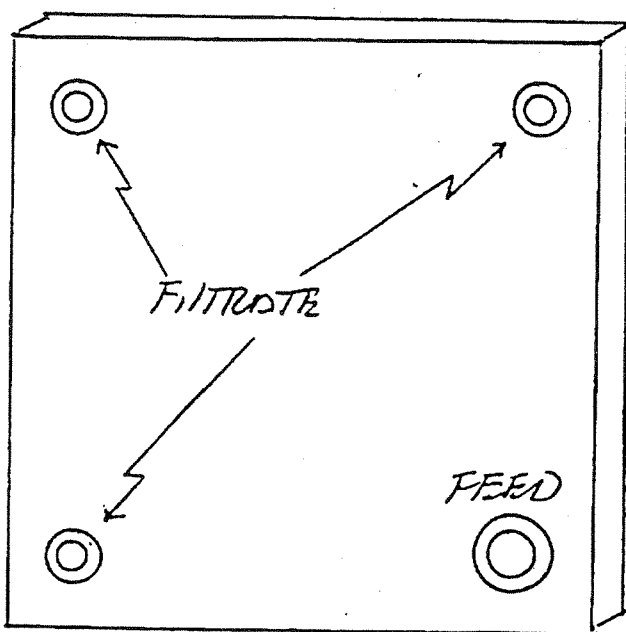
PRESS HEAD HOW IT NEEDS TO BE

### DRAWING #3



ROTATE LINER PLATE  
SO FEED LINE IS  
AT FILTRATE  
POSITION "A"

LINER PLATE AS IS NOW



LINER PLATE HOW IT NEEDS TO BE.

Jeg har gitt  
kopier til BB's folk og Jan.

4/3-98 PS.

3-2-98  
To: Mr. Paul Sagberg  
From: Dan Simpson

NR	VEAS	SETT
112	- 4. MAR. 1998	PS
KOPI		TIL 599
ARKIV NR	51.400	

Dear Paul,  
We have designated Mr. Jim Shewmaker to handle this modification. He has been speaking to your plant personnel directly. I have not sent drawings because we have not been able to locate a suitable feed hole wash pig yet. We hope to have one chosen, within the next couple of days. The pig will effect how we plumb the bottom feed.

We have however made great progress with screens, plumbing and hangers. Material will be shipping over the next two days.

We have designed a new stay boss system that appears to be very beneficial. Stay bosses are going to be cast of urethane, with a solid inner pvc center. They will be held in place by pockets in the screen. I have included the drawing of the puck, the D to R dimension is able to flex in both directions, allowing the plate to diaphragm smoothly.

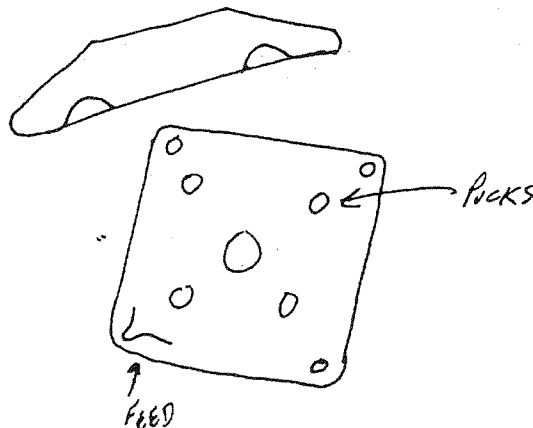
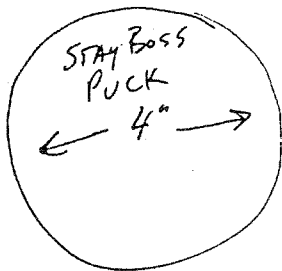
Jim will have a complete list of what help we will need today. We plan to bring additional help ourselves, also. As we discussed before, having the plates and hangers removed will be needed for sure.

I will call later with an update.

Regards,

Dan Simpson

THIS FAX DID NOT SEND YESTERDAY  
I DON'T KNOW WHY? IT SAYS IT  
COULDN'T GET THROUGH. DETAILS BY  
JIM HAVE GONE TO SVIEN.



DRY VAC ENVIRONMENTAL, 101 N. FRONT STREET, RIO VISTA, CA, 94571



FAX

Date: MARCH 5-98  
 Number of pages including cover sheet: 3

To: PAUL SAGBERG  
UFAS  
 Phone: 66-79-86-60  
 Fax phone: 66-79-67-55

From: JIM STEWART  
101 N. Front Street  
Rio Vista, Ca. 94571  
 Phone: (707) 374-7500  
 Fax phone: (707) 374-7505

REMARKS:  Urgent  For your review  Reply ASAP  Please comment

ANSWERS TO QUESTIONS FROM FAX  
5-3-98



*Revolutionizing Drying Technology*

To: Paul Sagberg  
VEAS 66 79 67 55

March 5, 1998

From: Jim Shewmaker  
Dry Vac 707-374-7500

Dear Paul Sagberg,

I received your fax from 5-3-98. Thank you for having the BB men remove the plates and hangers.

To answer your questions,

1. Plumbing the feed line;

We are still working on a clean out device at this time. You can continue rebuilding the feed line as illustrated by the attached drawing. The clean out tool can be added at any time. The position of the tee can be up or down or to the side, whichever is easiest

2. The core blow system;

Yes. Please move it to the bottom hole.

3. Hoses for the hot water connection;

Yes. We will want the uncut hoses and connecting pieces. We will attach the hose to the manifold in the same way as before. We will attach the hose to the plates on the outlet side using camlocks (see drawing).

We are still planing on arriving on the 16<sup>th</sup>.

Sincerely,

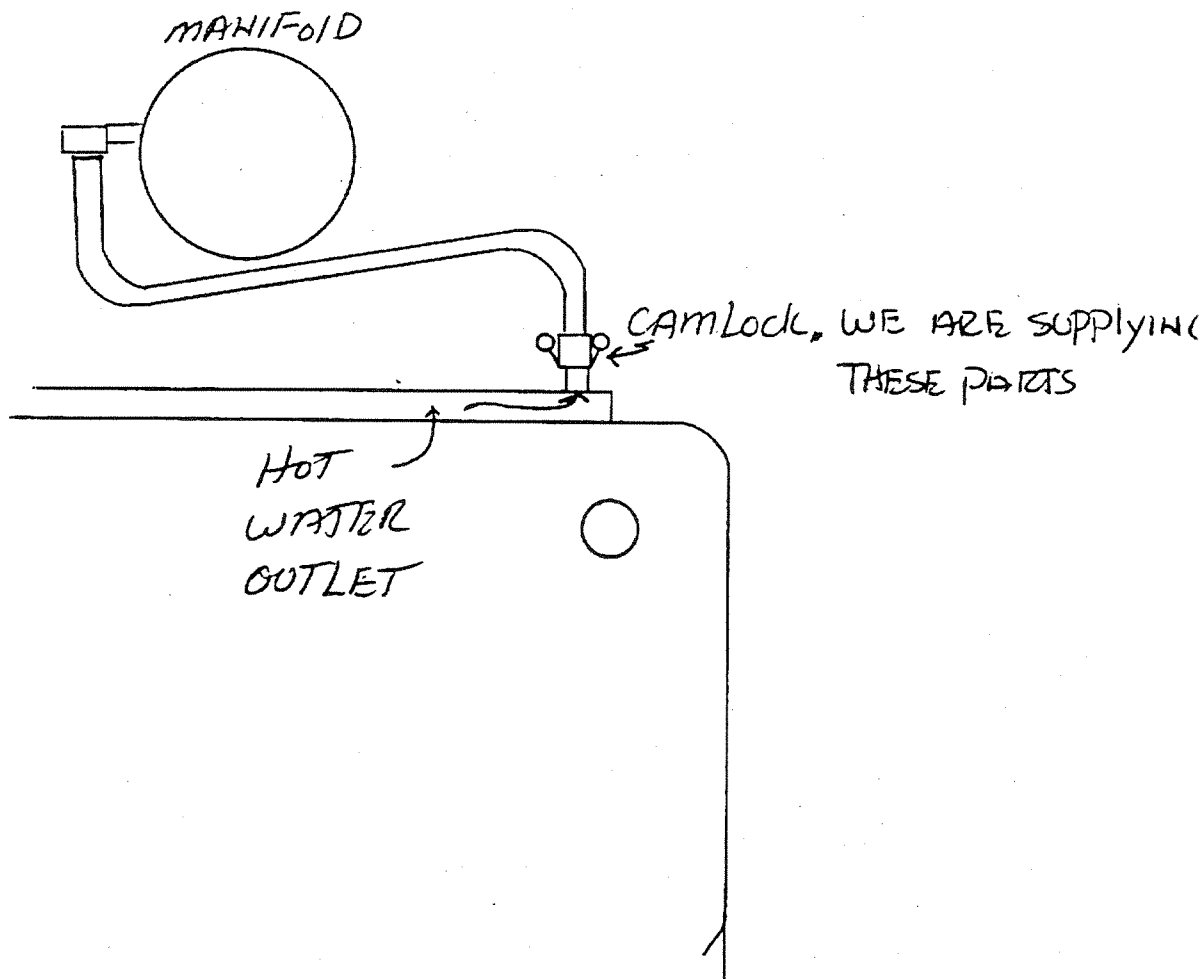
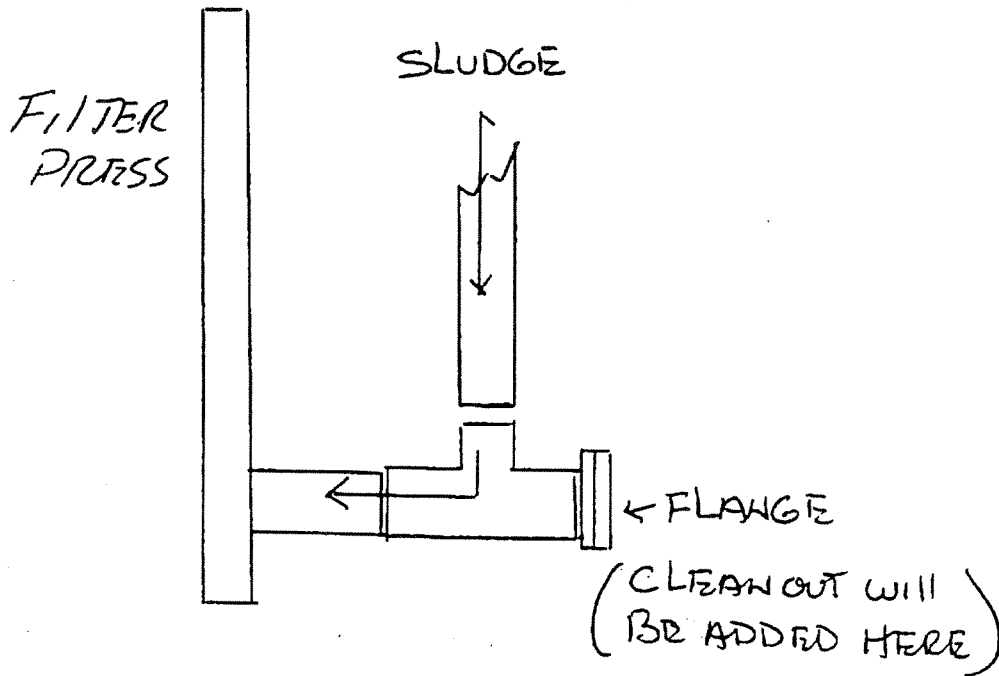
A handwritten signature in cursive script that reads "J. Shewmaker".

Jim Shewmaker  
Field operations manager  
Dry Vac Environmental

jcs

DRAWING WITH FAX  
5-3-98

### FEED LINE





Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

## TELEFAX

**Mars 06. - 1998**

To: Dan Simpson  
DryVac 001 707 374 7511

From: Paul Sagberg  
VEAS 011 47 66 796755

51.400-104.98

**Dear Dan Simpson and Jim Shewmaker**

Just a little clarification on your last reply Dan and a few new questions on what we can do before you arrive.

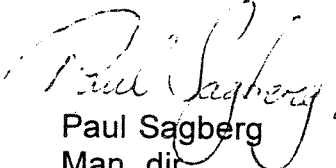
As I understand your reply, we take 125 plates with screens and strip them of screens and hangers and leave them waiting for you. The bare plates we have, some 80, we leave as they are in stack.

Should we remove all hoses from the manifolds because new hoses will have another length?

Will the new hydraulic cylinder arrive and be mounted at the same time? What alterations do we have to do? Could you, as promised, send a formal offer for the new hydraulic system.

Will you use camlocks on both sides of the press?

With regards

  
Paul Sagberg  
Man. dir.



March 9, 1998

# UNISTAR\*

AIR CARGO

377 Swift Avenue  
South San Francisco, CA 94080  
Tel. 650-589-1264  
Fax. 650-589-0413

ATTN:  
PAUL  
SAGBERG

To : Dry Vac Environmental  
Att : Charleen Lovick  
From : Pete Mackall/ Sr. Account Manager  
e-mail: mackallp@unistaraircargo.com

Re: Veas (MASTER AIRWAY BILL: 125-5720-0312)

Number of pages including this page: 2

\*\*\*\*\*  
Charleen - The 2nd page is our House Airway bill. Please have Mr. Paul Sagberg at Veas call my agent office and prepare late Thursday or early Friday March 13 the Norwegian Customs. Price on our House Airway bill does not include the [redacted] for clearance and delivery. The total cost will show on our invoice to you. Advise him to reference British Airways Master# 125-5720-0312.

ETA: 4:25 PM / MARCH 12TH.



Agent Office:  
Nordisk Transport  
Oksenoyvn 40, P.O. Box 180  
N-133- Oslo Lufthavn, Norway  
Tel.No: (47) 67 12-00-20  
Fax.No:(47) 67 52-98-09 22 328432  
Att: Thomas Martinsen

all kreditur. 12135-21  
Forbaksur. 00970 963 871

5/1/98. m

DRY VAC ENVIRONMENTAL, 101 N. FRONT STREET, RIO VISTA, CA, 94571



FAX

Date: 9-MARCH-98  
 Number of pages including cover sheet: 2

To: Paul Sagerberg  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 Phone: \_\_\_\_\_  
 Fax phone: 47 66 79 67 55

From: CHARLEEN LOVICK  
 \_\_\_\_\_  
 101 N. Front Street  
 \_\_\_\_\_  
 Rio Vista, Ca. 94571  
 \_\_\_\_\_  
 Phone: (707) 374-7500  
 \_\_\_\_\_  
 Fax phone: (707) 374-7505  
 \_\_\_\_\_

REMARKS:  Urgent  For your review  Reply ASAP  Please comment

A shipment is due on or en March 12th. Please  
contact the customs office of the shipper  
for delivery. THANKS  
CHARLEEN!

P.S. If you have any questions please call or  
fax me.  
CM



Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

Nordisk Transport  
Oksenøyveien 40 P.o.Box 180  
N-1330 Oslo Lufthavn

Att: Thomas Martinsen

Bjerkås 10.03.1998  
51.400-111.98

**TELEFAX: 22 32 84 32**

Viser til telefonsamtale idag 10.03.1998.

Vi ber om at de deler som kommer med British Airways Master # 125-5720-0312 bringes til VEAS, Bjerkåsholmen 125, Slemmestad så snart som overhodet mulig fredag morgen.

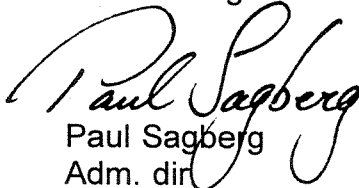
Det er fint om sjåføren ringer når han forlater Fornebu slik at vi kan ha gaffeltruck klar til å ta imot når han ankommer anlegget.

Telefon 66 79 86 60 spør etter Liv Kari Johansen.

Vårt toll kreditt nr.: 12 135 - 21

MVA reg. nr.: 00 970 963 871

Med vennlig hilsen

  
Paul Sagberg  
Adm. dir



Vestfjorden  
Avløpselskap  
RENERE  
OSLOFJORD

## TELEFAX

March 10. - 1998

To: Dan Simpson  
DryVac 001 707 374 7511

From: Paul Sagberg  
VEAS 011 47 66 796755

51.400-112.98

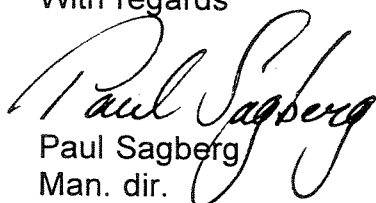
**Dear Dan Simpson and Jim Shewmaker**

I just received you drawings for the welding works and the notification on transportation.

I have spoken with the agent and he expects the goods to arrive at VEAS Friday 13th at 10.30. I have asked BB's people if they can work during the weekend, I will have an answer tomorrow. Do you wish them to do that, at a higher rate?

One of BB's people asked me if I was aware that the piping was mounted in a groove in the plate on one side, and that the filtrate line would be off senter by 13 mm when turned upside down. I told him I would adress the question to you. Could you please comment.

With regards

  
Paul Sagberg  
Man. dir.



Vestfjorden  
Avløpselskap  
RENERE  
OSLOFJORD

TELEFAX

March 11. - 1998

To: Dan Simpson  
DryVac 001 707 374 7511

From: Paul Sagberg  
VEAS 011 47 66 796755

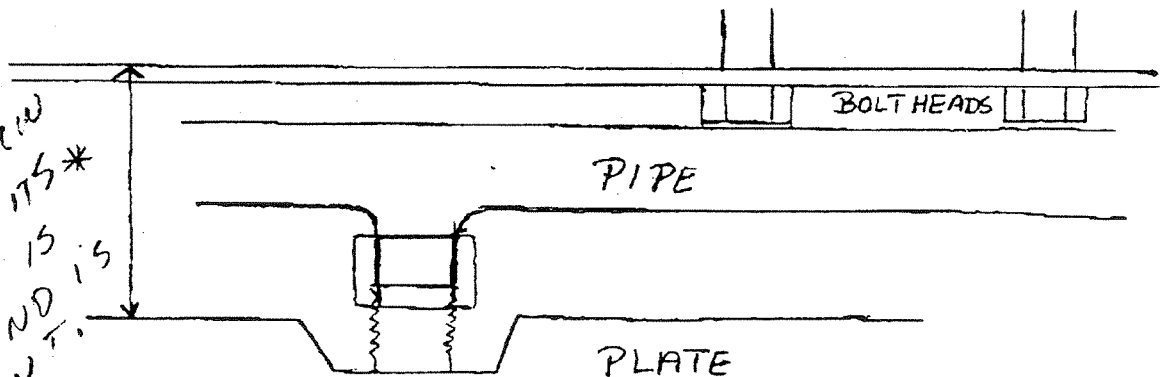
51.400-114.98

Dear Dan Simpson and Jim Shewmaker

I am returning to the question on the 13 mm. I had a chance to discuss the matter with BB's people today and got a full scale demonstration.

With original mounting direction the top has a groove 13 mm down from the upper part of the plastic. 3 treaded pipe ends extends from the grooves. The piping is fitted as close to the pipe ends as possible and the hangers as close to the pipe as possible (remember the 4 bolt heads for the hanger brackets extending some 7 mm down from the hangers). The pipe ends on the other side, the bottom, extends as far from the plastic surface as those located in the groove. This means as far as I can see that the plate itself will be 13 mm lower when the hanger is connected to the existing pipeends on the bottom side and turned up side down. Connecting the piping from todays top to the bottom pipe ends will be a problem as they do not exactly fit. How will you fit them? By melting the glue/solder?

I try to make a drawing to explain the above mentioned point.



*WE HAVE A FEW  
IFOLD THAT ITS  
PROBLEM IT IS  
BETTER AND IS  
O.K. JIM SHEWMAKER  
FURTHER. WILL  
DAN.*

*With regards  
Paul Sagberg  
Man. dir.*

*\* As I see it this is the absolute minimum distance from top hanger to plate. Mounted on bottom side, this distance must be at least 13 mm longer and the filtrate lines lowered 13 mm compared to the end plate holes.*



*Revolutionizing Drying Technology*

3-11-98

To: Mr. Paul Sagberg

From: Dan Simpson

Dear Paul,

It would be best if BB could work on Monday, Jim and Fred will arrive mid day on Monday, and will be able to answer any potential questions if they arise. I have been looking and measuring the plate and don't see what they are referencing. It appears that it will work alright to me. I would like to hear more, as it certainly worries me if those gentlemen think there is a problem? As soon as Steven Dickie arrives we will do more checking in Auto Cad.

Regards,

Dan Simpson



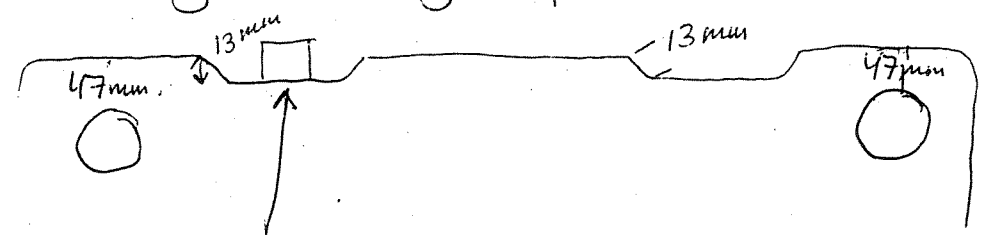
Revolutionizing Drying Technology

3-11-98  
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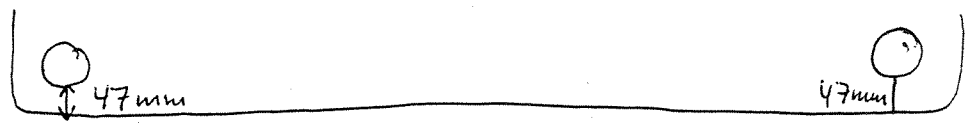
Dan Simpson

I don't know if I understand completely, but I will check tomorrow. I see that the grooves are 13mm and located only on today's top side, I do not



immediately see what this has to do with the positioning of the plate in the hangers.

Paul.





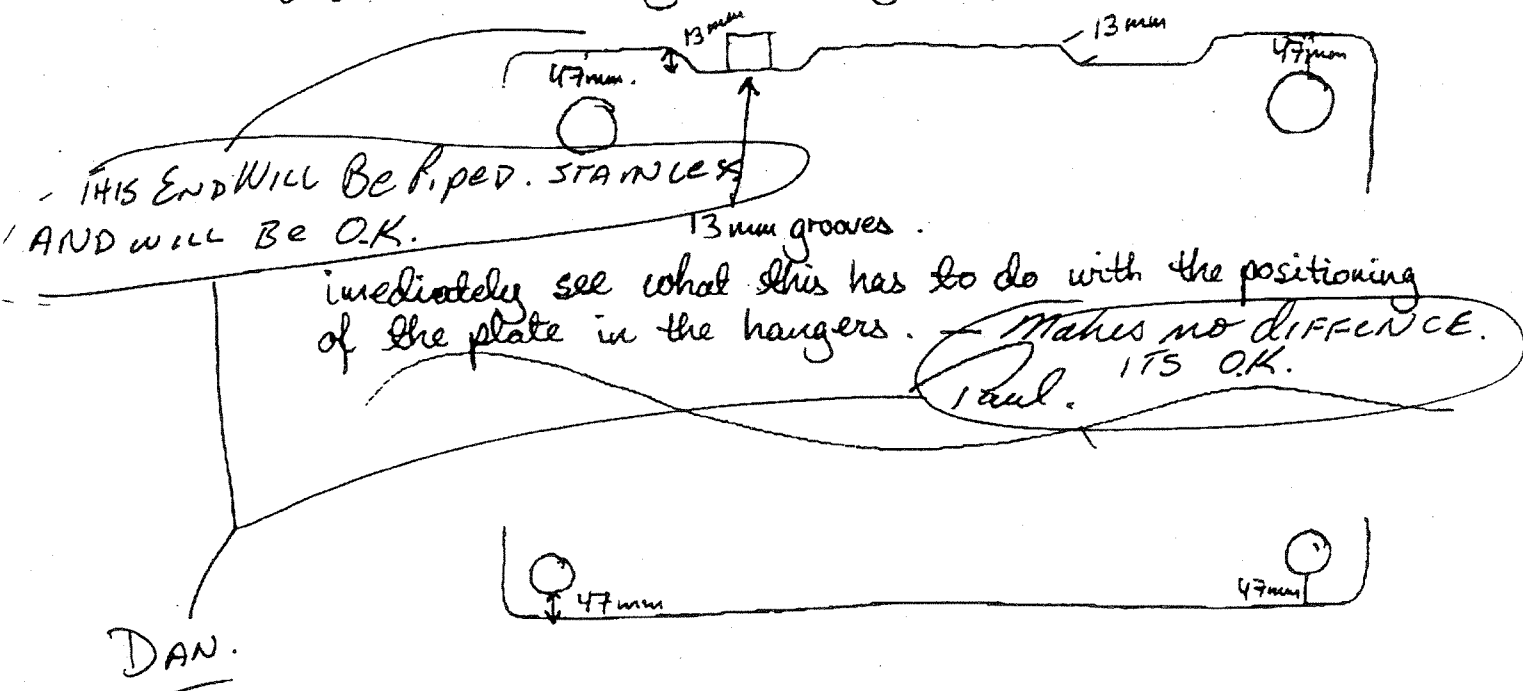
Revolutionizing Drying Technology

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 Regards,

Dan Simpson

I don't know if I understand completely, but I will check tomorrow. I see that the grooves are 13mm and located only on today's top side, I do not



THE N... .. RIV VISA... .. 94571  
 800-992-9113 ... 707-374-7505





Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

TELEFAX

March 11. - 1998

To: Dan Simpson  
DryVac 001 707 374 7511

From: Paul Sagberg  
VEAS 011 47 66 796755

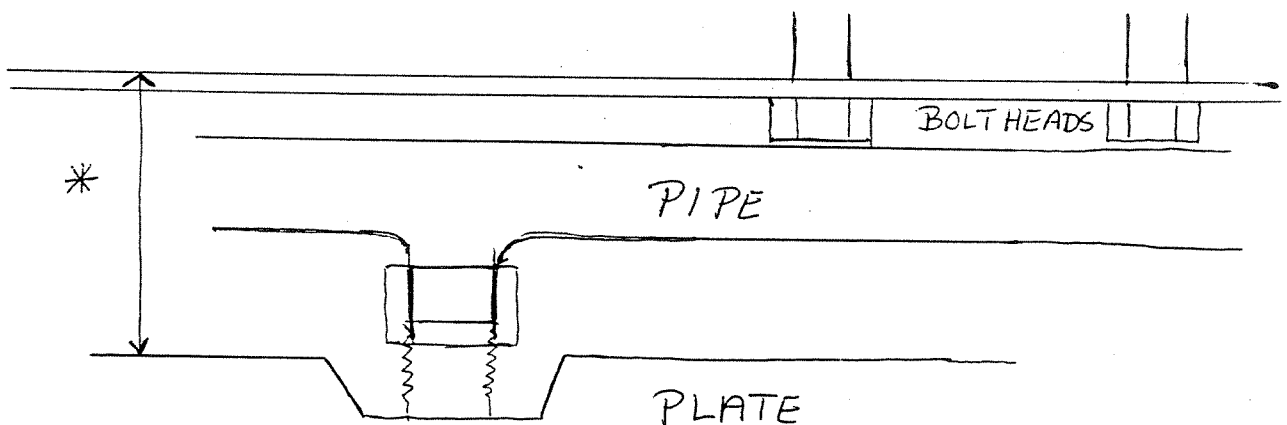
51.400-114.98

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I try to make a drawing to explain the above mentioned point.



With regards

*Paul Sagberg*  
Paul Sagberg  
Man. dir.

\* As I see it this is the absolute minimum distance from top hanger to plate. Mounted on bottom side, this distance must be at least 13 mm longer and the filtrate lines lowered 13 mm compared to the end plate holes.

DRY VAC ENVIRONMENTAL, 101 N. FRONT STREET, RIO VISTA, CA, 94571



# FAX

Date: MAR 9-98  
 Number of pages including cover sheet: 5

To:  
PAUL SAGBERG  
VEAS  
  
011-47  
 Phone: 66-79-86-60  
 Fax phone: 66-79-67-55

From:  
Jim STEWMAKER  
101 N. Front Street  
Rio Vista, Ca. 94571  
  
 Phone: (707) 374-7500  
 Fax phone: (707) 374-7505

REMARKS:  Urgent  For your review  Reply ASAP  Please comment

DEAR PAUL,

HERE ARE DIAGRAMS THAT SHOW HOW THE  
HANGERS AND ROLLERS NEEDED TO BE  
MODIFIED. LET ME KNOW IF YOU HAVE ANY  
QUESTIONS.

WITH REGARDS,

Jim STEWMAKER,

BE CUT OFF IN ORDER TO SEPARATE THE MANIFOLD FROM THE HANGER

USE MODIFIED HANGER FOR A GUIDE

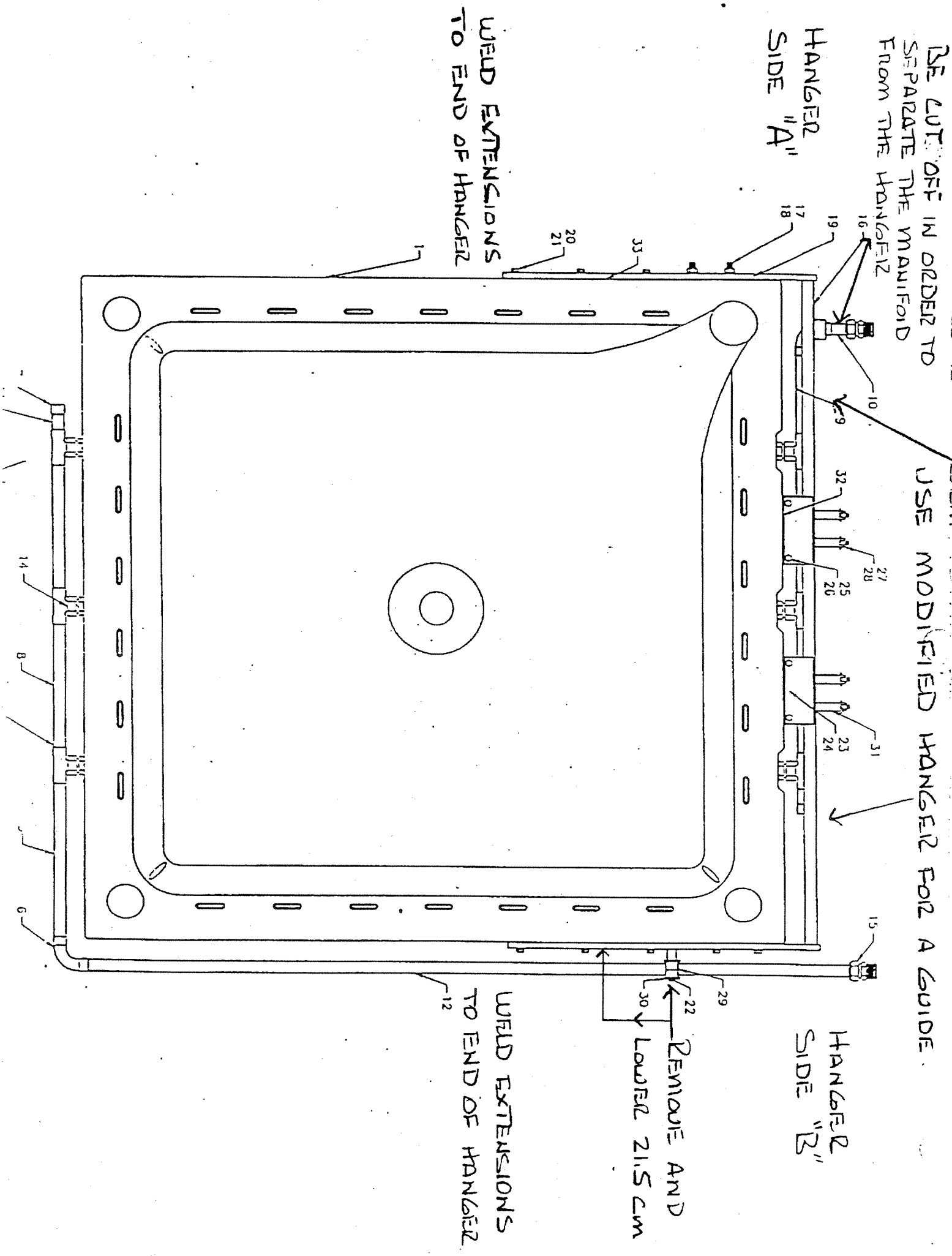
HANGER SIDE "A"

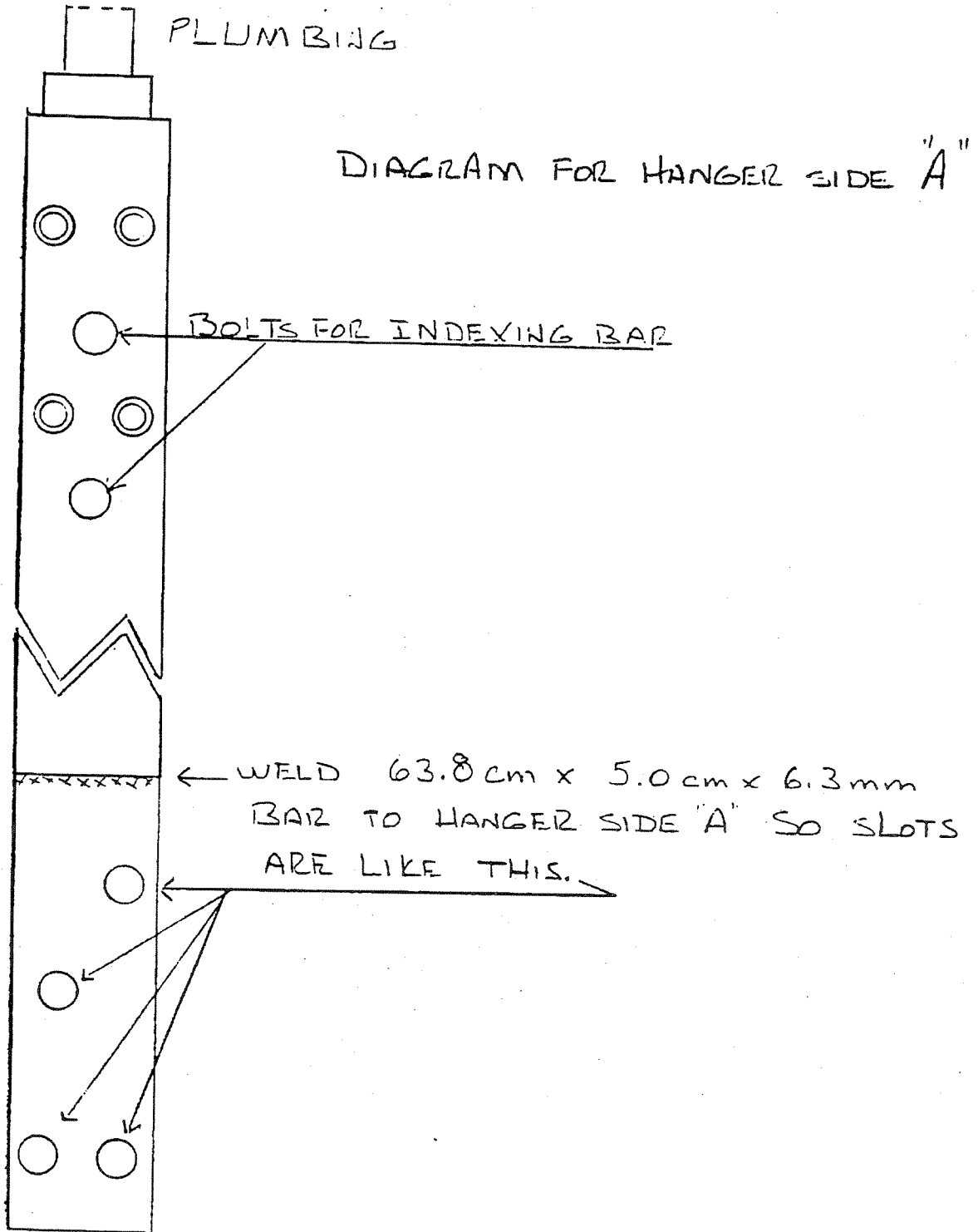
HANGER SIDE "B"

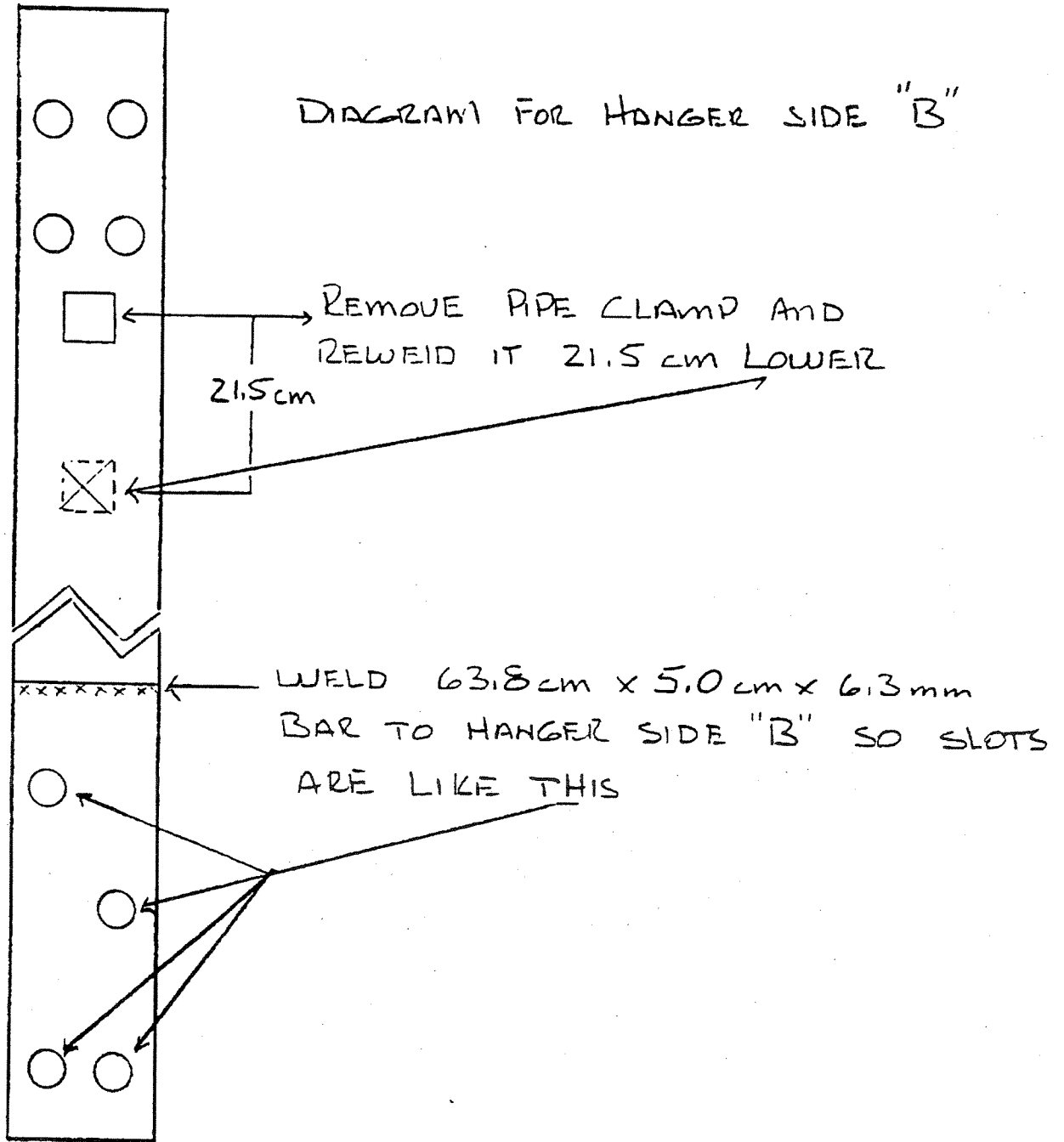
WELD EXTENSIONS TO END OF HANGER

WELD EXTENSIONS TO END OF HANGER

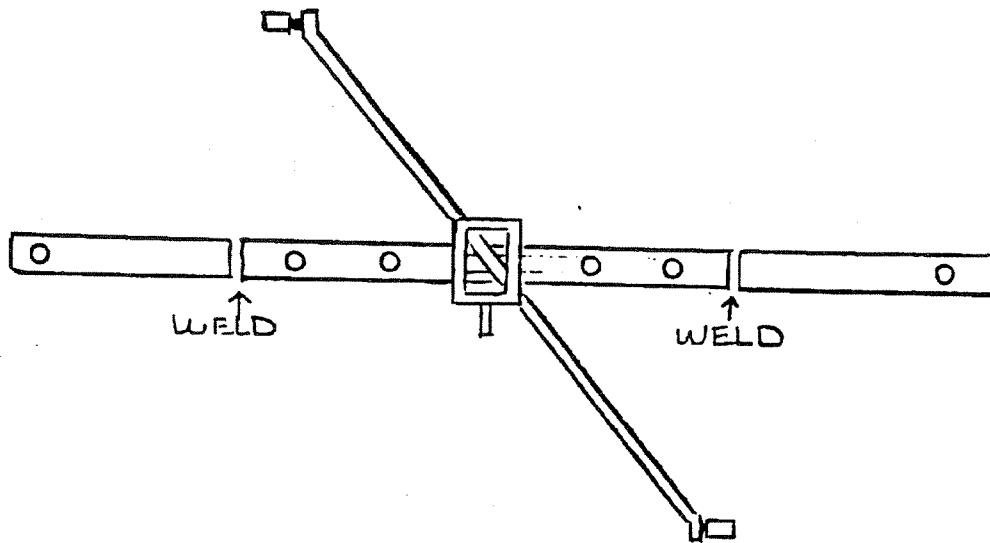
REMOVE AND LOWER 21.5 CM







## DIAGRAM FOR HANGER EXTENSIONS



WELD 35.56 cm x 4.44 cm x 4.44 cm  
SQUARE TUBING ROLLER EXTENSIONS ON  
THE END OF THE ROLLERS AS SHOWN.

10 mm HOLES WILL NEED TO BE DRILLED  
IN THE TOP OF THE HANGER FOR THE  
NEW HOLES AT THE END OF THE EXTENSIONS,  
USE THE MODIFIED HANGER AS A  
GUIDE FOR THESE NEW HOLES.



Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

## TELEFAX

March 16. 1998

To: Dan Simpson  
DryVac 001 707 374 7511

From: Paul Sagberg  
VEAS 011 47 66 796755

51.400-127.98

**Dear Dan Simpson**

I received your handwritten comments to my fax March 13.th 51.400-124.98.

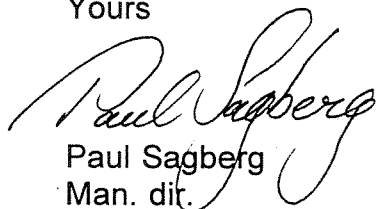
Please specify somewhat better dimensions of the hydraulic system you offer.

How long is it on both sides of the frame? What is the diameter outside the frame? Will the sylinder be selfsupporting or will it need support in the rock wall or from the top of the frame?

The five connecting pipes from todays hydraulic station, will they be connected at the same place and/or with the same connecting dimensions as today?

Please look at your quotation again. There seem to be some confusion about numbers. In your quotation you say total sum US\$ 12935,-. In your handwriting you say 12935 + FREIGHT. Please also include two sets of all necessary seals.

Yours

  
Paul Sagberg  
Man. dir.

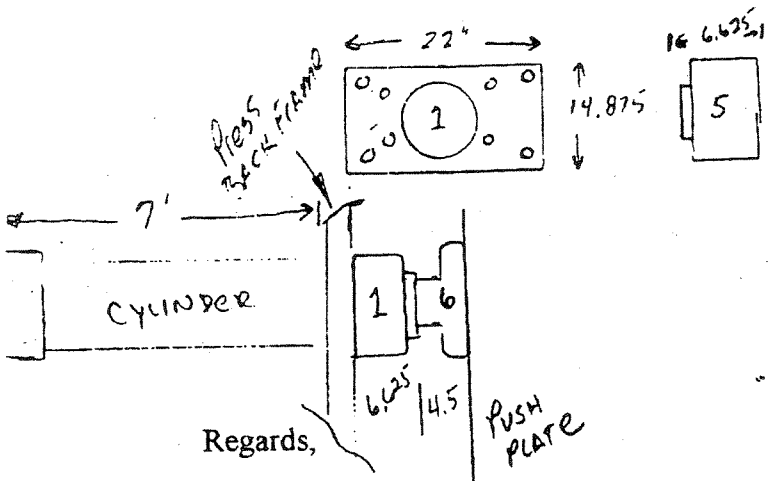


Revolutionizing Drying Technology

3-20-98  
 To: Mr. Paul Sagberg  
 From: Dan Simpson

INR	<b>VEAS</b>	SETT
134	23. MAR. 1998	PS
KOPI		TIL
	ARKIV NR 51.400	PS

- Dear Paul,  
 Regarding the hydraulic cylinder- the dimensions are:
1. Head plate – 4.5” \* 14.875” \* 22”
  2. Tail block – 4.5” \* 14.875”
  3. Rod wiper Block – 2.125” thick
  4. Overall length –
  5. Block length in front of the press frame – 6.625”
  6. Rod and connector – 4.5”



Regards,  
 Dan Simpson





Vestfjorden  
Avløpsselskap  
RENERE  
OSLOFJORD

**TELEFAX**

**March 13. - 1998**

To: Dan Simpson  
DryVac 001 707 374 7511

From: Paul Sagberg  
VEAS 011 47 66 796755

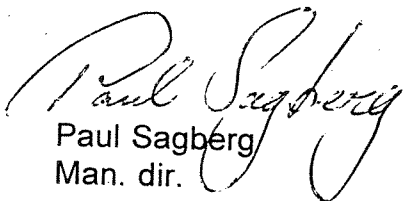
51.400-124.98

**Dear Dan Simpson**

I received the quotation for the hydraulic cylinder totalling US\$ 12935,-.

Could you please send a drawing and define the boundary conditions for the delivery. Which parts are included and which do VEAS have to get in addition to have an operable system. Please also specify necessary replacementparts for approx. 10 years operation and costs.

Yours

  
Paul Sagberg  
Man. dir.



*Revolutionizing Drying Technology*

3-12-98

Fax to: Mr. Paul Sagberg

From: Dan Simpson

Dear Paul,

The following is our quotation for a Warnock Model DV71250 Hydraulic cylinder.

Stroke 6'6"  
 Cylinder Diameter 12"  
 Overall housing dimension 7'8"

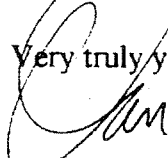
Weight 2,645 lbs

Operating pressure 5000psi

Total cost FOB Rio Vista California.....	\$12,435.00
Freight to Oslo Norway, VEAS plant.....	\$2,500.00
Total cost.....	\$12935.00

Delivery is 3 weeks after receipt of order.  
 Terms : 50% with order 50% at time of completion.

Note. A 4" steel plug must be installed in the press frame before installation of the new cylinder.

Very truly yours,  


Daniel J. Simpson, President  
 DryVac Environmental, Inc.

DRY VAC ENVIRONMENTAL, 101 N. FRONT STREET, RIO VISTA, CA, 94571



# FAX

Date: 3-12

Number of pages including cover sheet: 2

To:

Paul Soyberg

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Phone: \_\_\_\_\_

Fax phone: \_\_\_\_\_

From:

**Dan Simpson**

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101 N. Front Street

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Rio Vista, Ca. 94571

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Phone: (707) 374-7500

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Fax phone: (707) 374-7511

REMARKS:     Urgent     For your review     Reply ASAP     Please comment

We have half the work completed - The freight is about \$ per pd. and Terms are negotiable.

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Avløpselskap  
RENERE  
OSLOFJORD

## TELEFAX

April 20. 1998

To: Dan Simpson  
DryVac 001 707 374 7511

From: Paul Sagberg  
VEAS 011 47 66 796755

51.400-177.98

**Dear Dan Simpson**

We would like to give some preliminary comments on your fax of 15.04.98.

You state: "We have stated that we do meet the intent and the volume of the contract. We have presented the data that confirms."

How and when have you done this? I will here present the data I have. Please inform me of where in the calculations we are wrong. I would be very glad if you can advice me on this.

Let us assume you are right in your fax 14.04.1998 that the DS of feed is 3.8%.  
The actual feed to the press is approx 50 m<sup>3</sup> in 60 min.  
You have told us that the volume of teh press is 8 m<sup>3</sup>.  
As a rule of tomb the density of sludge is  $1 + \text{DS}(\text{in}\%)/200$  e.g. 1.019 at 3.8%DS  
and 1.15 at 30% DS.

A feed to the press of 50 m<sup>3</sup>, 3.8%DS gives

$$50 \text{ m}^3/\text{cycle} \times 1.019 \text{ tonns/ m}^3 \times 0.038 \text{ tonns DS/tonns feed} \\ = 1.94 \text{ tonns DS/ cycle}$$

The contractual requirement is 117 wt at 34%DS with 10% of time left for maintenance, i.e. pr. 21.6 hours. This gives a production rate of:  
 $117 \text{ wtonns} \times 0.34 \text{ tonns DS/ wtonns} / 21.6 \text{ hours} = 1.84 \text{ tonns DS/ hour.}$

With 3 presses this can be achieved at a total cycle time of:  
 $3 \times 1.94 / 1.84 \text{ hours/cycle} = 3.16 \text{ hours pr. cycle.}$

With 4 presses this can be achieved at a total cycle time of:  
 $4 \times 1.94 / 1.84 \text{ hours/cycle} = 4.22 \text{ hours pr. cycle}$



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We can calculate the approximate DS of the cake in the press after the initial 50 m<sup>3</sup> feed in a 8 m<sup>3</sup> press: We call this DS in % : "xDS".  
Rule of thumb gives a cake density of 1 + "xDS"/200.

We then have the following equation:

Volume of cake in m<sup>3</sup> x density of cake x dry solids content of cake in % =  
tonns dry solids fed to the press.

$$8 \times (1 + \text{"xDS"}/200) \times \text{"xDS"} = 1.94$$

Solving this equation gives "xDS" = 21.86%

In your tender you have not stated drying times at this low DS, but we can extrapolate and find that the maximum drying time will be approx 366 min.

If we look at the total cycle time after the last changes it looks like this:

Initializing of press:	3 min.
Feeding of 50 m <sup>3</sup>	60 min.
Core wash	1 min.
Core blow	1 min.
Filtrate blow	10 min.
Drying at 82°C and vacuum 0.066bar assuming licing is not required to achieve USEPA class A sludge .	
Your max. value from tender	366 min.
Blowing HT circuit	5 min.
Relieve pressure	1 min.
Vacuum to membranes before opening	3 min.

Total cycle time 450 min. or 7.5 hours

This tells me that if the drying rate is according to your guarantee and we have 3 1500 x 1500 presses our capacity will be in 21.6 hours:

$$3 \times 21.6/7.5 \times 1.94 \text{ tonns DS/ day} = 16.76 \text{ tonns DS/ day}$$

The requirement is 39.8 tonns DS/ day

3 presses have 16.76 /39.8 x 100% = 42% of contractual capacity.

4 presses would have 4/3 x 41% = 56% of contractual capacity.

If we assume that the drying rate is higher by 25%, which you will not guarantee, we can possibly reduce the drying time by 91 min. or total cycle time to 359 min or 5.98 hours.



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In this case 3 presses can produce in 21.6 hours:

$$3 \times 21.6/5.98 \times 1.94 \text{ tonns DS/day} = 21.02 \text{ tonns DS/ day}$$

The requirement still being 39.8 tonns DS/ day

3 presses would have  $21.02/39.8 \times 100\% = 53\%$  of contractual capacity.

4 presses would have  $4/3 \times 52.8\% = 70\%$  of contractual capacity.

These numbers do not give any conclusions. Several parameters will have to be checked thoroughly and possibly by an external arbitrator if we do not agree on what we find. The deviation from what we expect is, however, so large that we hope you understand why we are very reluctant to go forward at this stage. We, of course, hope that we are completely wrong in our calculations and that everything on our side is a regretfull misinterpretation of the situation, please enlight us.

We have to remind you that only some 16 cycles, on only one press, have been run, with several rebuildings in between, not much possibility to optimize a complicated total system which was assumed to be in continous operation with 3 units working.

Just as an over positive example as a finish we will put in some other figures **which have not been observed** just to see where this would bring us.

60 m<sup>3</sup> feed to 8 m<sup>3</sup> press in 60 min. at 4% DS and 25% liquid water removal in drying and 4 presses.

$$60 \times 1.02 \times 0.04 \text{ tonns DS / cycle} = 2.45 \text{ tonns DS/cycle}$$

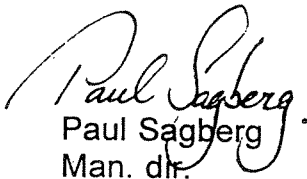
Calculated DS after initial filling 26.98%. Guaranteed drying time 336 min.

Drying time with 25% liquid water removal 252 min. Total cycle time 342 min or 5.7 hours.

$$4 \times 21.6/5.7 \times 2.45 / 39.8 \times 100\% = 93\% \text{ of contractual capacity.}$$

Even 4 presses do not have the capacity at non-proven or too positive assumptions.

Press no 4 do, however, feed 70 m<sup>3</sup> in 85 min these last days. The main theme therefore is why your press can not take this feed or even larger?

  
Paul Sagberg  
Man. dir.



Revolutionizing Drying Technology

4-21-98  
 Mr. Paul Sagberg  
 Mr. Rune Vogt  
 VEAS

INR	<b>VEAS</b>	SETT
178	23. APR. 1998	TIL
KOPI	ARKIV NR 57.400	PS
		RV

From : Gregg Crocco

Dear Paul,

We have been anxious to hear how you did on your testing last week, the second pump to allow feed at 180m? Have you run and can we get copies of the curves? We hope the following information will clarify the current position. Things went so well while we were testing and we felt you were excited about the results and our getting on with the job.

When we left VEAS you were going to install the second pump, that we believe is needed to achieve the better feed rate for the presses. When we last spoke last week you were ready to try the new pump at the feed rate of one hundred eight cubic meters per hr. that is 225% faster than the 79 cubic meters we were able to feed last time. As we discussed during our last visit there are still many things that can and will be done to improve the performance. I thought you felt the current performance in relationship to the testing we have been able to get completed was very good. You seemed to indicate to us that you were very pleased with how things were progressing. The only reason we have limited the feed quantity at this time is because of the pressure differential problem that can be exaggerated by the rag and hair problem.

In reviewing your letter of April 20, 1998 to Dan I'm in agreement with your math and methods used. This is not the first time this exercise has been done. You and I worked out the worst case cycle times and dry rates together on several occasions including your trip to Rio Vista in April 1997. You are correct in that 40 dry tons a day was the basis of the discussions we had even though the contract did not spell this out. We both worked out the capacity of the DryVac plates with 6 hr. cycles and knew that a fourth press would be needed if the lime could not be reduced to generate a total of 33 dry tons a day. The uncertainty that both VEAS and DryVac had was the actual percent solids the DryVac plates would achieve. We thought it would range between 25% and the 35% the cast iron plates were getting. The worst case would be no reduction in solids production, ie: (40 dry tons/day) and low percent solids in the cake (25%). Even at this worst case 40 dry tons/day would represent 142 cubic meters of 25% cake. This represents 17.7 cycles/day of 8 cubic meter presses. VEAS and DryVac knew if this happened we would have to sacrifice cake dryness in order to run the plant even with four presses. DryVac could not guarantee something we did not know and could not take the risk if forced to. VEAS knew this and allowed the contract to read, "At the time the fourth press is required for performance no refundability and or rejection of the DryVac filter plates and cloths will be permitted." I would like to reiterate the fact that there was never any implied two year historical data that was part of the contract. I was very careful to make

sure that the contract did not tie capacities and dry rates together. I was very open and acted in good faith in explaining this. All parties acknowledged these facts and approved our taking exception's in the contract agreement. DryVac could not guarantee something that we didn't know. The only thing we could venture to guarantee was that the plates would get what they got and the dry rate would follow the 1200 kg/hr per press. The table VEAS had DryVac complete in section 7.4 was just this calculation on various percent solids of cake. It was never implied verbally or stated in the contract that by filling out the table meant DryVac is guaranteeing we would get a min of 25% solids in the dewatered but un-dried cake.

DryVac freely shared with you the data from testing other biosolids in smaller plates but this was all we knew at the time. It seems strange to me seeing the words "contractual capacity" through out your letter, when I review the discussions and methods used in developing the contract. The shared risk aspects of how the contract was finally agreed upon seemed to have disappeared. VEAS and DryVac knew that there were facts about the project that were unknown at the time/ The known's were put in the contract and the rest was not. I can state that none of the capacity calculations or the total cycle times you have documented in your letter are anything that was withheld from VEAS at the time of the contract or not discussed fully.

There are still some things I do not understand about the current operation. If I use your numbers the plant makes 1200 cubic meters of 3.8% solids, this results in 46 dry tons per day. This number does not mean anything except when we start dividing the 1200 cubic meters per day into the fifty cubic meters per cycle feed total in order to determine how many press cycles a day are needed. Also with the same logic that the DryVac press gets 22% solids, then press 4 would get 29% solids before squeeze and the standard presses would achieve 32.6% solids. Using these same numbers and the number of drops per day of each press what is the calculated dry tons per day of the plant??

Here are just a couple of points we should clear up.

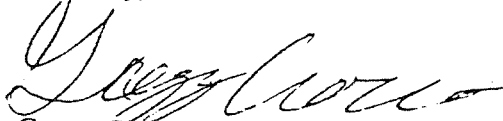
1. 3.8% is a number that VEAS gave us.
2. In the contract the figure of 10% for maintenance was to be used in the decision to take the option on the fourth unit if things appeared close. This was to benefit and assist VEAS in part because of the un-knowns.
3. There was never any contractual agreement to supply 117 tons at 34%. The contractual agreement was that the units would produce at what ever rate of wet solids that they would achieve. Veas asked for the option to take the fourth unit at a reduced price if needed. Again the plates can certainly achieve much more than 50 cubic meters, but under the current circumstances we feel we have taken enough of a beating due to lost plates on differential pressure and are asking you to limit the possibility of greater losses.
4. DryVac did not generate the tender table in section 7.4, VEAS did. DryVac only filled it in to provide the data to which the unit would dry at.



We have never agreed to, or represented that our plastic plates would do what a cast iron plate can do, we have not been asked to build a plastic plate that can have the strength of a cast iron plate. Your question " why can our press will not take 70cubic meters or larger", is a fair question. The answer is "it can" but if you clog the feed zone and create a pressure differential, at some point it will break the plate. As we discussed in the plant we see the same problem in press four, where the sludge dewaterers in the chamber causing a wedge. The DryVac Plates as with any plastic or other material have structural limitations, they are less able to stand differential pressure than the R&B Cast Iron plates. It is not that the DryVac plates cannot take the volumes that press four is taking, its that the DryVac plates can not run in the adverse conditions that currently are existing at and with the VEAS solids. We have all discussed this and you are taking steps to eliminate this problem, with new equipment to remove hair and rags. You were taking these steps before we even became aware of what the cause was. We are not able to say what the maximum total solids intake can be for our presses, because we have not taken the risk of feeding at optimum conditions, and packing to achieve high volume. In most slurries there is little difference in the dewatering performance that a DryVac plate will obtain vs. any other standard plate. It is no different here. We have not said that the maximum capacity is fifty cubic meters. We have asked you to not exceed these numbers to keep the financial losses at a minimum until we have time to decide what steps make sense for both VEAS and DryVac Environmental, Inc.

Removal of the hair and rags in the feed should lessen the tendency of the VEAS sludge to cause differential pressure and thus reduce the restrictions that limit performance.

Sincerely,



Gregg Crocco

VP DryVac



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## TELEFAX

April 23. 1998

To: Dan Simpson  
DryVac 001 707 374 7511

From: Paul Sagberg  
VEAS 011 47 66 796755

185  
51.400-~~464~~.98

**Dear Dan Simpson**

Just a few comments to our telephone conversation today.

The loss of water from the expansion tank is mainly caused by leakage from the hot water pipes underneath the press. According to BB's people this is caused by the remounting of the pipes after turning of the plates. The pipes did not fit exactly, so your people had to force them to fit, with stress as a result. Very many places have leakages, some with a constant fine spray. Some have more leakage before the water heats up, other reduces the leakage as the temperature increases. The loss is approx. 2 m<sup>3</sup> pr. cycle. I have, at the moment, no reason to believe that the water goes into the sludge, but this gives unacceptable conditions of operation.

After only 2 cycles the screen on circulating hot water is clogged, i.e. with a pressure drop of more than 1.4 bar. Very fine material together with some more coarse cause the trouble. It is of course impossible to use a system behaving this way, except for some experimental trials..

The production of condensate water 1 hour after vacuum is connected is only approx. 350 kg/ hour at a temperature ranging between 82° C and 88° C and a vacuum of -0.950 bar. The vapor temp. to vacuum pump is 14-18 °C. This is measured as the level difference in the condensate well between start and stopp of pump. Measured on site this difference is approx. 14- 15 cm, well has Ø 0.99 meters and the curves show 3 fillings pr. hour. Later in the cycle this decreases slowly with time even at product DS below 50%. According to you, we should have an almost constant drying rate of 1200 kg/h. Where do you suggest the water goes, if it leaves the cakes. We have higher temperature and vacuum than you required from us.

The feed to the presses under the restrictions you have put on the system i.e. max 4.5 bars and min flow of 15 m<sup>3</sup>/h is in the range 45-50 m<sup>3</sup>. We have had starting flow of >160m<sup>3</sup> which is the limit of the meter and reduced it to 140 m<sup>3</sup>/h with different reduction strategies. Because of the high feed in the beginning,



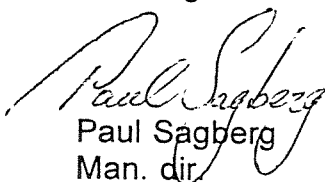
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which causes high counter pressure almost immediately, most of the feeding is done under a pressure regulating regime of 4.5 bars. The feeding time has been 60-68 min. From a capacity standpoint this rebuilding you have called for, has not given any positive effect. As a comparison press no.4, which is assumed to have a volume of 7.7 m<sup>3</sup>, receives 70 m<sup>3</sup> in 82-85 min. with a starting flow of 77 m<sup>3</sup>/h and an end flow of 20-23 m<sup>3</sup>/h at 8 bars.

I will include two curves, all other material will remain here until we have agreed on what we can expect from you, and you from us.

You say that you got the impression that I was satisfied with the system when you left before easter. Either I express myself in a way you have difficult to understand or you want to hear something that is not said. To be specific, I was pleased with the progress made on the system, but the way forward to a system that can operate automatic, unattended during nights and weekends, with the capacity required, will be long and hard, if successfull, and we are already far on overtime.

With regards

  
Paul Sagberg  
Man. dir.

NB. As I said in an earlier fax to you, Dan, Lenser have taken contact with us. They seem to be very well informed on problems with your and Bertrams equipment and state that they have new and better equipment than the two of you. They state that the equipment tolerates temperatures of 100°C and 4 bars on the hot water side of the membrane. I will have a meeting with Lenser May 6th.. At the moment I have no other knowledge of their system.

# Historikvú

PR2\_FT02

MÁLING

PR2\_PT02

MÁLING



498 PR2 PAUL4

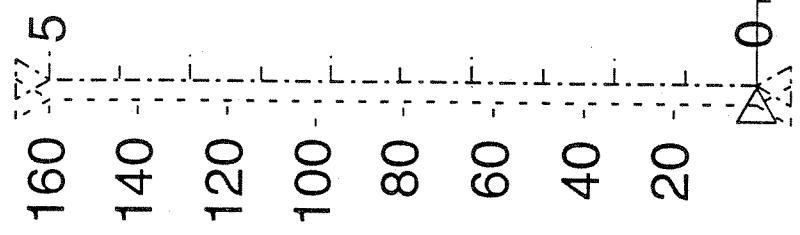
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0.0 m3/h

0.0 bar

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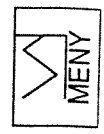


13:00:00  
98-04-23

14:00:00  
98-04-23

98-04-23

98-04-23



# Historikvly

- PR\_PT01 MÅLING
- PR2\_TT01 MÅLING
- PR\_LT05 MÅLING
- PR\_TT03 MÅLING

495 PR2\_PAUL1

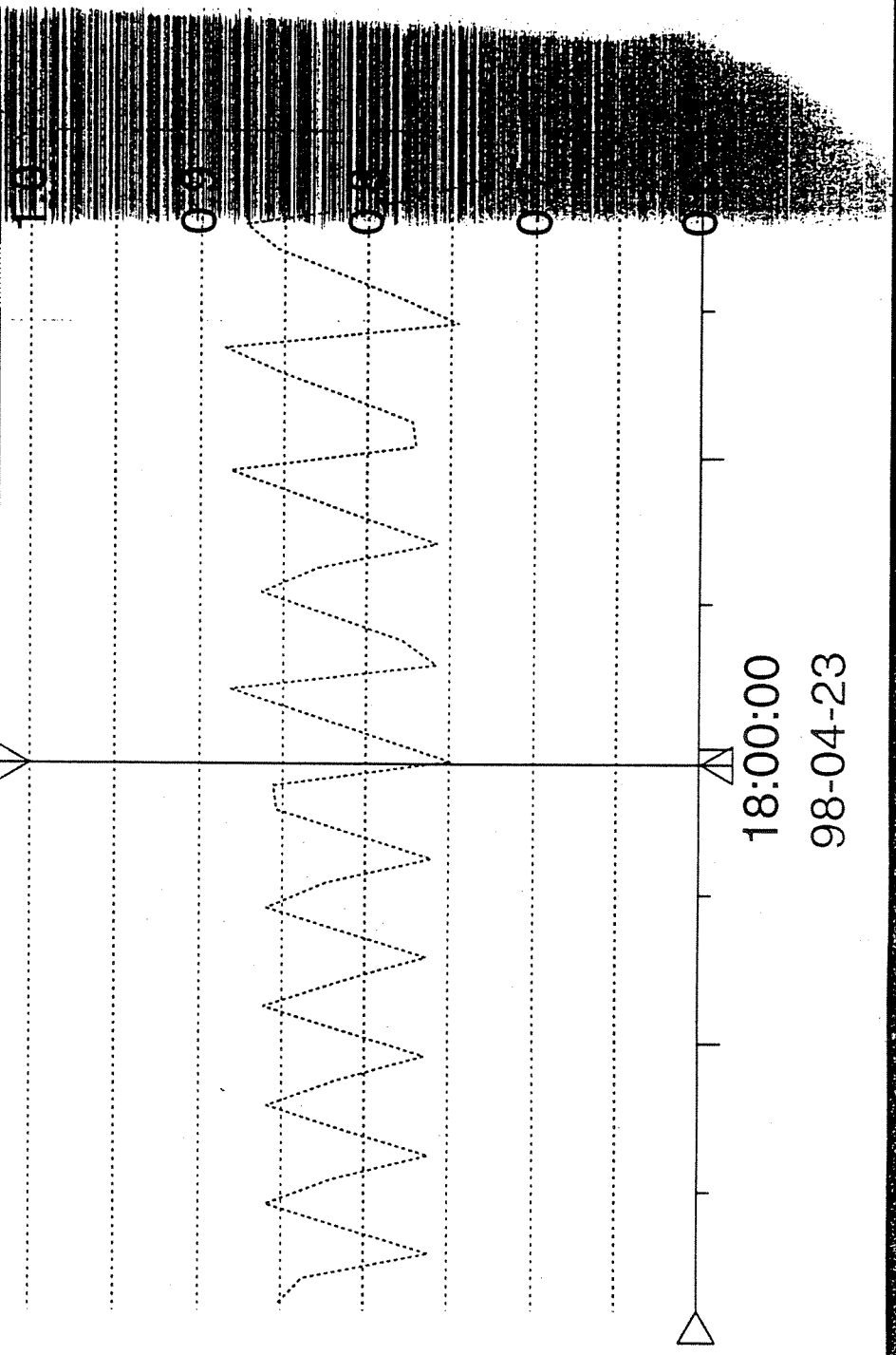
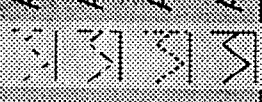
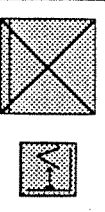
1998-04-23-17:56:46

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0.75 m

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18:00:00  
98-04-23



# Historikvy



495 PR2\_PAUL1



1998-04-23 16:19:05

-0.950 bar

85.2 C

0.78 m

16.7 g/C

MÅLING

MÅLING

MÅLING

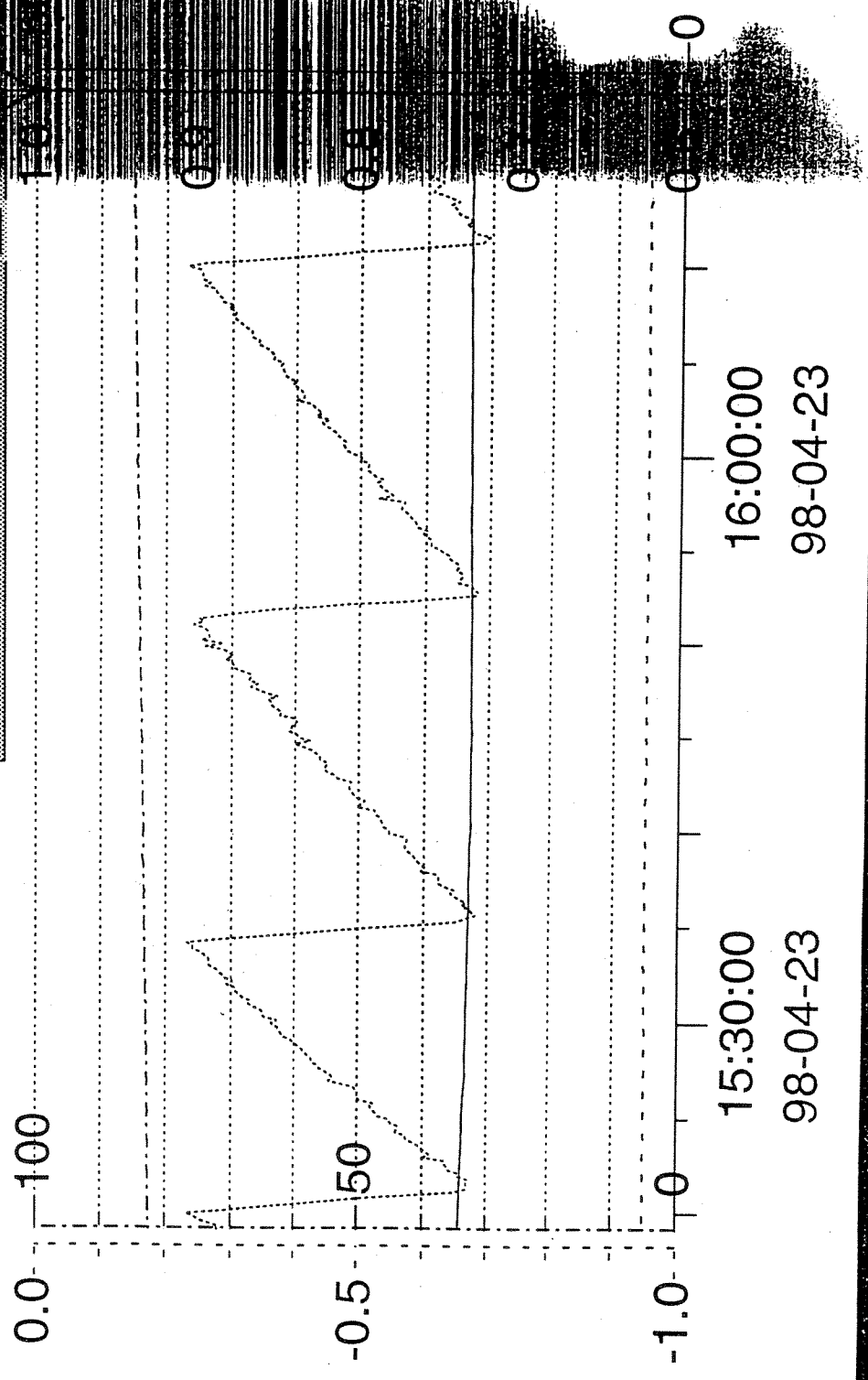
MÅLING

PR\_PT01

PR2\_TT01

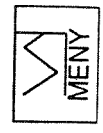
PR\_LT05

PR\_TT03



15:30:00  
98-04-23

16:00:00  
98-04-23



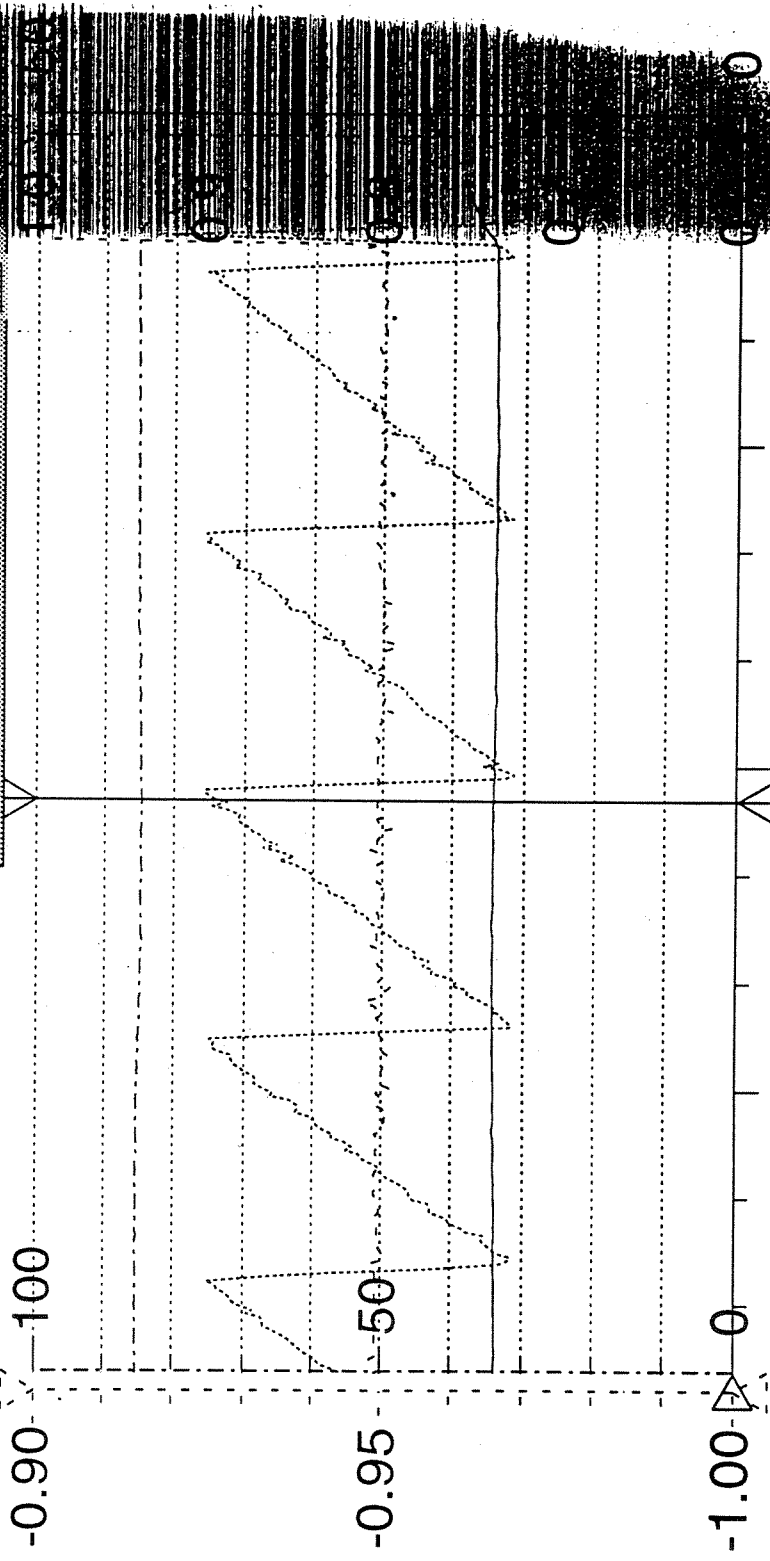
# Historikvy

495 PR2\_PAUL1

1998-04-23-18:56:49

- PR\_PT01 MÅLING
- PR2\_TT01 MÅLING
- PR\_LT05 MÅLING
- PR\_TT03 MÅLING

-0.949 bar  
 84.6 C  
 0.90 m  
 17.2 g/C



19:00:00

98-04-23





Revolutionizing Drying Technology

5-3-98

Paul Sagberg  
VEAS

From Gregg Crocco  
DryVac Environmental

Dear Paul

I would like to share with you some of the logic we had in designing the 1500 mm plates. First in reviewing the DryVac process, the E.P.A. was concerned about the center feed area not meeting class A requirements. Testing at the Rio Vista plant showed the cores would dry but took significant longer than the rest of the plate area. This is not much of a concern with a small plate dropping into a bin because the cores can be picked out if they are not dry. We felt that in order to meet the class A specification in the tender a corner feed plate would have to be used because it would be easier to wash and blow out the feed zones. We still feel it would be difficult to guarantee all parts of the cake would meet class A standards with a center feed plate and the limited cycle times we had to work with, in your case.

As to pressure differential we designed the plate to withstand about the same load as other corner feed membrane plates on the market. (As it turns out our plate is at least twice as resistant as the average plastic plate.) The theory being, that as long as there is a liquid annulus between the two cake halves then the feed pressure will be equally exert on each side of the plate. The theory does not hold true for very compressible materials or slurries that are not uniform and could plug or fill the liquid annulus between the two cake halves. All of the biosolids we tested that were treated with inorganic chemistry did not seem to be of the type that would give a corner feed plate a problem. We felt that the cavity thickness of 1.75 inches would give an extra .25 inches to maintain a liquid annulus during dewatering and still meet capacity without plugging. As with all corner feed plates the DryVac plates were not designed to make drier cake by stuffing slurry into a semi-solid non plastic cake solid from a far away corner.

I hope you can see that the plate geometry and strength were not just chosen out of the blue. We have continued testing and working on new prototypes and have been able to come up with several ways to make our plate take full seven bar pressure differential. We can now build you a plate 2.3 \* 1.5 that can stand seven bar pressure differential and with

INR	VEAS	SETT
190 B	- 4. MAI 1998	TIL
KOPI	ARKIV NR 51.400	PS RV



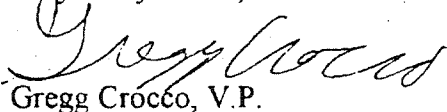
full warranty. The capacity would be 1.5 times the 1500mm. We can also make 1500mm plates with this same strength.

Regarding your letter of April 23, 1998, we are concerned and a little confused by the tone. We had felt that all concerned had wished us to explain our position and are now wondering why after giving what we feel is a detailed and factual explanation that you are angry and don't wish to listen to what we feel are the facts. If we are wrong then we would appreciate a response that shows where we have difference's in the interpretation of the specs. We would very much appreciate an opportunity to discuss this with Mr. Odd Tvedt and Mr. Rune Vogt. If we have erred it will be in a technical matter and we will then know what direction to take to solve the problem.

With regards to our informal conversations, we are working with our notes and certainly would like your interpretation and any thing you feel that we are leaving out. We have stated over and over that it is our goal to work the problem as it is, not as the spec was written. We have always acknowledged that there are two issues, the issue of the specification and the need of the plant to operate as is needed on a day to day real life basis. However in regards to payment we were told that we must only work to the spec's and that is what we have been trying to accomplish, and explain. It seemed to us that when we last met that we were in agreement that we had met the specifications. When we try to clarify this it seems to leave you with bad feelings, please tell us what it is we need to do.

With regard to capacity again when we ran at the higher seven bars we made cake that was 38% solids. That is a number that was provided to us by VEAS. We know that if we run at seven bars with the current plate and the hair and rag problem that we will have differential pressure problems. Therefore to meet those type of requirements we need a plate that can stand that type of pressure. We now have one, but we did not in 96 Or 97.

Very Truly Yours,



Gregg Crocco, V.P.

DryVac environmental, Inc.