

MSTAMD1 DOC 27



Department of Energy

625 MARION ST. NE, SALEM, OREGON 97310 PHONE 378-4040 TOLL FREE 1-800-221-8035

TO: Energy Facility Siting Council DATE: September 18, 1987

FROM: Charles Grist *CG*

SUBJECT: Mist Underground Gas Storage Project Site Certificate Amendment

Action: Council adopt the proposed amendments contained in Attachment 1.

Background: Oregon Natural Gas Development Corporation (ONG) is a subsidiary of Northwest Natural Gas Company (NNG). ONG has a site certificate agreement with the Siting Council to build an underground gas storage facility near Mist in Columbia County. The site certificate was issued in September 1981. The agreement requires that the facility be completed by August 31, 1987.

ONG began conversion of the facility to storage operation in 1985. However, ONG has deferred completion of the facility because of economic uncertainties. In April 1987 ONG requested that the construction deadline be extended until August 31, 1990. This would allow time for the PUC to reach its decision and for ONG to complete the facility.

Staff notified the public about the proposed amendment. Local Mist residents and Columbia County both requested a hearing on the amendment. A hearing was held near Mist on July 15, 1987. Attachment 3 to this memo summarizes the hearing and the testimony given.

Columbia County has raised seven issues about the site certificate. None of these challenge the construction extension requested by ONG. Instead they deal with storage pool description, project location and supporting facilities, County conditional land use permits, emergency response, over pressurization of the storage reservoirs, and saltwater disposal. Local residents brought up concern about earthquake like tremors they have felt, safety, and water quality. The Mist-Birkenfeld Rural Fire District had concerns about fire safety and emergency response.

Staff has prepared a discussion of each of the issues and recommendations for EFSC action. These are included in Attachment 2.

Recommendation: ODOE recommends that the Council approve the proposed amendments which are included at Attachment 1.

CG:cg
2466K

A T T A C H M E N T 1

PROPOSED
AMENDMENT NO. 1 TO
UNDERGROUND STORAGE FACILITY
SITE CERTIFICATION AGREEMENT
FOR THE
MIST SITE
BETWEEN
THE STATE OF OREGON
ACTING BY THE THROUGH ITS
ENERGY FACILITY SITING COUNCIL
AND
OREGON NATURAL GAS DEVELOPMENT CORPORATION



PROPOSED

Amendment No. 1 to

Underground Storage Facility
Site Certification Agreement

for the Mist Site

between

The State of Oregon
acting by and through its
Energy Facility Siting Council
and

Oregon Natural Gas Development Corporation

1. The Mist Site Certification Agreement ("Agreement") was executed by Oregon Natural Gas Development Corporation (ONG) and the State of Oregon (State), acting by and through its Energy Facility Siting Council (EFSC), on September 30, 1981. The Agreement authorizes ONG to construct and operate an underground storage facility for natural gas and associated facilities at the Mist Site in Columbia County, Oregon.
2. ONG wishes to amend this Agreement in order to extend the deadline for constructing the proposed facility.
3. Columbia County, the Mist-Birkenfeld Rural Fire District and local residents requested additional amendments to the Agreement.
4. EFSC has reviewed ONG's request and the concerns and requests made by the public. EFSC agrees that certain amendments to the Agreement should be executed.

In consideration of the foregoing, it is agreed that:

- a. Section III.A. of the Agreement is amended to read as follows:
"ONG warrants that the construction of the underground natural gas storage facility and related and supporting structures will be completed prior to August 31, 1990."
- b. The map in Appendix 1 of the site certificate is replaced by the map attached herein.
- c. Section II.A.1 is amended to read as follows: "two naturally existing underground gas reservoirs (the Flora and Bruer pools) in portions of 3 sections of land all in Township 6 North, Range 5 West of the Willamette Meridian in Columbia County, Oregon, containing 940 acres, more or less from the surface of the earth to the base of the Clark and Wilson Sands and the stratigraphic equivalent thereof, which in the case of the Bruer pool was identified at a measured depth of 3,095 feet in the REC CC#1 RD 1 well and in the case of the Flora pool was identified

at measured depth of 2,760 feet in REC CC#33-3 well and are entirely within project boundaries described in Appendix 1 attached hereto and by reference incorporated herein; and"

- d. Section IV.C.5 is amended to read as follows: "Design, construction and operation of the underground storage reservoir and related of supporting facilities shall incorporate a monitoring program to ensure the public health and safety and to detect leakage using the best available technology and testing procedures available as of the date of this Certificate or as described in ONG's application and supporting testimony relating to OAR 345-100-040(6) and (7). The program shall include monitoring of local seismic activity using the best available technology and testing procedures available as of the date of Amendment Number 1 and as described in the staff report on Amendment Number 1, dated September 18, 1987."
- e. The following sentence is added to the end of Section IV.C.11: "ONG shall notify Columbia County when it notifies EFSC that it wishes to increase reservoir gas pressures above discovery pressure."
- f. Section V.1 is amended to read as follows: "It is agreed by ONG and EFSC that construction or replacement of any monitoring well, injection/withdrawal well, pipeline or gathering line, or any other facility not shown in Appendix 1 or identified in part II of this agreement shall require an amendment of this agreement as provided in part VII below."
- g. Section VI.6 is amended to read as follows: "Building, plumbing, electrical, and conditional land use permits."

IN WITNESS WHEREOF, this Amendment No. 1 to the Mist Site Certification Agreement has been executed by the Chairman of the Energy Facility Siting Council of the State of Oregon and Oregon Natural Gas Development Corporation, as below subscribed this ____ day of _____, 1987.

OREGON NATURAL GAS DEVELOPMENT CORPORATION

STATE OF OREGON ENERGY FACILITY SITING COUNCIL

By: _____
General Manager

By: _____
Chairman

Attest: _____
Secretary

Attest: _____
Secretary

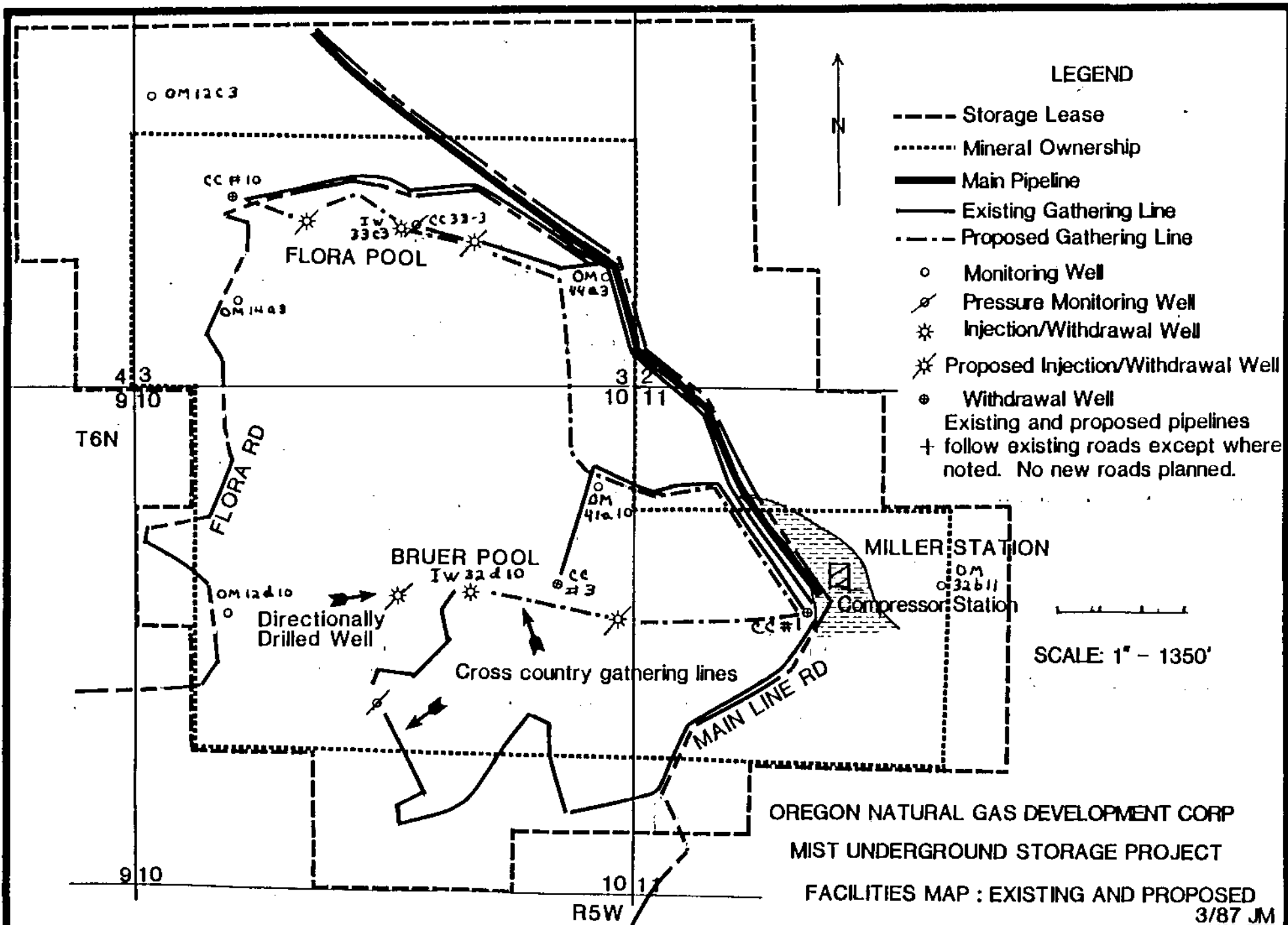


Exhibit 3 Revised 9/17/87



A T T A C H M E N T 2

STAFF REPORT ON

AMENDMENT NUMBER 1
TO THE UNDERGROUND STORAGE FACILITY
SITE CERTIFICATE AGREEMENT
FOR THE MIST SITE

Charlie Grist

September 18, 1987



PROPOSED AMENDMENT: Extend the warranty for completion of construction to August 31, 1990.

PROPOSED BY: Oregon Natural Gas (ONG)

DISCUSSION AND CLAIMS: ONG requested to amend the construction completion warranty in April of 1987. This was five months before the August 31, 1987 expiration date.

ONG has not completed construction of the project because it is waiting for the Public Utility Commission (PUC) to approve the project to be paid for by rate payers. ONG applied for this approval before the project is completed which is not usual. PUC staff has serious concerns about the economics of the project.

ONG plans to complete the project. ONG believes that the option to fully develop Mist should be preserved. Completion would include drilling several new wells, adding gathering lines, compressors, and other facilities. About \$10 million has been spent on facilities at Mist so far not including gas. Completion would take another \$5 million.

One Mist resident believes that extension should not be granted because of safety issues. In her opinion EFSC should make sure that there is no danger from reported seismic events before the certificate is amended.

Columbia County has not challenged this amendment.

STAFF EVALUATION: There have been no technical reasons why the project could not have been constructed before the August 31, 1987 site certificate warranty deadline. The delay is probably caused by uncertain economics.

It is doubtful that the PUC will decide to allow the project in rate base before the project is completed. More likely PUC will wait until the project is completed to decide if it is used and useful. This is only staff opinion since the issue is still in contested case proceedings at the PUC.

Although ODOE staff believes that project economics are in question, there is no siting standard for need or economic prudence for underground gas storage projects. Hence, there are no grounds for the Council to deny the amendment based on uncertain economics.

Staff does not believe that potential danger from reported seismic activity is enough to deny extending the site certificate. Seismic activity should be monitored however. This is addressed in another amendment.

Staff believes that with proper monitoring there is no unreasonable risk to public health and safety by extending the construction completion date. In effect, an extension would give ONG another three year option to complete the facility.

RECOMMENDATION:

Staff recommends the Council extend the construction completion warranty as requested by ONG. Section III.A should be amended as follows. New language is underlined, language to be deleted is bracketed:

- III.A. Completion of Construction
"ONG warrants that the construction of the underground natural gas storage facility and related and supporting structures will be completed prior to August 31, 1990 [August 31, 1987]."

PROPOSED AMENDMENT: Update the map of existing and proposed facilities for the Mist Project.

PROPOSED BY: Oregon Natural Gas

DISCUSSION AND CLAIMS: Appendix 1 of the site certificate is a map of existing and proposed facilities at the storage site. Exhibit 3 from ONG's amendment application is an updated version of this map. Included in the new map are two proposed injection/withdrawal wells, new loops for gathering pipelines and new locations for monitoring wells.

All parties agree to the updated map.

STAFF EVALUATION: The existing facilities are accurate. The proposed facilities are based on ONG's most recent vision of the completed project.

RECOMMENDATION: Staff recommends that the map in Appendix 1 of the site certificate be replaced by the map in Exhibit 3 of ONG's amendment application.

PROPOSED AMENDMENT: Clarify the description of the project to include a depth limitation.

PROPOSED BY: Columbia County

DISCUSSION AND CLAIMS: The certificate describes the surface boundaries of the storage site, and mentions the Bruer and Flora pools. It does not describe the depth of the pools. The County wants the depth described in the certificate.

The County also discovered that the site description, Section II.A.1. does not agree with Appendix I or Exhibit 3 in the number of sections of land that the pools are under. The correct number is three sections.

ONG does not believe an amendment is necessary but would not object to the addition of the depth description or the correction of the number of sections affected.

STAFF EVALUATION: The depth description is already contained in the mineral leases and deeds which are supporting documentation. However, staff believes that adding the depth description to the certificate would clarify the description and satisfy County concerns.

RECOMMENDATION: Staff recommends that section II.A.1 be amended as follows. Proposed language is underlined. Language to be deleted is in brackets:

II.A.1. "two naturally existing underground gas reservoirs (the Flora and Bruer pools) in portions of 3 [6] sections of land all in Township 6 North, Range 5 West of the Willamette Meridian in Columbia County, Oregon, containing 940 acres, more or less from the surface of the earth to the base of the Clark and Wilson Sands and the stratigraphic equivalent thereof, which in the case of the Bruer pool was identified at a measured depth of 3,095 feet in the REC CC#1 RD 1 well and in the case of the Flora pool was identified at measured depth of 2,760 feet in REC CC#33-3 well and are [in Columbia County, Oregon,] entirely within project boundaries described in Appendix 1 attached hereto and by reference incorporated herein; and"

PROPOSED AMENDMENT: Expand what changes to the facility require a site certificate amendment. Clarify what procedure ONG uses to obtain County conditional land use permits for amendments.

PROPOSED BY: Columbia County

DISCUSSION AND CLAIMS: The County wants ONG to amend the site certificate each time a facility is installed, changed or moved. They want the list of facilities requiring amendments expanded. Secondly, the County is unclear about the procedure for amendments when County land use issues are concerned. The County wants to be sure that it can protect its land use plans and goals if the facility is modified or expanded.

ONG has agreed to apply to the County for conditional land use permits. However, they do not believe that EFSC should give up its authority to overrule local government land use decisions.

STAFF EVALUATION: The site certificate already requires ONG to obtain amendments for major modifications. The list of facilities can be expanded as the County requests.

Staff believes that the procedure addressing land use is the same for facility modifications as it is for site certificates. That procedure requires ONG to apply to the County for a conditional land use permit for a major modification. The County can grant or deny this permit.

The rules require EFSC to find that the modification is consistent with County land use plans. If the County grants the permit there is no problem. If the County denies that the modification is consistent with its land use plan, EFSC must determine that the modification is consistent with statewide planning goals before amending the certificate. This procedure allows EFSC to consider County land use concerns. But it also allows EFSC to overrule local authority when necessary to protect public health and safety or promote state planning goals. This language is in OAR 345-100-45.

RECOMMENDATION: Staff recommends amending Section V.1 by adopting language specified by the County to expand the list of facilities requiring amendments. Proposed language is underlined. Language to be deleted is bracketed:

V. Other Conditions

1. "It is agreed by ONG and EFSC that construction or replacement of any [other] monitoring well injection/withdrawal well, pipeline or gathering line, or any other facility not shown in Appendix 1 or identified in part II of this agreement shall require an amendment of this agreement as provided in part VII below."

Staff also recommends changing Section VI.6 to require ONG to apply for County conditional land use permits for these types of amendments.

VI. Approvals

6. "Columbia County Building, plumbing, [and]electrical, and conditional land use permits."

PROPOSED AMENDMENT: Include a requirement to develop an emergency response plan as a condition of the site certificate.

PROPOSED BY: Columbia County and the Mist-Birkenfeld Rural Fire District

DISCUSSION AND CLAIMS: The County and ONG agree that a plan should be developed and implemented to protect people and property from potential accidents at the storage site. They agree to work together with the Mist-Birkenfeld Rural Fire District (M-B RFD) and other appropriate local response agencies to develop and implement such a plan. The County wants ONG to bear the reasonable cost of developing such a plan. They also want EFSC, or some other state agency to approve the plan. The County wants these conditions addressed explicitly in the site certificate.

ONG does not want the cost responsibility and plan approval to be a condition of the site certificate. They would rather work out a plan that is acceptable to the County. ONG is willing to pay something to develop and implement the plan. They believe that if the plan and/or cost responsibilities are not acceptable to the County, then the County can go to EFSC for review of the plan.

STAFF EVALUATION: Staff believes that the existing certificate is adequate. Warranty III.D of the certificate addresses safety. It requires ONG to ensure that construction and operation of the Mist underground storage facility poses no danger to the public health and safety. This is accomplished through existing federal DOE pipeline safety regulations and special distance conditions, between facilities and residences, imposed by the site certificate.

Staff believes that it is an implied condition of this warranty that ONG provide training and any special equipment necessary for the appropriate agencies to respond to natural gas fires at the site.

RECOMMENDATION:

Since ONG, the County, and the M-B RFD all agree that a plan should be developed, there is no need to amend the site certificate. Rather, staff recommends that such a plan be developed by ONG before April 30, 1988. If the plan is not acceptable to the County or the M-B RFD, they can demonstrate to the Council that Warranty III.D has not been met. The Council can then decide to revoke, amend, or maintain the site certificate.

PROPOSED AMENDMENT: Notify the County of any request to pressurize the storage facility above discovery pressures.

PROPOSED BY: Columbia County

DISCUSSION AND CLAIMS: The County wants to be notified when ONG seeks to pressurize either of the reservoirs above discovery pressures. This is to give the County time to have their geologist do an independent review of the safety of over pressurization.

ONG has agreed to notify the County at the same time they demonstrate to EFSC that higher pressures will not endanger public health and safety in accordance with Section IV.C.11.

STAFF EVALUATION: Staff concurs.

RECOMMENDATION: Staff recommends that the certificate be amended by adding the following sentence at the end of Section IV.C.11:

"ONG shall notify Columbia County when it notifies EFSC that it wishes to increase reservoir gas pressures above discovery pressure."

PROPOSED AMENDMENT: ONG be directed to file saltwater disposal permits with EFSC and that copies be provided to the County.

PROPOSED BY: Columbia County

DISCUSSION AND CLAIMS: Some gas wells produce saltwater. This water is disposed of in two ways. For large amounts of water the Department of Geology (DOGAMI) allows disposal by reinjection into abandoned wells. For small amounts the Department of Environmental Quality (DEQ) allows saltwater to be spread on roads during the summer months.

The County wants the appropriate permits to be filed with EFSC and with the County.

The question of water quality changes was also raised by some local residents. Some residents have complained of changes in their well water since the project began.

STAFF EVALUATION: The saltwater disposal permits are held by ARCO which drills most of the wells in the area, and produces most of the saltwater. ONG does not hold these permits. ONG has an agreement with ARCO to dispose of saltwater generated at the storage site.

Copies of the appropriate permits are available to the County through DEQ and DOGAMI.

None of the water quality changes claimed by residents have been documented. ONG has agreed to test any water thought to be contaminated. One resident did have tests and no harmful agents were found in the water. Staff does not believe the project has caused any of the changes noted. If documented violations of water quality standards occur, there are existing ways to address them. None require a change to the site certificate.

RECOMMENDATION: Staff recommends that since the appropriate permits have been granted, and are on file at DEQ and DOGAMI no amendment is necessary. The County can request copies of the permits from DEQ and DOGAMI.

Staff recommends that individuals with water quality complaints should document changes through water quality testing. Testing is available from ONG, the Department of Water Resources, DEQ, or private testing labs. If it can be shown to the satisfaction of the Council that operation or construction of the project is the likely cause of water quality deterioration then the Council can take action.

PROPOSED AMENDMENT: Amend the site certificate to require ONG to provide seismic monitoring.

PROPOSED BY: Staff

DISCUSSION AND CLAIMS: Earthquake-like events were reported by Mist residents the last week of April, 1987. An independent geophysicist hired by ONG prepared an interim report on the reported tremors. He made no conclusions but noted that initial indications were that the events were not ground movements. He noted that seismic instruments at PSU, Trojan, and Mount St. Helens did not pick up any earth source movements originating in the Mist area during the last week of April.

In response to the reported tremors the independent geophysicist began seismic recording in June. This testing has not recorded any ground movement to date. During the monitoring period there were two reports of tremors. The geophysicist noted that neither of these was picked up by the instrument. His final report and conclusions were not available at the time this staff report was prepared.

ONG doubts that the events were caused by storage facility operation. DOGAMI doubts that the reported events were caused by gas injection or withdrawal but cannot be sure without further instrumentation and documentation.

Residents don't know the cause but have two concerns about possible earth tremors. One concern is that operation of the storage reservoir somehow causes tremors that will cause damage to property, or make the storage site unsafe. The other concern is that natural tremors in the area could make the storage facility unsafe by causing leaks or equipment failure.

STAFF EVALUATION: Earth tremors or other things like sonic booms or local seismic testing could explain the reported phenomena. Seismic testing for gas exploration coincided with reported tremors in the Mist area during the last week of April. The geophysical testing company noted that tests using dynamite occurred up to dark that week. Sunset occurred about 8:10 in the evening that week. Dark occurred at about 8:40, about the time of the latest reported tremors. The independent geophysicist hired by ONG indicated seismic testing could cause minor tremors.

Regarding the first concern of residents, it is not known if operation of the facility caused the April events. There is some chance that this could happen. Geologists at DOGAMI doubt it is likely but admit it is a possibility. The reported April events did not cause any measurable property damage. They did not cause any change in the response of the reservoirs to gas injection. The reservoirs did not develop leaks during this period. Scientists can not assess what risk facility-caused tremors may create without extensive geotechnical research.

Regarding the second concern there is little evidence in the nation's 400 other storage sites that natural earth movements present a significant risk. Most natural gas reservoirs, like Mist, have held gas for millions of years before they were discovered. Probably many of them have endured earth tremors. In the few instances where leaks have occurred at storage sites they were caused by well casing failures or leaks in the rock structures that cap the reservoirs. However, every storage site is geologically different. Because it has not happened elsewhere is no proof it could not happen at Mist. The likelihood of earth tremors in the Mist area causing leaks cannot be known without expensive additional study.

To determine if the operation of the facility is causing tremors DOGAMI believes that several injection withdrawal cycles should be monitored to look for correlations between seismic events and reservoir pressure, pumping data, local reports, and other phenomena. Necessary instrumentation would consist of at least three seismic measuring units set up around the storage site. The instruments cost about \$3000 each. An adequate monitoring system would cost ONG \$10,000 to \$20,000.

Staff believes that there is legitimate concern about seismic events and safety. ONG should be required to monitor seismic activity in the immediate vicinity of the storage site for three injection/withdrawal cycles. This should be done to look for correlations between seismic activity and facility operations.

If no ground movements are detected in three cycles ONG can discontinue seismic monitoring. If ground movements are detected but not thought to be caused by storage operations, ONG should determine what risk such events present to the safety of the facility. If it appears that storage operations cause ground movements ONG should pay for any damages caused to private property, as well as assess the risk such events present to the safety of the facility.

RECOMMENDATION: Staff recommends that the certificate be amended to include seismic monitoring as a condition of the site certificate. Section IV.C.5 should be amended as follows. New language is underlined:

IV.C.5 Monitoring Program

"Design, construction and operation of the underground storage reservoir and related of supporting facilities shall incorporate a monitoring program to ensure the public health and safety and to detect leakage using the best available technology and testing procedures available as of the date of this Certificate or as described in ONG's application and supporting testimony relating to OAR 345-100-040(6) and (7). The program shall include monitoring of local seismic activity using the best available technology and testing procedures available as of the date of Amendment Number 1 and as described in the staff report on Amendment Number 1, dated September 18, 1987."



A T T A C H M E N T 3

SUMMARY OF THE HEARING REGARDING
THE MIST STORAGE SITE

CONTENTS

1. Summary of the Hearing, Charles Grist Hearing Officer
2. Testimony of Paul Hathaway, Oregon Natural Gas
3. Testimony of Robert Grey, Attorney for Columbia County
4. Testimony of John DeFrance, Columbia County Office of
Emergency Services
5. Summary of responses to a Local Survey about Earth Tremors
and Water Quality.
6. Copies of Local Surveys
7. Interim Report on Ground Vibration Monitoring at Mist,
Oregon, by Michael Feves, Ph.D.
8. Summary of Natural Gas Pipeline Accidents in Oregon



SUMMARY OF THE HEARING
ABOUT AMENDING THE MIST GAS STORAGE SITE CERTIFICATE

Held at Natal Grange Hall near Mist, Oregon
July 15, 1987
Charlie Grist, Hearing Officer

The meeting began at 7:30 in the evening.

Approximately 30 people attended the meeting. About half were local citizens. The other half were representatives of Columbia County, Oregon Natural Gas Development Corp., Northwest Natural Gas, the Mist-Birkenfeld Rural Fire District or ARCO.

Robert Johnson, counsel for Northwest Natural Gas (NNG), was the first to take the microphone. He announced that there were copies of the existing certificate, the proposed amendment, and Paul Hathaway's testimony available. These were put on a table, and people took copies.

Paul Hathaway, President of Oregon Natural Gas Development Corporation (ONGDC) and Senior Vice President of NNG was the next to testify. He presented the amendment as proposed by ONGDC. A transcript of his testimony is attached. The proposed amendment would:

- extend the completion date to August 31, 1990;
- add exhibit number 3, a map, which would conform the description of the related and supporting facilities for the project to what exists today and what the company envisions to complete the project.

Next, three representatives from Columbia County presented testimony. County Commissioner Jack Petersen introduced the attorney for the County, Robert Grey, and County Emergency Response Coordinator, John DeFrance.

Robert Grey presented testimony that was intended to clarify understandings between the County and ONGDC. Eight specific concerns, understandings, and requests for amendments are listed below. A copy of his testimony is attached.

1. The County understands that amendment map, exhibit number 3, identifies all related and supporting facilities. They believe that any modifications of related or supporting facilities will require further amendments. They want the amended certificate to include a statement to that effect.
2. They want the description of the facility to include a depth description of the Bruer and Flora pools.
3. They want a clarifying statement that exhibit 3 specifies all supporting facilities.

4. They want all new monitoring wells, including those that are moved, to be included as major supporting facilities and thereby require an amendment to the site certificate. They want to know whether or not the site certificate preempts county requirements that any new or moved well get a conditional use permit from the County.
5. They want to be notified if ONGDC applies to pressure the reservoir above discovery pressure. They want enough time to have independent review by their own geologist
6. They understand that any saltwater disposal requires a DEQ permit and that the required parties get permits from DEQ. They want ONGDC to provide copies of these permits.
7. They are concerned that the site certificate does not require an emergency response plan. They requested that the certificate should have such a provision and that ONGDC or NNG should bear the reasonable cost of developing a plan. They recommend that the plan should be coordinated with the County, the Mist-Birkenfeld Rural Fire District, and have final approval by an appropriate state agency.
8. They noted that the time between notification of the proposed amendment and the deadline for requests for hearings was too short for them to adequately address problems.

John DeFrance, County Emergency Response Coordinator made statements next. A copy of his testimony is attached. He testified:

- that the Mist-Birkenfeld Rural Fire District (M-B RFD) has undertaken the initial burden of emergency response;
- that their plan includes both fire and ambulance service to the gas well facilities;
- that the M-B RFD is a totally volunteer force. That any major emergency will require assistance from other resources in Columbia County;
- for the development of a coordinated plan and operational procedures; and
- that the plan should be tested through periodic exercises.

Citizen Art Laubach testified:

- that local citizens weren't against the project, they just wanted answers to concerns about earth tremors and water quality issues.

Dave Crawford, chief of the M-B RFD testified:

- in favor of developing an emergency response plan paid for by ONGDC;

- that reports of tremors and water quality problems should not be ignored; and
- that he would like to see more gas company people involved in community affairs.

Norm Muller, Fire Marshal of the M-B RFD, is responsible for fire safety inspection in the district. His area covers the storage site and many exploration and gas production wells. He testified:

- about problems with well drillers not filing for permits on time;
- that most problems seem to be with ARCO, the major driller in the area, not with ONGDC;
- that the safety of activities at the storage site were better than at other drilling activities; and
- that most problems at the storage site are cleared up soon after being identified.

Louise Green, local citizen, testified about her response to a survey of local residents about earth tremors and water quality changes. She testified:

- that she has noticed earth tremors;
- that she has noticed a change in the odor of her water since gas injection has started;
- that tremors need thorough investigation and that possibly storage be ceased until the cause of the tremors is identified;
- that no amendment should be granted until tremor studies are completed; and
- that if tremors are caused by operation of the storage site, restitution be given affected land owners.

Louise Green's testimony relaxed the group enough so that others began to testify about tremors. This seemed to be the major concern of local residents. Local citizen Art Laubach presented copies of surveys completed by residents. Several people elaborated on their survey responses. The hearing officer agreed to tabulate the survey results. These results and all specific comments are attached.

Seventeen households responded to the survey. Twelve of the seventeen have noticed tremor like events. Many of these occurred during the last week of April 1987. Three events have specific dates and times.

Seven of the seventeen reported negative changes in their water systems. Complaints include less water, well runs dry sooner, tastes of sulfur, gas and oil, or drilling mud.

Paul Hathaway testified that ONGDC wants to work with the M-B RFD and the County on emergency response and training.

Charlie Stinson of ONGDC took the microphone to address some of the issues raised in previous testimony. He noted:

- that all well casings at the storage site have been tested. All casings are tight. Any water quality problems are probably not caused by leaky well casings;
- that local water quality has always been poor;
- that water tests were made before construction was started so there is a reasonably good base of information on pre-existing conditions;
- that ONGDC would test water and address specific complaints if asked;
- that noise at the facility is within DEQ limits; and
- that ONGDC hired a geophysicist to study the tremors and do some monitoring.

Michael L. Feves, the independent geophysicist presented his interim report on ground vibration in the Mist area. He noted:

- that he installed a sensitive vibration monitor at the residence of Art Laubach to try to record tremor activity;
- that no events identified as tremors have yet been recorded;
- that his preliminary analysis is that events reported by Mist residents were either very localized ground movements, or caused by non-ground sources like air over pressure from blasting, sonic booms, or engine backfires;
- that the events reported by Mist residents between April 20 and April 30 do not correlate with events recorded at sensitive instruments at Portland State University, Trojan Nuclear Plant, and Mount St. Helens;
- that additional analysis of pump and pressure data from the injection fields should be conducted to determine if there is any correlation between pumping activities and the reported April events; and
- that copies of his interim report were available at the table in the front of the room.

There was a long period of questions for Dr. Feves from residents, M-B RFD, and the hearings officer. Several hypotheses for tremors were discussed including fluid migration, strength of rock under high and low gas pressure or water saturation, fault lines, fault lubrication, other local seismic testing, changes in pressure gradients as injection starts, and others. Case histories at other storage sites were discussed. Lillian Jones of Columbia County requested some data. No conclusions about the source of the tremors were made. A copy of his interim report is attached.

One resident suggested replacing the large gas compressors with electric motors to reduce noise.

Dorothy Laubach, a Mist resident, suggested that all the people who reported tremors live very near each other and that they all live along a fault that runs from the storage site to Natai Bluff.

The meeting concluded at about 10:30. A tape recording of the hearing was made and is available for review.



BEFORE THE ENERGY FACILITY SITING COUNCIL
OF OREGON

In the Matter of the Application)
of Oregon Natural Gas Development)
Corporation to Amend its Mist)
Underground Storage Facility Site)
Certificate Agreement)

TESTIMONY OF
PAUL L. HATHAWAY

Dated: July 15, 1987



BEFORE THE ENERGY FACILITY SITING COUNCIL
OF OREGON

In the Matter of the Application)
of Oregon Natural Gas Development)
Corporation to Amend its Mist)
Underground Storage Facility Site)
Certificate Agreement)

TESTIMONY OF

PAUL L. HATHAWAY

My name is Paul L. Hathaway. I am President of Oregon Natural Gas Development Corporation and Senior Vice President of Northwest Natural Gas Company. I am presenting this testimony in support of Oregon Natural's application to amend its Mist Underground Storage Facility Site Certificate.

Oregon Natural is requesting that the Energy Facility Siting Council extend the completion date for construction of the Mist Storage facility and recognize the latest design for the facility. The proposed amendments are shown in Exhibits A and B to my testimony.

Oregon Natural received its Site Certificate to develop the Mist Storage Project on September 30, 1981. At that time, the proposed storage facility was part of the Mist natural gas production area. Gas production continued at the proposed facility through November, 1984.

With the suspension of production, Oregon Natural commenced preparation for the conversion of the reservoirs to


underground storage operations. Further engineering and geologic studies were commenced, as were studies to determine the most economic way to use the storage operations.

The engineering studies reviewed the facilities requirements to activate storage operations and the timetable for construction. The geologic studies reviewed the known information regarding the reservoirs and conducted additional field studies to establish the operating characteristics and well requirements for the reservoirs. The economic studies addressed whether the facilities should be integrated into Northwest's system or dedicated to interstate use.

The engineering studies concluded that the existing configuration of the facilities to move the gas into and out of storage would require some modification. The gathering system to the injection/withdrawal wells would be modified by looping the system to provide two-way access to each well. No other modifications were found to be necessary. The studies also concluded that the Mist Project could be completed by June, 1987 with construction starting in the summer of 1986.


The geologic studies established that the reservoirs are subject to water intrusion with the reduction in pressure caused by the withdrawal of natural gas, which could result in the reduction of the storage capacity of the reservoirs. The studies also identified more clearly the location requirements for the injection /withdrawal wells and monitoring wells.

The economic studies concluded that the maximum benefit from the development of the storage reservoirs would occur if the



Mist Project was integrated into Northwest's system as part of its utility operations.

As a result of the economic studies, Northwest commenced discussions with the Oregon Public Utility Commissioner's (OPUC) office regarding the transfer of the Mist Project. On July 29, 1986, Northwest filed an application with the OPUC for authority to acquire the Mist Project and to recover through rates the cost of completing the Project. On August 21, 1986, the OPUC set Northwest's application to acquire the Mist Project for hearing (Dockets UM 125/UP 38) in order to review the economics of developing the project in light of national gas policy. As a result of the time requirements of the OPUC's review of Northwest's application, Oregon Natural has deferred completion of the Mist Project.



The decision to defer completion of the Mist Project has not stopped Oregon Natural or Northwest from taking interim measures to protect the storage capacity of the reservoirs. Northwest has negotiated an interim storage agreement with Oregon Natural to place into storage sufficient natural gas to repressure the reservoirs to seventy-five percent (75%) of their discovery pressure to block future water intrusion.

As a result of this arrangement, and in order to deal with the problems of water intrusion and potential loss of storage capacity, Oregon Natural commenced drilling of monitoring wells in November, 1986. Injection/withdrawal wells sufficient to allow the repressuring of the reservoirs were completed in January, 1987 and injection of natural gas began in February,

1987. The locations of the wells drilled under this interim arrangement are shown on Exhibit B to my testimony.

Oregon Natural's amendments would extend the completion date to August 31, 1990 and conform the description of the related and supporting facilities for the Mist Storage Project to what exists today and what the company envisions to complete the project. Exhibit A is the verbatim amendment to the Site Certificate to reflect the change in the completion date. Exhibit B is the updated facilities map showing the related and supporting facilities for the Project.

This concludes my testimony, however, I will be glad to answer any questions regarding the application.



EXHIBIT A

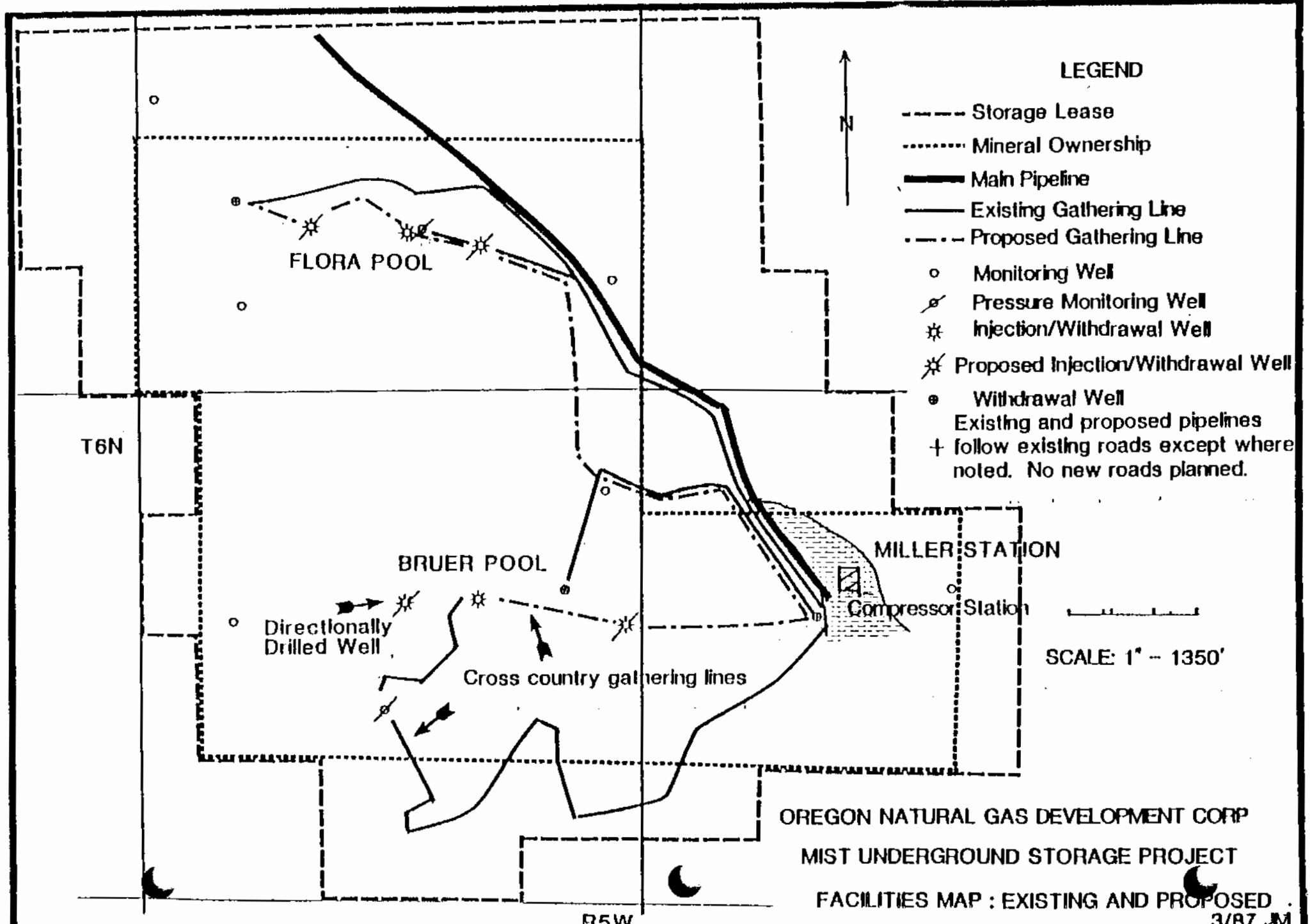
III. Warranties

...

"A. Completion of Construction

ONG warrants that the construction of the underground natural gas storage facility and related and supporting structures will be completed prior to August 31, 1990."...





OREGON NATURAL GAS DEVELOPMENT CORP
 MIST UNDERGROUND STORAGE PROJECT
 FACILITIES MAP : EXISTING AND PROPOSED

3/87 JM

Exhibit B

LAW OFFICES OF
PRESTON, THORGRIMSON, ELLIS & HOLMAN

3200 U. S. BANCORP TOWER
111 S. W. FIFTH AVENUE
PORTLAND, OREGON 97204-3635
(503) 226-3200

TELECOPY (503) 248-9085


July 20, 1987

5400 COLUMBIA SEAFIRST CENTER
701 FIFTH AVENUE
SEATTLE, WASHINGTON 98104-7011
(206) 623-7550
TELEX 4740035
TELECOPY (206) 623-7022

1735 NEW YORK AVE., N.W., SUITE 800
WASHINGTON, D.C. 20006
(202) 628-1700
TELEX 904059 WSH
TELECOPY (202) 331-1024

420 L STREET, SUITE 404
ANCHORAGE, ALASKA 99501
(907) 276-1959
TELECOPY (907) 276-1369

SEAFIRST FINANCIAL CENTER
SUITE 1480
SPOKANE, WASHINGTON 99201
(509) 824-2100
TELECOPY (509) 456-0146



ERT J. GREY
RECEIVED

DEPARTMENT OF ENERGY

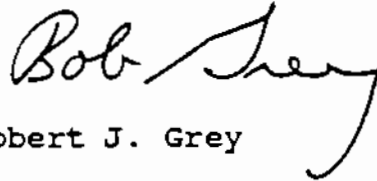
Mr. Jack Peterson
Columbia County Commissioner
Courthouse
St. Helens, Oregon 97204

Re: Testimony Presented on Behalf of
Columbia County before EFSEC

Dear Jack:

Enclosed is a copy of our testimony before EFSEC.

Very truly yours,



Robert J. Grey

Enclosure

cc: Mr. Charlie Grist
Mr. Robert Johnson

RJG/la
C:COL003.LTR



T E S T I M O N Y

Presented on Behalf of

Columbia County before EFSEC

My name is Robert J. Grey. I am an attorney with Preston, Thorgrimson, Ellis & Holman. My address is 3200 US Bancorp Tower, 111 SW Fifth Avenue, Portland, Oregon 97204-3635. I am here tonight representing Columbia County.

Columbia County has a number of comments about the EFSEC permit request which is the subject of this proceeding. Our comments are intended to clarify some matters which are raised in the application. With the changes requested by the county, we are not opposed to the application.

As you probably know, Columbia County has an interest in these proceedings for two reasons. First, because a number of county citizens have expressed concerns about the proposed facilities. We want to ensure that those concerns are fairly responded to before the permit is granted. Second, the county is the mineral owner for a substantial portion of the minerals located in Mist Fields. As you know, the county conveyed its mineral interest in the Bruer and Flora pools to ONGDC last year in settlement of litigation involving those pools. The county wants to be sure that the proposed storage facility will not in any way interfere with its remaining mineral interest and will not adversely affect the safety and welfare of county residents.

The county has the following specific comments on the draft application.


1. Description of project location.

After meeting with representatives of Northwest Natural Gas, it is our understanding that the EFSEC permit applies to the site identified in Exhibit 3 attached to the amended application, and that Exhibit 3 identifies major components of related and supporting facilities which are subject to this permitting process. We understand that any modification of these related and supporting facilities will require further amendments to the certificate. We believe a statement to this effect would be helpful in clarifying the application.

2. Depth description.


The amended application, as drafted, does not contain any description of a depth limitation which applies to the proposed storage facility, although the exhibits include a copy of a deed conveyed by the county to ONGDC, which does include a depth limitation. For purposes of clarity, and to conform with the requirements of OAR 345-100-055, we request the application include a depth limitation description, and propose that the description of the deed be included in the permit. We understand that ONGDC is agreeable to this change.

3. Supporting facilities.




As indicated before we met with Northwest Natural Gas, it was unclear exactly which facilities were included as supporting facilities under the terms of OAR 345-100-055. We now understand that Exhibit 3 identifies the major related and supporting facilities. It may be helpful to include a clarifying statement in the certificate to this effect.

4. Permits for monitoring wells.



It is our understanding that once the EFSEC permit is granted, additions of major related and supporting facilities will require amendments to the certificate. We understand that Northwest Natural believes that additional monitoring wells constitute a major addition. In that case, Northwest Natural believes that they would be required to seek conditional use permits, but, if denied, they could assert that land use requirements are preempted. Also, Northwest Natural believes that relocating an existing monitoring well would not constitute a major modification for which an amendment would be required.



We have not had the opportunity to conduct a thorough legal review to determine whether we agree that the EFSEC process can preempt conditional use requirements for such wells. However, we are concerned about this prospect as the same land use considerations which required conditional use review for the existing monitoring wells would also apply to any relocated or new well. We believe

relocated wells are major modifications for which an amendment is required. Further, if EFSEC has any discretion, we request that the certificate state that conditional use requirements for monitoring wells remain in place and not be preempted.


As a sidelight to this, the county wishes to note that there was a disagreement in the past over Northwest Natural's right to locate a monitoring well outside the portion of the Bruer and Flora pools conveyed to ONGDC once the existing mineral lease expires. This disagreement does not appear to be affected by the EFSEC permit with respect to this facility, except that in our view, Northwest Natural will need to enter some arrangement with the county to continue to locate monitoring wells in those areas on expiration of the mineral lease.

5. Pressurization to 1250 psi.

Northwest Natural has requested the right to request an increase in pressurization to 1250 psi at some future time. The county would like to be notified of any such requested increase so our independent geologist can comment on its feasibility. We understand this is acceptable to Northwest Natural.


6. Saltwater disposal.

We have discussed with Northwest Natural the present practice of disposing of saltwater in one county well and on certain private roads in the county. We




understand that this disposal is being conducted by ARCO under permit from DEQ. We have requested a copy of the permit.

We are concerned about any additional saltwater disposal which may occur as a result of storage facility operations. We understand from Northwest Natural that should any saltwater disposal occur as a result of the storage operation, Northwest Natural is required to obtain the appropriate disposal permits.



7. We are also concerned that the certificate does not require an emergency response plan. The county believes this emergency response plan should be included in the certificate and that Northwest Natural should be required to pay for the reasonable costs of implementation. We also believe that the plan should be coordinated with the county and that final approval be required by EFSEC or some appropriate state agency. The county has asked John DeFrank, Emergency Services Director, to address this.



Our final concern has to do with timing of this application. The county only received the application to amend the site certificate one week before requests for hearing were due. While the county does not wish to create

any stumbling blocks in the permit process, we are concerned that the health and welfare and economic well-being of county residents be protected. It is our feeling that the brief review period we had at that time made it more difficult to carry out these responsibilities.

Thank you for the opportunity to comment. We will be pleased to answer any questions you have.

RJG/la

C:COL001.MM



OFFICE of EMERGENCY SERVICES
COURTHOUSE,
ST. HELENS, OREGON 97051

Phone: 503 397-2100

RECEIVED

JUL 15 1987
DEPARTMENT OF ENERGY

July 15, 1987

My name is John DeFrance. I am the Emergency Services Director for Columbia County. I want to briefly expand on some of the testimony given on behalf of Columbia County.

Since the start of drilling in this area and the development of the several gas wells, transmission lines, Miller Station and now the underground storage facility, the burden of initial emergency response has fallen to the Mist-Birkenfeld Rural Fire District. The Fire District has developed a response plan and provides both fire and ambulance service to the gas well facilities. The primary emphasis for emergency response is with explosion and fire and its potential impact on persons and property.



While it is well recognized that the Mist-Birkenfeld Rural Fire District would be the first local government agency to respond, it is also well to recognize that in a major emergency they will need assistance. It is in recognition of this that we feel a broader emergency response plan is needed. Resources from within Columbia County and others available through the State can be used to assist with an emergency response. However, to adequately utilize these resources and coordinate an emergency response, a plan and operational procedures must be developed. In addition, the plan and procedures must be tested through periodic exercises.

We are proposing that a coordinated effort be undertaken by the County, the State, local response agencies and NW Natural Gas to develop plans and procedures agreeable to all that will protect the life and property of citizens living in this area. I would suggest that the final authority for approval of the plan be vested with the State, either the EFSC or an ODOE representative. Further, I would suggest that funding for the cost of planning and on-going updates, testing and training be borne by NW Natural Gas.



I do feel that an acceptable and workable emergency response plan can be developed. With the various parties previously mentioned working together this can be done. Thank you.



ART LAUBACH SURVEY RESPONSE

	<u>Water Problems</u>		<u>Tremors</u>		<u>Noise</u>
Marvin Bloomer	YES		YES		
Pierce Dozier		NO	YES		
Bonnie Forney		NO		NO	
Natal Grange Hall		NO	YES		
Jeanette Grant	YES		YES		
Louise Green	YES		YES		
Jerry Hemeon		NO	YES		
David Higginbotham	YES			NO	
Art Laubach	YES		YES		
Marjory Lushy		NO	YES		
Walter Mathews	YES			NO	
Anne Oijah		NO		NO	
Anna Rau		NO	YES		
Vivian Reynolds		NO	YES		YES
Roberta & Bruce Shaw	YES		YES		
Mist Store		NO	YES		
Mary Lou Yoder		NO		NO	
	<u>7</u>	<u>10</u>	<u>12</u>	<u>5</u>	

Area Population Estimate: About 125 registered voters, about 35 families

CG:tjp
2454K(f1)



EARTHQUAKE LIKE TREMORS
SUMMARY OF COMMENTS FROM THE ART LAUBACH SURVEY

Below are written comments people made answering the question: "Have you noticed any earthquake type tremors in the last two years? If yes, please explain."

Marvin C. Bloomer: Had a good hard tremor on April 25, 1987, 7:30 p.m. That's the only hard one we felt.

Pierce Dozier: On April 25, 1987, we experienced a moderate tremor which shook our house (we live in a mobile home).

Natal Grange Hall: On April 22 at about 8:30 p.m. while attending a meeting at the Natal Grange Hall the whole north wall rattled in the building.

Jeanette Grant: Big banging noise, house shakes.

Loise Green: It is hard to explain since we've never experienced anything like this. However, on 4-24 and 4-25, 1987, at 8:30 p.m. we were in bed but fully awake when a definite movement occurred through our house; starting at the NW corner and traveling through to the SE corner. Perfume bottles rattled, doors and windows rattled. It was like an invisible wave passing through everything. There was no accompanying sonic boom or other sound. It was a very upsetting and terrifying experience.

Jerry Hemeon: The first [one] I felt was a boom, like a sonic blast. The second was small tremors, rattling dishes, doors, etc. 4-24-87.

Arthur Laubach: On April 29, at about 8:45 p.m. in our house a very odd movement, and glass rattling, and twisted noise.

Majorie Lushy: I have noticed several tremors that vary in density and length. I can't remember the dates, but usually occur in the late evening. One was also reported to the news station mid-winter.

Vivian Reynolds: Have felt this type of vibration two times. One time I went out to check to see if there was a jet, but there was not. It happened sometime between 7:00 and 10:00 p.m.

Roberta and Bruce Shaw: Twice in March, same time, 9:30 to 10:00 p.m. More than twice in April, again around the same time which was in the afternoon. All together about seven to eight times and shook the whole house a lot.

Mist Store: Three or four weeks.

Ann Rau: April 20 visiting neighbors like a blast went off - couple of times. Heard sounds like close thunder but no storm.

WATER QUALITY
COMMENTS FROM THE ART LAUBACH SURVEY

Below are written comments people made answering the question: "Have you noticed any change in your water system in the last two years that you consider abnormal? If yes, please explain."

Marvin Bloomer Ran out of water quicker than normal in a hand dug well 16 feet deep, 8 foot water depth.

Jeanette Grant Sulfur and rotten eggs taste in a drilled 65 foot well.

Louise Green Summertime taste of sulfur. Former owners said no such problem, in a hand dug well 10 feet deep, water at seven feet.

Higginbotham Real wierd taste, getting worse with time in a drilled 85 foot well.

Art Laubach Had a taste exactly like the smell of drilling mud. Had to install a water purification system on his spring source water system.

Marjory Lushy Had to install a filter or purification system on her stream source well.

Walter Mathews Noticed change in hand dug well, 9 feet deep; water level is at four feet

Roberta and Bruce Shaw Gaseous - oily smell, oily film, bad taste, stomach upset on a hand dug well 9 1/2 feet deep, water depth is 1 1/2 feet.

CG:tjp
2454K(f1)
09/01/87

SURVEY

Have you noticed any change in your water system in the last two years that you consider abnormal? Yes _____ No

If yes please explain

Was it odor? YES _____ No _____
Sulfur ? _____
Rotten egg ? _____
Natural gas ? _____
Other ? _____

Was it taste ? Yes _____ No _____
Sulfur ? _____
Rotten egg ? _____
Natural gas ? _____
Other ? _____

Type of well = Drilled _____ Hand dug _____ Spring _____
Stream _____ River _____

Depth of Well _____ Depth of Water _____

Have you had to install A water filter or purification system in the last two years ? Yes _____ No _____

Have you noticed any earth Quake type tremors in the last two years ? Yes No _____

If yes please explain *Apr 20 visiting neighbors like a blatt went off - couple times heard sounds like close thunder but no storm*

Name *Cecilia Rau*

Address *Mist * Rt 1 Box 279 Clatskanie Or 97016*

Signature *Cecilia Marie Rau*

SURVEY

Have you noticed any change in your water system in the last two years that you consider abnormal? Yes No

If yes please explain

RECEIVED

Was it odor? YES No
Sulfur?
Rotten egg?
Natural gas?
Other?

DEPARTMENT OF ENERGY

Was it taste? Yes No
Sulfur?
Rotten egg?
Natural gas?
Other? *at different times*

Type of well = Drilled Hand dug Spring
Stream River

Depth of Well *65* Depth of Water *45*

Have you had to install a water filter or purification system in the last two years? Yes No

Have you noticed any earth quake type tremors in the last two years? Yes No

If yes please explain *big banging noise
house shakes*

Name *Jeannette Grant*

Address *64820 Nehalem Hwy N,
Wernonia, Oregon*

Signature *Jeannette Grant*

INQUIRY

Have you noticed any change in your water system in the last two years that you consider abnormal? Yes No

If yes please explain

At summertime leads our water taste of sulphur. According to former owners there was no such problem.

Was it odor? YES No
Sulfur?
Rotten egg?
Natural gas?
Other?

Was it taste? Yes No
Sulfur? *some what faint taste, strong odor.*
Rotten egg?
Natural gas?
Other?

Type of well Drilled Hand dug Spring
Stream River

Depth of Well *12ft* Depth of Water *7ft* ~~2ft~~

Have you had to install a water filter or purification system in the last two years? Yes No

Have you noticed any earth quake type tremors in the last two years? Yes No

If yes please explain

It is hard to explain since we've never experienced anything like this. ~~had~~ ^{was} ~~at~~ ^{near} 8:30 pm we were in bed but fully awake when a definite movement occurred thru our house starting at the N.W corner & traveling thru to the S.E. corner. ~~Plugs~~ ^{Plugs} rattled, doors & windows rattled. It was like an invisible wave passing thru every-thing.

Name *Orin & Jannie Green*

Address *Mist Rt Box 25, Clatskanie, OR 97016*

Signature *Jannie Green*

There was no accompanying sonic boom or other sound. It was a very upsetting & terrifying experience.

SURVEY

Have you noticed any change in your water system in the last two years that you consider abnormal? Yes _____ No

If yes please explain

Was it odor? YES _____ No _____
Sulfur ? _____
Rotten egg ? _____
Natural gas ? _____
Other ? _____

Was it taste ? Yes _____ No _____
Sulfur ? _____
Rotten egg ? _____
Natural gas ? _____
Other ? _____

Type of well = Drilled _____ Hand dug _____ Spring _____
Stream _____ River _____

Depth of Well _____ Depth of Water _____

Have you had to install a water filter or purification system in the last two years ? Yes _____ No _____

Have you noticed any earth quake type tremors in the last two years ? Yes No _____

If yes please explain

*The first I felt was a boom (like a sonic boom)
The second was like small tremors
(rattling dishes doors etc)*

4-24-87

Name *Jerrie Jensen*

Address *Box #52*

Wallace Rd, Mich. Ore 97016

Signature *Jerrie Jensen*

SURVEY

Have you noticed any change in your water system in the last two years that you consider abnormal? Yes _____ No _____

If yes please explain

Was it odor? YES _____ No _____
Sulfur ? _____
Rotten egg ? _____
Natural gas ? _____
Other ? _____

Was it taste ? Yes _____ No _____
Sulfur ? _____
Rotten egg ? _____
Natural gas ? _____
Other ? _____

Type of well = Drilled _____ Hand dug _____ Spring _____
Stream _____ River _____

Depth of Well _____ Depth of Water _____

Have you had to install A water filter or purification system in the last two years ? Yes _____ No _____

Have you noticed any earth Quake type tremors in the last two years ? Yes No _____

If yes please explain *Have felt this type of vibration 2 times
One time I went out to check to see if there was a jet but there was not. It happened some time between 7 p.m. & 10 p.m.*

Name Vivian L. Reynolds

Address 14431 Wallace Rd

Mist Ono 97046

Signature Vivian L. Reynolds

There is so much noise coming from the pump station some nights that one day back a
constantly it (1... of sleep)

SURVEY

Have you noticed any change in your water system in the last two years that you consider abnormal? Yes _____ No 23

If yes please explain

Was it odor? YES _____ No _____
Sulfur ? _____
Rotten egg ? _____
Natural gas ? _____
Other ? _____

Was it taste ? Yes _____ No _____
Sulfur ? _____
Rotten egg ? _____
Natural gas ? _____
Other ? _____

Type of well = Drilled _____ Hand dug _____ Spring X
Stream _____ River _____

Depth of Well _____ Depth of Water _____

Have you had to install A water filter or purification system in the last two years ? Yes X No _____

Have you noticed any earth Quake type tremors in the last two years ? Yes X No _____

If yes please explain *on April 22nd at about 8:30 PM while attending a meeting at Nat'l Oregon Hall, the whole North side rattled in bed, on April 29th at about 8:45 PM, in over hour, a very odd movement, and glass rattling was testified now*

Name Arthur C. Leubach

Address 64306 Hwy 47

Mish, Oregon 97016

Signature Arthur C. Leubach

SURVEY

Have you noticed any change in your water system in the last two years that you consider abnormal? Yes _____ No X

If yes please explain

We had our water tested a few months ago by a professional one of our faucets with a filter in second line the tested our water was very good and did not find any impurities.

Was it odor? YES _____ No _____

Sulfur ? _____

Rotten egg ? _____

Natural gas ? _____

Other ? _____

Was it taste ? Yes _____ No _____

Sulfur ? _____

Rotten egg ? _____

Natural gas ? _____

Other ? _____

Type of well - Drilled X Hand dug _____ Spring _____

Stream _____ River _____

Depth of Well 50' Depth of Water 20' from surface

Have you had to install A water filter or purification system in the last two years ? Yes _____ No X

Have you noticed any earth quake type tremors in the last two years ? Yes _____ No _____

If yes please explain *In April 25, 1997 we experienced a small tremor which was about 1/2 inch from all the ground in house.*

Name Dianna M. Poize

Address 1015 E. 1st Street

Metairie, OR 97016

Signature *Dianna M. Poize*

SURVEY

Have you noticed any change in your water system in the last two years that you consider abnormal? Yes No

If yes please explain

We ran out of water quicker than normal, usually run out in month of May usually and was run out of May instead of Nov,

Was it odor? YES No

- Sulfur ?
- Rotten egg ?
- Natural gas ?
- Other ?

Was it taste ? Yes No

- Sulfur ?
- Rotten egg ?
- Natural gas ?
- Other ?

Type of well = Drilled Hand dug Spring

Stream River

Depth of Well *1611* Depth of Water *211*

Have you had to install A water filter or purification system in the last two years ? Yes No

Have you noticed any earth Quake type tremors in the last two years ? Yes No

If yes please explain *Just a few days*

tremors, a April 25 27, 7:30/30. That's only but one, we felt

Name *Marion C. Bloomer*

Address *Mail at Box 19*

Clatskanie, Or 97016

Signature *[Handwritten Signature]*

SURVEY

Have you noticed any change in your water system in the last two years that you consider abnormal? Yes No

If yes please explain

It has a gas/oil smell and a film on it. The taste is bad and we have had some stomach upset

Was it odor? YES No

Sulfur ?

Rotten egg ?

Natural gas ?

Other ?

gas oil smell

Was it taste ? Yes No

Sulfur ?

Rotten egg ?

Natural gas ?

Other ?

not really sure how to explain taste, but it's not good

Type of well = Drilled Hand dug Spring

Stream River

Depth of Well 9 1/2 ft Depth of Water 1 1/2 ft

Have you had to install A water filter or purification system in the last two years ? Yes No

It was a bit ready he reworked the monitor

Have you noticed any earth Quake type tremors in the last two years ? Yes No

If yes please explain

twice in March same time 9:30pm-10pm, again more than twice in April around the junction between the bedroom, all together about 7-8 times and it shakes the house

Name Robert & Bruce Shaw

Address Star Rt / Box 27 Chatskovic, Va 97016

Signature Robert J. Shaw

but we can't use it because ~~it~~ when
it back flushes it makes the wells
go dry.

SURVEY

Have you noticed any change in your water system in the last two years that you consider abnormal? Yes No

If yes please explain

Was it odor? YES No
Sulfur?
Rotten egg?
Natural gas?
Other?

Was it taste? Yes No
Sulfur?
Rotten egg?
Natural gas?
Other?

Type of well Drilled Hand dug Spring
Stream River

Depth of Well 40 Depth of Water

Have you had to install A water filter or purification system in the last two years? Yes No

Have you noticed any earth Quake type tremors in the last two years? Yes No

If yes please explain

Name BONNIE FORNEY

Address 1147 67 200 70

CHARLOTTE, NC 28216

Signature Bonnie Forney

SURVEY

Have you noticed any change in your water system in the last two years that you consider abnormal? Yes _____ No X

If yes please explain _____

Was it odor? YES _____ No _____
Sulfur ? _____
Rotten egg ? _____
Natural gas ? _____
Other ? _____

Was it taste ? Yes _____ No X
Sulfur ? _____
Rotten egg ? _____
Natural gas ? _____
Other ? _____

Type of well = Drilled _____ Hand dug _____ Spring _____
Stream _____ River _____

Rich Hawk Lake

Depth of Well _____ Depth of Water _____

Have you had to install A water filter or purification system in the last two years ? Yes _____ No X

Have you noticed any earth Quake type tremors in the last two years ? Yes _____ No X

If yes please explain _____

Name John Smith

Address 123 Main St

Signature _____

SURVEY

Have you noticed any change in your water system in the last two years that you consider abnormal? Yes _____ No X

If yes please explain _____

Was it odor? YES _____ No X
Sulfur ? _____ X
Rotten egg ? _____ X
Natural gas ? _____ X
Other ? _____ X

Was it taste ? Yes _____ No X
Sulfur ? _____ X
Rotten egg ? _____ X
Natural gas ? _____ X
Other ? _____

Type of well = Drilled _____ Hand dug _____ Spring _____
Stream _____ River _____

*Freshwater
Lake water
System*

Depth of Well _____ Depth of Water _____

Have you had to install A water filter or purification system in the last two years ? Yes _____ No X

Have you noticed any earth Quake type tremors in the last two years ? Yes _____ No X

If yes please explain _____

Name Mary Lou Jodan

Address Rt 1 Box 220

Benkenfeld, Ohio 47016

Signature Mary Lou Jodan

SURVEY

Have you noticed any change in your water system in the last two years that you consider abnormal? Yes No

If yes please explain

Was it odor? YES No
Sulfur ?
Rotten egg ?
Natural gas ?
Other ?

Was it taste ? Yes No
Sulfur ?
Rotten egg ?
Natural gas ?
Other ?

*Lead, heavy metals, Hard to explain
increasing in time*

Type of well - Drilled Hand dug Spring

Stream River

Depth of Well *85'* Depth of Water

Have you had to install A water filter or purification system in the last two years ? Yes No

Have you noticed any earth Quake type tremors in the last two years ? Yes No

If yes please explain

We feel that there should be a filter/purification system with to reduce the iron or sulfur

Name *David H. ...*

Address *678 ...*

47061

Signature *[Signature]*

SURVEY

Have you noticed any change in your water system in the last two years that you consider abnormal? Yes No

If yes please explain

Was it odor? YES _____ No _____
Sulfur ? _____
Rotten egg ? _____
Natural gas ? _____
Other ? _____

Was it taste ? Yes _____ No _____
Sulfur ? _____
Rotten egg ? _____
Natural gas ? _____
Other ? _____

Type of well : Drilled _____ Hand dug Spring _____
Stream _____ River _____

Depth of Well 9' Depth of Water 4'

Have you had to install A water filter or purification system in the last two years ? Yes _____ No _____

Have you noticed any earth Quake type tremors in the last two years ? Yes _____ No

If yes please explain

Name Walter C. Mathews
Address Box 211 - Mt. Pleasant, Ark.
Signature Walter C. Mathews

SURVEY

Have you noticed any change in your water system in the last two years that you consider abnormal? Yes No

If yes please explain

Was it odor? YES No
Sulfur ?
Rotten egg ?
Natural gas ?
Other ?

Was it taste ? Yes No
Sulfur ?
Rotten egg ?
Natural gas ?
Other ?

Type of well Drilled Hand dug Spring
Stream River

Depth of Well 40 Depth of Water

Have you had to install A water filter or purification system in the last two years ? Yes No

Have you noticed any earth Quake type tremors in the last two years ? Yes No

If yes please explain 3 or 4 times

Name MAIST STONE

Address

Signature

SURVEY

Have you noticed any change in your water system in the last two years that you consider abnormal? Yes _____ No X

If yes please explain

Was it odor? YES _____ No _____
Sulfur ? _____
Rotten egg ? _____
Natural gas ? _____
Other ? _____

Was it taste ? Yes _____ No _____
Sulfur ? _____
Rotten egg ? _____
Natural gas ? _____
Other ? _____

Type of well = Drilled _____ Hand dug _____ Spring _____
Stream X River _____

Depth of Well _____ Depth of Water 1-3 ft.

Have you had to install A water filter or purification system in the last two years ? Yes X No _____

Have you noticed any earth Quake type tremors in the last two years ? Yes X No _____

If yes please explain I have noticed several tremors, all but two in January 2008. One in the night, one in the morning, and one in the afternoon. - One was reported to the local newspaper, mid winter.

Name MARJORIE KUSHNY

Address 1015 N. B. 20A

Whitman, Ore 97140

Signature Marjorie Kushny



INTERIM REPORT ON
GROUND VIBRATION MONITORING AT MIST, OREGON

Submitted to:

OREGON NATURAL GAS DEVELOPMENT CORP.
221 N.W. Second Avenue
Portland, OR 97209

Submitted by:

MICHAEL L. FEVES, Ph.D.
4110 S.W. Jerald Court
Portland, OR 97221
(503) 227-7650

July 14, 1987

11



INTRODUCTION

This report presents preliminary findings of a study of ground vibrations at Mist, OR. The work was authorized by Oregon Natural Gas Co. (ONG) under purchase order #7252 dated June 1, 1987.

BACKGROUND

Previously, a survey of the residents in the Mist area was conducted to determine the extent to which people have felt earthquake tremors within the past two years. Of the twelve people who responded to the survey, seven people reported some type of ground motion or air overpressure event. All of the reported events occurred in the immediate vicinity of Mist, OR. People from Vernonia, Clatskanie and Birkenfeld did not observe any events.

The reported events were variously described as: rattling of walls and windows, a "twisted noise", shaking of a mobile home, "a good long tremor", and several tremors of "varied density and length". These descriptions correspond to a Modified Mercalli earthquake intensity of III to IV. The Modified Mercalli intensity scale is shown in Table 1. It is more fully discussed in many introductory geophysics texts. (e.g. Bolt et al., 1975; Richter, 1958)

Most of the survey respondents could not pin point a time and date for the events, but most of the events were reported to occur after 6 PM in March and April, 1987. Art Laubach reported that events occurred on April 22, 1987 at about 8:30 PM and on April 29, 1987 at about 8:45 PM. Pierce Dotie and Marvin Blumer reported that tremors occurred on April 25, 1987 at about 7:30 PM.

On February 12, 1987 and March 16, 1987, ONG began injecting gas into the Bruer and Flora pools respectively. These pools are located at a depth of approximately 2,200 feet in the Clark and Wilson sands of the Cowlitz formation. The gas injection wells are located two to three miles from the reported events. Figure 1 shows the location of the two pools. Because of the close proximity of the gas field to the site of the observed events, ONG ordered the present study on June 1, 1987.



Table 1. Modified Mercalli (MM) intensity scale of 1931

I	Not felt except by a very few under especially favorable circumstances.
II	Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.
III	Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibration like passing of truck. Duration estimated.
IV	During the day felt indoors by many, outdoors by few. At night some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Felt by nearly everyone, many awakened. Some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop.
VI	Felt by all, many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight.
VII	Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motor cars.
VIII	Damage slight in specially designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motor cars disturbed.
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken.
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks.
XI	Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and landslips in soft ground. Rails bent greatly.
XII	Damage total. Practically all works of construction are damaged greatly or destroyed. Waves seen on ground surface. Lines of sight and level are distorted. Objects are thrown upward into the air.

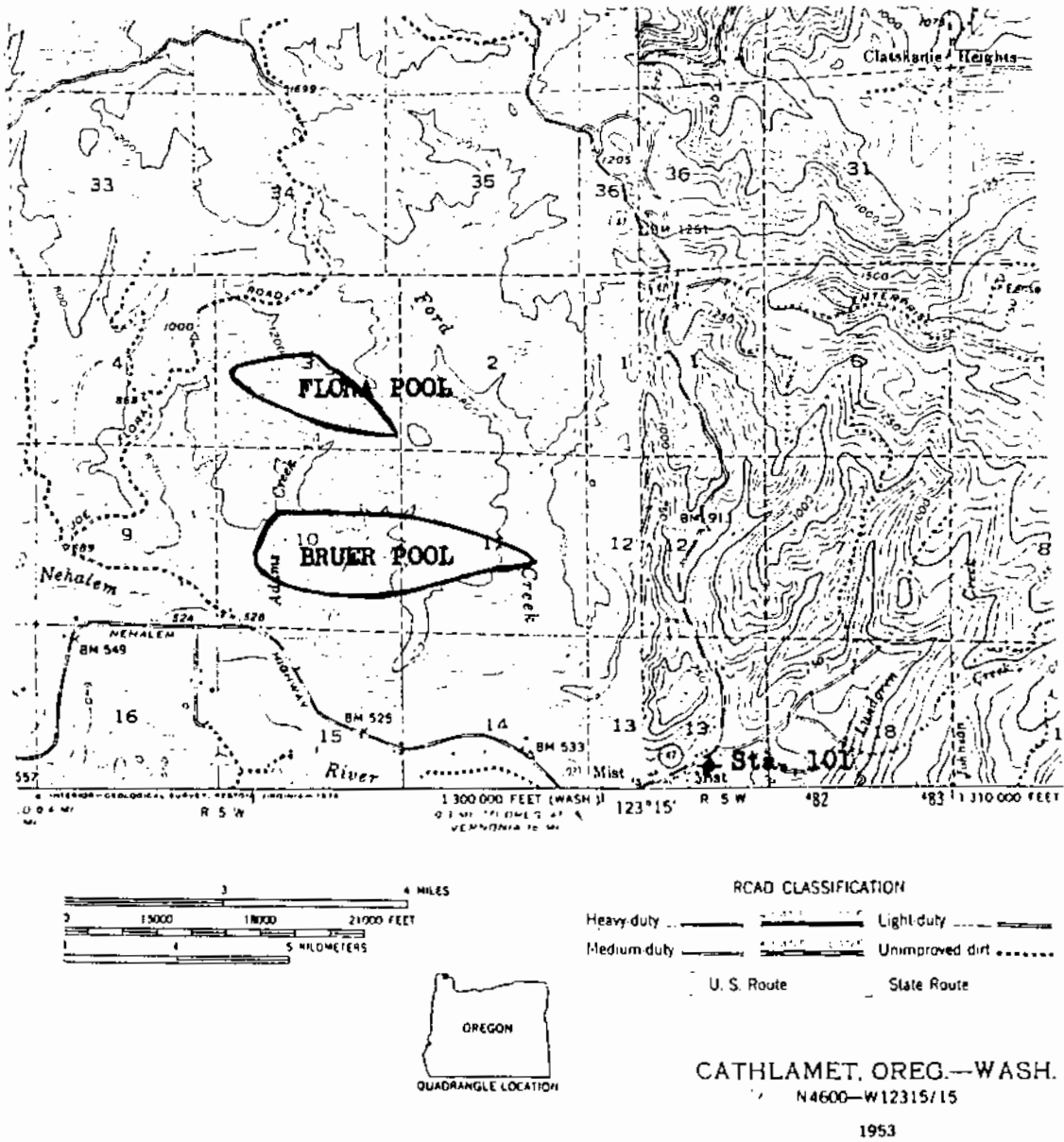


Figure 1. Location of monitoring station and pools.

INSTRUMENTATION

Ground vibrations are being monitored using a SINCO Model S-4 vibration monitor. This instrument uses a triaxial transducer to sense ground motion in three orthogonal directions. The output of the transducer is continuously monitored. When the transducer output exceeds a predefined limit, the S-4 computes the vector sum of the ground motion and prints the peak ground particle velocity in inches/second. Ambient ground motion which is below the trigger threshold can be printed manually at any time.

For this study, the transducer was installed at Art Laubach's residence approximately 350 feet south of Oregon State Highway 47. The transducer location is designated as Sta. 101 in Figure 2. The location of Sta. 101 was selected to maximize the signal to noise ratio by minimizing interference from vehicular, foot and animal noise. The transducer was buried at the depth of one foot in soil to ensure good contact with the ground.

The vibration monitor was installed on June 10, 1987. It has been operating continuously since installation.

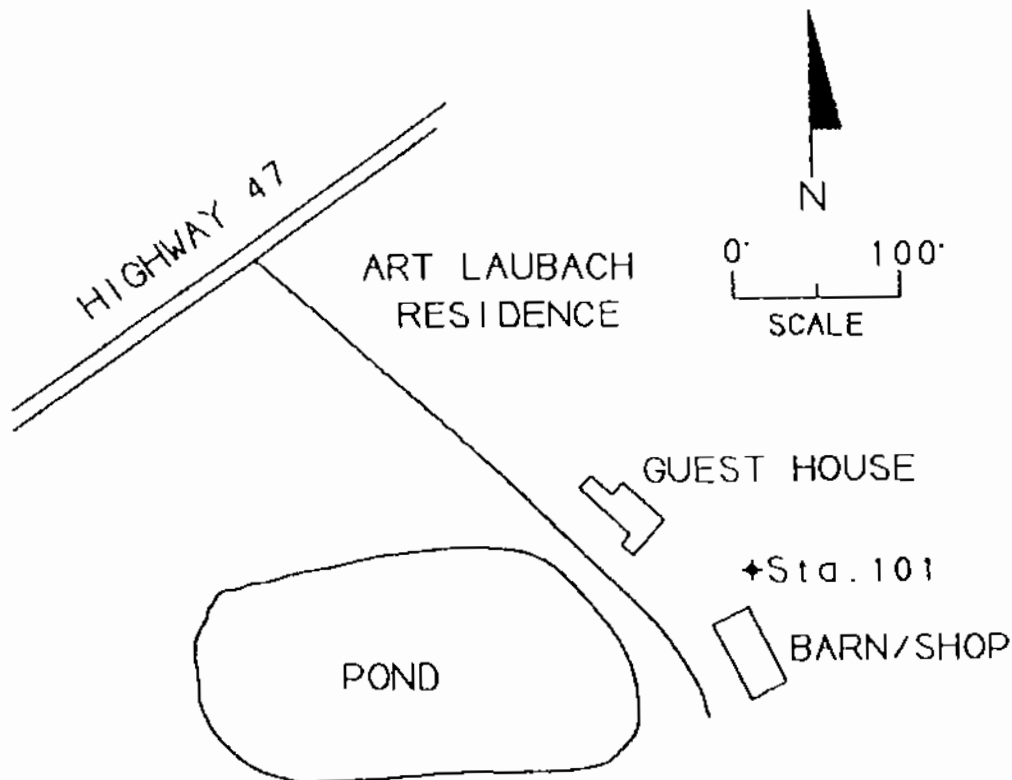


Figure 2. Location of vibration monitoring station.

RESULTS

As of July 9, 1987, three ground motion events have been recorded. Data from these events are summarized in Table 2. The three events occurred on June 16, 1987 during a ten hour period from 4:46 AM to 2:42 PM. The amplitude of the events ranged from 0.056 to 0.096 inch/sec.

Vibration data from common background sources are summarized in Table 3. The data in Table 3 indicate that ambient ground motion is typically less than 0.012 inch/sec. Footsteps within three feet of the transducer produce ground motion ranging from 0.128 to 0.250 inch/sec and a sledge hammer blow five feet away produces a vibration level of 1.006 inch/sec.

Table 2. Measured Ground Vibrations.
June 10, 1987 - July 9, 1987

<u>Date</u>	<u>Time</u> <u>hh:mm:ss</u>	<u>Peak Particle Velocity</u> <u>(inch/sec)</u>
6/16/87	04:46:49	0.096
6/16/87	08:52:47	0.056
6/16/87	14:42:11	0.076

Table 3. Ground Vibrations From Background Sources.

<u>Source Description</u>	<u>Peak Particle Velocity</u> <u>(inch/sec)</u>
Ambient Background	0.010-0.012
Footsteps within 3'	0.128-0.250
Tapping transducer	0.614
Sledge hammer within 5'	1.006

DISCUSSION

The events recorded on June 16, 1987 were probably due to non-earthquake sources. No earthquakes were detected at the seismic stations at the Trojan Nuclear Plant, Portland State University or Mount Saint Helens. No one in Mist reported feeling any unusual ground motion on June 16, 1987.

Comparison of the data in Table 2 and 3 indicate that the magnitudes of the events on June 16, 1987 were less than ground motion caused by footsteps. At present, it is believed that the events which were recorded on June 16th were caused by animal footsteps or wind noise.

In order to help determine if the reported events on April 22, 25 and 29, 1987 were earthquakes, the records from the seismic stations at Mount Saint Helens and Portland State University were examined. The seismic events recorded at these stations from April 20th to April 30th are summarized in Table 4. None of the times and locations of the recorded earthquakes listed in Table 4 correlate with the ground motion at Mist. This observation indicates that the source of the Mist events is probably very localized, or is not related to ground movement. Non-ground movement sources consist of air overpressure from blasting, sonic booms, engine backfires, etc.

Table 4. Summary of Seismic Events.
April 20-30, 1987

<u>Date</u>	<u>Time</u>	<u>Epicenter Distance (mi)</u>	<u>Station Location</u>
4/22/87	00:54 PDT	150	MSH
4/22/87	16:38 PDT	190	MSH
4/23/87	13:00 PDT	>400	MSH
4/25/87	05:00 PDT	>6,000	PSU
4/28/87	11:43 PDT	270	MSH

Experiments at Rangley, Colorado in the late 1960's demonstrated that injecting fluids underground may trigger earthquakes. (Healy et al., 1968) When fluids are injected into rocks, the pore pressure in the rock formation increases. Increasing pore pressure may cause the shear strength of the rock to decrease because bonding of the rock matrix become weaker. If the shear strength of the rock becomes less than the applied shear stress, the rock will fracture and an earthquake may be produced.

Increased pore pressure also reduces the effective stress while the differential stress and shear stress remain constant. If a rock is initially stressed near the failure limit, the decrease in effective stress due to increasing pore pressure may be sufficient to cause rock failure. The effective stress law was first proposed by Terzaghi (1924).

More complete discussions of the theoretical basis and experimental results can be found in most rock mechanics texts. (e.g. Farmer, 1983; Goodman, 1980)

Analysis of pump and pressure data from the Flora and Bruer pools is presently being conducted to determine if there is a causal relationship between the events of April 22, 25 and 29, 1987 and gas injection at the pools. Preliminary results indicate that there is no clear correlation between the pressure data and the April events. However, additional analysis is required before a firm conclusion can be made.

CONCLUSION

Based upon analysis of the seismic records from the Trojan Nuclear Plant, Mount Saint Helens and Portland State University, it appears unlikely that the ground motions which were felt by several Mist residents on April 22, 25 and 29, 1987 were caused by earthquakes. No earthquake related motion has been detected or reported since April 29, 1987. At present, the cause of the April events is unknown. Additional analysis of pump and pressure data from the injection fields should be conducted to determine if there is any correlation between pumping activities and the April events.

REFERENCES

- Bolt, B.A., W.L. Horn, G.A. Macdonald, and R.F. Scott, Geological Hazards, Springer-Verlag, New York, 1975.
- Farmer, I., Engineering Behaviour of Rocks, New York, 1983.
- Goodman, R.E., Introduction to Rock Mechanics, John Wiley & Sons, New York, 1980.
- Healy, J.H., W.W. Rubey, D.T. Griggs, C.B. Raleigh, Science 161, 1301, 1968.
- Richter, C. F., Elementary Seismology, W.H. Freeman & Co., San Francisco, 1958.

SUMMARY OF NATURAL GAS PIPELINE ACCIDENTS
 DATA FROM US DOT OFFICE OF PIPELINE SAFETY
 1970 to 1986

TRANSMISSION SYSTEM INCIDENTS

DISTRIBUTION SYSTEM INCIDENTS

Incidents in Oregon 13
 Deaths 0
 Injuries 0
 Damage Range \$300 to \$68,000
 Damage Total \$205,000

112
 3
 13
 \$5 to \$800,000
 NA

CAUSES:

Damage by Outside Forces 7
 Construction/Material Defect 4
 Corrosion 0
 Other 2

84
 1
 10
 17

OWNERS

NW Pipeline 6
 Pacific Gas Transit 2
 Northwest Natural Gas 5
 UGI Corporation NA
 Calif-Pacific Utility NA
 Public Service Elect. and Gas NA

NA
 NA
 109
 1
 1
 1



MINUTES

MST AMD 1 Doc 30

ENERGY FACILITY SITING COUNCIL

The Village Inn
535 S. Columbia Blvd.
St. Helens, OR

October 6, 1987

COUNCIL MEMBERS PRESENT:

Bill Wiley, Chair
Marlene Bayless Mitchell, Vice-Chair
Dr. Clarissa Beatty
Dr. Jean Mater
Al Thompson
Pat Metke

COUNCIL MEMBERS ABSENT:

None

ODOE MEMBERS PARTICIPATING:

Mike Grainey, Deputy Director
Bill Dixon, Administrator, Siting and Regulation
Mike Alsworth, Reactor Safety Manager
Harry Moomey, Trojan Resident Engineer
Tom Meehan, Energy Specialist
Dave Stewart-Smith, Radioactive Materials Program Manager
Felix Miera, Lakeview Project Manager
Mary Lou Blazek, Hanford Coordinator
Charlie Grist, Utility Energy Specialist
Walter Perry, Assistant Attorney General
Marilyn Dawson, Management Assistant

OTHERS PARTICIPATING IN ORDER OF APPEARANCE:

Robert M. Johnson, Attorney representing Oregon Natural Gas Development Corporation and Northwest Natural Gas
Robert Gray, Attorney
Roy Marvin, Vice President of Administration, Precision Castpasts
Vivian Reynolds, Citizen
Noni Anderson, Vernonia Independent Newspaper
Lloyd Marbet, Forelaws on Board

The meeting was convened at 9:10 a.m. by Chairman Wiley.

1. Announcements:

Bill Dixon announced that:

- 1) David Yaden has been appointed as Director of ODOE
- 2) Introduced Rose Bennett who is ODOE's Trojan Emergency Response Coordinator,
- 3) Mary Lou Blazek will be working out of Olympia, Washington for the next few months,
- 4) Pat Metke has been seriously ill but has recuperated,
- 5) Felix Miera will be getting married later this month.

2. Consent Calendar:

- a. The Minutes of the May 21, 1987 meeting were approved as written.

3. Action Items:

a. Mist Underground Storage - Amendment to Site Certificate:

Charlie Grist said that Oregon Natural Gas Development Corporation (ONG) requested an amendment to the site certificate. The purpose of the amendment was to extend the completion of construction warranty. Mr. Grist said that in the course of taking comment on the proposed amendment six other issues were brought up. He said the staff report and proposed amendment language addressed all seven issues.

Mr. Grist said that new information had recently been received on the seismic issue. This information led him to believe that further seismic monitoring was not necessary. He recommended that the amendment be changed to reflect this.

Robert Johnson said that the companies he represents support Mr. Grist's recommendation. He said sufficient work has been done to show there is no current relationship between the storage activities and the reported vibrations in the Mist area. He said that it is difficult to test for the negative. He said they have not come up with any linkage with the increased pressures in the reservoirs and the activities in Mist. If there is a linkage they will do the monitoring and testing, and take remedial steps necessary to correct those problems. He said they have done a local seismic study which shows no relationships between the injection operations at Mist between February and early September and the events that occurred.

Dr. Mater asked if the amendment to Section 4. C. 5. is acceptable except for the monitoring phase, but not the testing of seismic activity. Mr. Johnson said that they would support Mr. Grist's recommendation which would delete the underlying language in the proposal.

Marlene Bayless Mitchell asked Mr. Grist when he decided to make that amendment. Mr. Grist said he received the final report from the geophysicist two days before. He said that if there are any ground movement events, and if they present a danger to the storage operations or to local residents, then the Council has the responsibility to require monitoring for any ground movement.

Marlene Bayless Mitchell said that she does not like to vote on anything she has not received in writing at least one day prior to the meeting.

Chairman Wiley said that the proposed amendment #1 is satisfactory from his perspective with the subject to the discussion over this one clause.

Dr. Mater said that she thinks the residents are concerned if there isn't a monitoring program. She said the Council could request a more comprehensive study to try to eliminate the causes.

Chairman Wiley asked if substitute language has been proposed. Mr. Johnson said they just heard staff's recommendation and have not been able to put any language together.

Dr. Beatty said that Amendment 1.D includes seismic monitoring. Chairman Wiley asked how the Council would deal with that in the future if they were to treat it in the same manner. Mr. Grist responded that there are injection and withdrawal logs to compare the two.

Chairman Wiley said there are rules on the safety issue, but if they want to cover the seismic it should be included in the site certificate. Mr. Grist responded that monitoring as opposed to emergency response is a specific concern. He said they do not have a standard for emergency response. Dr. Beatty asked if the Council should vote on a change in Amendment 1 because she would eventually like for the Council to adopt it.

Mr. Grist recommended that ODOE consider requesting ONG to provide monitoring of air over pressure events for the next year and try to correlate those with events reported by the locals.

Dr. Mater asked if all concerns could be addressed by changing the last sentence in item D of the amendment to read "the program shall include logging local seismic activity using the best available technology and delete "and testing procedures".

Vivian Reynolds asked why NWNG does not want to monitor it. She said the County, State and the nation would benefit.

Dr. Clarissa Beatty moved that the Council adopt proposed Amendment 1 to the site certificate for the Mist Underground Storage Facility. Dr. Jean Mater seconded.

Marlene Bayless Mitchell suggested the following draft language in Amendment 1, Section 4. d. to amend this. "Oregon Natural Gas shall recommend for Energy Facility Siting Council approval a program to evaluate reported local unusual vibrations. The program shall include annual reports to EFSC. If ONG or EFSC believes there is a correlation between reported vibrations and storage reservoir activity, ONG shall recommend to EFSC a program to install and monitor seismic instruments."

Marlene Bayless Mitchell moved to adopt that amendment to Amendment 1. Dr. Clarissa Beatty seconded. A roll call vote was taken and the motion carried unanimously.

Robert Gray said Columbia County has an interest in the siting conditions applicable to the underground storage facility for two reasons. One is that the facility is located within the county's boundaries, and the County wants to ensure that the safety and well being of its residents is protected. Secondly, the County conveyed the mineral interest in the Bruer and Flora Pools to ONG, but retained its remaining mineral interest in the Mist fields outside the area conveyed to ONG. The County wants to be sure that the underground storage operations will not affect its remaining mineral interests. Columbia County participated in the hearings on the proposed amendment and subsequently submitted comments on a number of matters raised by the request. He said they have had the opportunity to review the draft report, and generally agree with the conclusions of the report. They are concerned about the Emergency Response Plan. During the July 15 hearings the County requested that the site certificate be amended to include a requirement that an emergency response plan be included and approved by EFSC. The County requested that the certificate provide that ONG be responsible for the reasonable costs of implementation of that plan. The staff report includes the existing certificate adequately addresses the need for an emergency response plan. He said they also believe that the permit should explicitly require that the reasonable costs of implementation should be borne by ONG. The County takes this position because EFSC has an affirmative responsibility under ORS 469.310 to protect the health, safety and welfare of the public. Since it is clear that an adequate emergency response plan is needed, EFSC has an affirmative duty to ensure its adequacy in order to fulfill its statutory responsibility.

Dr. Mater asked if there were other applicable state laws or agencies that require an emergency response plan once a site certificate has been granted. Bill Dixon responded that ORS 401 deals with emergency preparedness in the State of Oregon. It basically says that emergency preparedness is the responsibility of local government. There are exceptions and that is why the lead responsibility for Trojan Emergency Preparedness rests with the Oregon Department of Energy. There are no other instances other than Trojan where the Siting Council has become involved in approving an emergency preparedness plan.

Mr. Grist said that there are several things in the site certificate that protect safety. One is that the construction of the facility has to comply with federal Title 49 Department of Transportation Regulations about construction of pipes and well heads. The site certificate originally imposed extra constraints on those standards for locating wells and pipes safe distances from residences. Mr. Grist said the Public Utility Commissioner staff who monitors safety of gas pipes in the state believes that extra precautions are needed at the Mist facility. A well or pipe could rupture and cause a natural gas fire. He said that NWNG needs to coordinate with the local fire district to pull together a plan if one of these wells or pipes blows. Special equipment and training is needed to fight those kind of fires. He said that the County, the local fire district, and NWNG are willing to work out a Response Plan by April.

b. Precision Castparts Corporation – Action of Forelaws on Board Request to Review Waste Disposal Practices:

David Stewart-Smith reminded the Council of FOB's request for action on Precision Castparts Corp (PCC) past disposal practices. The Council had been sent a copy of the subcommittee report and recommendations previously.

Chairman Wiley asked Mr. Stewart-Smith to review for the Council the nature of PCC waste. He said it was largely silica (silicon dioxide) in a ceramic binder about one-half inch thick. If that piece could be isolated from the rest of the waste there may be higher concentrations of radioactive materials in that one piece than in the entire range of samples. It's not a powder or soil-like consistency material that was spread evenly throughout the landfill. It was taken in large 40-yard dumpsters and dumped into the landfill along with waste from municipal garbage collection agencies. Given the nature of a landfill it would be difficult to sample. He said his calculations revealed that the concentration of radioactive material is not different from what would be found in normal soils.

Marlene Bayless Mitchell asked if this reaffirm's the issue that Lloyd Marbet raised. That is, if there were a flood, there may be material that is solid rather than diluted. There could be the possibility of a radioactive piece being carried down the river. She said the Council may be getting into an area where there are concerns about health and safety.

Dave Stewart-Smith responded that in his judgement that is not the case. The pathway or the route of risk to the public from a material like this, if there was enough of it in one place at one time, in an uncontrolled manner, would be contamination of water. One small piece will not present a significant water contamination problem.

Marlene Bayless Mitchell said that she lives right near where the Clackamas and Willamette come together. She asked if Mr. Stewart-Smith could assure her that those are not going to come floating down to her property. Mr. Stewart-Smith responded that he is not sure how he could provide her with that assurance. The landfill, at the confluence of the Clackamas and Willamette River, will someday be subject to flooding. As waste was placed into this landfill it was compacted and layered with soil with a layer of soil on top. It's now a hill, where at one point it was a hollowed out depression in the ground and they filled it in with municipal garbage and chunks of concrete, wood, and other things that go into garbage dumps. He said he was not aware of any instance where a flood has taken a closed municipal landfill and spread it down river. He said he does not believe that there would be a mechanism that would provide a direct hazard to any individual as a result of that flood other than the flood itself is a fairly destructive process. The existence of the radioactive material in that waste would present little additional risk to the public.

Marlene Bayless Mitchell asked what would happen if the molds through movement within the landfill ended up in the top 30 centimeters. Mr. Stewart-Smith responded that it would not represent an airborne hazard. Any exposure to the public would still be waterborne. Any chemical or dissolved species in water, whether it's sodium, regular salt, or another kind of constituent, has a tendency to adsorb onto soil or other waste particles. There would be material below the top 30 centimeters to adsorb that material before it got into the groundwater. This might even be a less hazardous situation, except for human intrusion, if it were all in the top 30 centimeters. He said he does not know of any way to concentrate this material in a landfill.

Marlene Bayless Mitchell said she wanted to go on record saying that she would like the Council to consider an independent study of the area identified as problem areas with respect to the presence of radioactive materials. She said the Council would be on stronger grounds and she would be more comfortable.

Lloyd Marbet said what is not being taken into consideration is how this material is synergistically interacting with whatever else is in that landfill. An example of how materials can get to the top of the landfill is tires. They literally work up from the bottom of the landfill to the top with possibly anything caught inside the tire. And, there are other kinds of chemical constituents in the landfill which could cause leaching. He said he thinks the Council needs to take that into consideration.

Chairman Wiley adjourned the meeting for lunch and reconvened at 1:15 p.m.
Continuation of Precision Cast Parts and Rossman Landfill.

Chairman Wiley asked Mr. Stewart-Smith if any dilution that may have occurred was intentional. Dave Stewart-Smith said in 1970, when the Health Division first issued a licence, the disposal practices were authorized by the Health Division license. Those practices were the same in 1981 as in 1970 except for the percentage of material in the total solid waste stream represented by the titanium casting shell. They were authorized by license to dispose of this shell in 1970 and the process hadn't changed. All mold knock-off was done in the same place on one set of equipment and conveyor belts. It travelled from there into the waste dumpster and to the landfill. He said he would have to conclude from that and from what he knows about the plant, that the dilution was a fact of their process. It was not intentional for the purpose of meeting or avoiding any kind of regulatory requirement.

Chairman Wiley asked if the material meets the Pathway Exemption. Dave Stewart-Smith responded that the laboratory analyses were on selected portions of their waste stream designed to tell him what was in that waste stream. He took small portions of it and did small laboratory analyses. He said his judgement would be that the entire solid waste volume of the Precision Castparts plant would not represent radioactive waste as an entire volume of material. He said he does not believe it would constitute radioactive waste under Council rules.

Roy Marvin said he has been employed with Precision Cast Parts for 26 years. He has been a participant in almost all of the discussions that have taken place with respect to the material being used. He authorized PCC participation in the Science Applications, Inc. (SAI) and the SAI study that was required to be made by the Health Division to the Oregon Legislature in 1979. In one of the outputs of the SAI report, was a recommendation that the Health Division consider requiring PCC to separate their waste streams. In the process, all castings were manufactured in the same way, whether it is stainless steel, nickle alloy, or titanium. When it came time to knock off the shell material, they had one set of equipment which was used to knock off all of the mold material from the castings. The Health Division requirement made it necessary to buy another set of equipment, so they would have one set for titanium and one for everything else. PCC then had an identifiable waste stream which did not meet the Pathway exemption. According to calculations, before the streams were separated, it was a single waste stream and it met the Pathway exemption.

Dr. Clarissa Beatty moved that the Council accept the report and record of the Energy Facility Siting Council subcommittee. Dr. Jean Mater seconded.

Chairman Wiley said that Precision Castparts acted consistent with the State Law at all times. He said the report communicates that there is no threat to health and safety. He said he believes the material meets the Pathway Exemption. For that reason, he is comfortable with the subcommittees position.

A roll call vote was taken and the motion carried with Marlene Bayless Mitchell voting no.

c. Proposal to Initiate Rulemaking to Develop Administrative Rules for Ballot Measure 9.

Dave Stewart-Smith said the proposal in the mailing packet fulfills a staff commitment from the Oregon Department of Energy to two legislative committees that were looking at this issue during the last legislative session to seek Council authority to initiate rulemaking on Ballot Measure #9. ODOE's recommendation is to initiate rulemaking and a draft of the administrative order has been provided to make that happen.

Marlene Bayless Mitchell moved that the Council accept the recommendation of the staff to authorize the initiation of Rulemaking on Ballot Measure #9. Further that EFSC approve the order provided the Council in the packets to begin the rulemaking process. Dr. Jean Mater seconded.

A roll call vote was taken and the motion carried unanimously.

d. Non-Attorney Representation in Contested Case Hearings – Request to Initiate Rulemaking:

Tom Meehan said about one year ago the Attorney General advised that state law required parties in contested case proceedings be represented by an attorney. There was concern expressed about this requirement at that time. The 1987 Legislature changed the law. The law no longer requires that parties must be represented by an attorney. Instead, a group or organization, can designate one of its members to be a designated representative. Before this can happen, agencies need to adopt administrative rules that specifically provide this. The Attorney General recently adopted temporary model rules that allow this. The Attorney General intends to adopt permanent rules later this fall as part of a law conference. The Council needs to adopt its own rules to implement this law. Mr. Meehan recommended that the Council authorize staff to conduct a rulemaking, take public testimony and prepare proposed rules that would accomplish this.

Lloyd Marbet said he supports this rulemaking. He said it would be helpful if there were draft rules formulated by ODOE so that there would be something to comment on.

Tom Meehan said the general procedure is that rules are not drafted until the Council has authorized the rulemaking. The draft rules would be provided to the public for their comment. A hearing would be held if there is specific request and the draft rules would be revised as appropriate depending on the kind of public response. Rules have not been drafted because ODOE is just now requesting the authority to undertake this.

Bill Dixon said the Attorney General intends to take action by the end of this month. Council authority to initiate rulemaking would allow ODOE to begin the process shortly thereafter rather than waiting until the next Council meeting.

Bill Dixon said this bill has a lot of opposition in the Legislature. There were many folks who did not want to see this bill pass. There are only a few agencies who are allowed to let parties designate non-attorney representatives. EFSC and ODOE are two of the few agencies because of our lobbying efforts. But it does require agency-specific rules to implement the law.

Marlene Bayless Mitchell said she has a different concern. She said several times reference was made that EFSC rules would provide that one of the Council members or an ODOE employee could represent the Council in contested case hearings. She said while she is a member of this Council she wants the Council represented by an attorney.

Dr. Jean Mater moved that the Council authorize the Department of Energy to conduct a rulemaking on representation by non-attorney's in contested case hearings and that the Council adopt the order proposed by staff. Pat Metke seconded.

Chairman Wiley proposed an amendment in paragraph 4 before the comma in the first line to insert the words "concerning proposed rules".

Mr. Alsworth said that now PGE better recognizes the potential for contamination from the pellets. This potential warrants doing more than just letting them stay for the life of the plant in the bottom of the vessel. That is why PGE is doing what Mr. Moomey described in removing and filtering them out.

- b. Lakeview Uranium Mill Clean-Up Status: Felix Miera said tremendous progress is being made on the clean-up project, aided by three straight months without rain. To date about 800,000 cubic yards, about 100,000 cubic yards over what was reported in the written status report have been relocated. They are hauling about 5,000 yards per working day. They are still working seven days per week, 12 hours a day.

At its peak the project employed 141 people and maintained about 135-140 employees between June and September. There have been some cutbacks in personnel because some services are not required at this point. The payroll at peak times was about \$125,000 per week. Most of this money went directly into the Lakeview economy.

Mr. Miera said that it is estimated there will be 900,000 cubic yards of material to move. This is above what was estimated before the start up of the project. This increase in materials came out of the old retention ponds which covered 70 acres and where Thorium and arsenic were more mobile than anticipated. Every 30 by 30 foot block of the site which covers 120 acres, a sample is taken and tested for Radium-226, Thorium-230 and arsenic to ensure the clean-up criteria are achieved. There were some areas that had "hot spots" where they had to go 16 feet below the ground surface to remove the contaminants.

Mr. Miera said the wastes in the cell will be about 2 feet higher than originally designed. This will not affect erosion protection material requirements.

Mr. Miera said they have verified four of the seven retention ponds as being clean. The objective is to get all of the contaminated material to the new site before the end of the construction season. He said they are hoping to contour the site to provide for good drainage. There are about three weeks of work left to do. Under this schedule the project should be completed by about July of next year.

Mr. Miera said that the trial date of January 12, 1988 has been set for the land taking with Mr. Collins. The trial will be in Lakeview.

Mr. Miera reported that on October 4 at about 10:00 a.m. a truck turned over en route to the new disposal site spilling its load of contaminated waste. This is the first vehicle accident. The driver apparently got too close to the shoulder of the road. He lost control and one of the two trailers tipped over on its side off the road. Using the ODOE Lakeview Emergency Response Plan, all appropriate people were notified. Most of the material remained in the trailer because each of these vehicles is covered by a secured canvas. The material spilled was about 2 to 3 yards and both the material and vehicle were cleaned up immediately.

Dr. Jean Mater accepted that amendment as part of her original motion. Pat Metke seconded.

A roll call vote was taken and the motion carried with Al Thompson voting no.

4. Information Reports by Staff/Hearing Officers:

Approved Facilities:

- a. Trojan Nuclear Plant: Mike Alworth said that the Trojan Nuclear plant is on the line at this time. It's operating at about 60 percent power. The reason it's operating at only 60 percent power is because the circulating water pump and the feed water pump are out of service which limits the power.

Harry Moomey reported on a short outage at Trojan from September 28 to October 1. The reason for the outage was a leak in the auxiliary building. The valve is on a system that injects water into the primary plant. The concern was that leakage from this valve, if there was an emergency situation, would lead to a condition where the control room environment for operators could be uninhabitable. Regulations required that Trojan shut down and take care of the leak. There was no actual concern for the operators since there was no emergency.

Mike Alworth said that during the summer maintenance refueling outage Trojan experienced some problems. Mr. Alworth and Mr. Moomey have been working with NRC and PGE to ensure that PGE resolve these problems. Mr. Alworth said a meeting was held last week with the Trojan committee to bring them up to date on the problems and their significance. ODOE is confident that corrective action taken is acceptable. There are still outstanding issues, but ODOE is working with the Trojan committee and PGE and will report back at a later date.

Mr. Alworth had an update on an item reported at an earlier meeting. There was a potential problem with the cooling water system for some of the safety equipment. PGE reported to the Nuclear Regulatory Commission that the system was not capable of operating according to design requirements. The problem was further analyzed and determined not to be a problem. In other words, the system was fully capable of operating within design limits. He considered the issue closed.

Mr. Alworth said that at a previous meeting a problem was discussed that occurred in the containment building. A spent fuel pellet resulted in contamination in containment. This was a very difficult problem to resolve. PGE spent a lot of time decontaminating and training their workers.

NRC reviewed the problem and determined that PGE could have done a better job. The company knew there were loose fuel pellets in the reactor coolant system. It should have been better prepared to deal with the occurrence. PGE was fined \$50,000.

ODOE agrees with the NRC. The problems found with PGE's radiological control group warrant that PGE be fined. PGE has paid the fine.

Mr. Miera said it was expected that the EPA would have the Groundwater Standards out by the end of September for all Title 1 sites. It is almost two years to the date that the federal courts muted out the existant standards issued in 1983. When they are available ODOE will share them with the Council to determine what implications, if any, they will have on the Lakeview Project.

Mr. Miera said that he, Mike Grainey, and Bill Dixon will be meeting with the Forest Service in Lakeview. The Forest Service as part of their 5-year Management Plan has decided to look at the issue of the mines from where the uranium was obtained to process at the mill. The two mines are again abandoned and filled with water, but a portion of the mineral rights are apparently still active. Access and control of these areas is not limited and the intention of the Forest Service will be to investigate potential health and safety problem with these areas.

- c. **Boardman Coal Plant:** Harry Moomey gave an update on two issues: the main re-heat line and a death at Boardman. ODOE had committed to report back to the Council on the final outcome of these issues.

Mr. Moomey said the plant is shutdown. It is in a standby status. He said he was informed this morning that the plant is receiving additional coal. This would extend their stockpile and operational ability.

Other Items of Interest:

- d. **Northwest Natural Gas Company Proposed Gas Pipeline:** Tom Meehan said Northwest Natural Gas has been considering a way to expand its ability to move gas from the Mist Underground Storage site to and from Portland. They filed a notice with ODOE that says they want to build a 50 mile pipeline from Mist to the Portland area. It would pass near Vernonia and North Plains, then follow Highway 26. The Council's rules require that it adopt alternatives to the line in 60 days. This must be done by a rulemaking and require public hearings if requested. ODOE has made public notice of the rulemaking and set a deadline for public comment of October 14. Staff is in the process of developing proposed alternatives.
- e. **Hanford Activities:** Mary Lou Blazek reported on many activities related to the Hanford reservation in Washington. She included status reports on a regional health effects panel, high level waste research and Oregon's litigation efforts against USDOE.
- f. **TWCA Disposal Plan:** David Stewart-Smith informed the Council that the TWCA sludge ponds will not be disposed of until the EPA finished a review of the entire site. This will likely be two or more years from now.
- g. **Salt Caves Hydroelectric Project:** Tom Meehan said that the City of Klamath Falls had not applied for a site certificate and that their application to the Water Resources Department was still incomplete. Thus, the EFSC-WRC joint review was still on hold.

The Department of Environmental Quality had finished its review in August. The DEQ denied water quality certification of the project because it would violate the water temperature standards. In September the City appealed this decision to the Environmental Quality Commission. The Federal Energy Regulatory Commission (FERC) accepted the City's federal license application for review in July. FERC set October 9 as the deadline to intervene. It also gave the state 60 days to comment on the federal application. The Hydro Task Force, which was created by the State Strategic Water Management Group (SWMG) was following the Salt Caves Project. The Task Force recommended that State agencies should file a single joint intervention rather than separately. The SWMG concurred with this. The SWMG decided it would intervene on behalf of State agencies. The intervention would not take a position at this time, but would present the State's concerns. The SWMG also decided that all agencies comments on the application should be consolidated into a single document. The SWMG agreed to provide the public an opportunity to comment on a draft of the State comments to FERC.

Several Council Members asked about FERC'S role in reviewing Salt Caves and how it related to the SWMG.

Mr. Meehan responded that the Department of Energy had been given a lead role in preparing the consolidated state comments. He said ODOE believes that it understands the Council's concerns and knows what the Council's standards and rules say.

- h. Legislative Summary: Michael Grainey gave a summary of the energy bills passed by the Legislature. Two of the Department's bills involve the Siting Council. House Bill 2053 clarifies that the applicant for an energy facility site certificate will pay the entire cost of the state's review. House Bill 3383 clarified state laws to continue the clean-up at Lakeview. He said other bills the Council may be interested in are Senate Bill 905 - Lay Representation; House Bill 2021 changes state liability law to be consistent with federal law on nuclear accidents. House Bill 2338 authorizes inter-state cooperation between Oregon, Idaho and Washington on shipments of radioactive materials. House Bill 3168 formalizes and radifies the process used to review the portion of the third AC transmission line.

5. Public Comment Period:

Noni Anderson said she is pleased that the meeting was held in St. Helens and thanked the Council because the subject (Mist Amendment) is of vital interest to the area. She said it has been difficult getting notification about the proposed pipeline to people in the Mist and Vernonia areas, and wanted the Council to be aware of this. The News Release dated September 25 was not received in time for the City Council to have an opportunity to prepare comments. She is concerned because it asks for comments which must be received by EFSC by October 14. The City will not meet again until October 19. She said advance notice is very important to their area.

Bill Dixon said that within 60 days after receiving a voluntary notice of intent the Council needs to determine the alternatives. The Council could decide to extend that period. Marlene Bayless Mitchell agreed that they need to extend that time period. Walt Perry said that the Council could do a temporary emergency rule at this time and take it up at the next meeting.

Marlene Bayless Mitchell moved that the Council adopt a temporary rule extending the time period to a 120 days for a response in the case of the NWNNG Pipeline. Pat Metke seconded. The motion carried unanimously.

Lloyd Marbet distributed to the Council information items regarding earthquakes in the Pacific Northwest. He encouraged the Council to examine this information because it impacts the Council's regulation of the Trojan Nuclear Plant. He also distributed FOB's recent initiative petition in response to the Legislature's consideration to extend the emergency evacuation zone at Trojan. FOB proposes to extend it from its current 10-mile radius to a 100-mile radius. He also said he was concerned about the recent agenda which failed to mention under the Public Comment Period that the public has the right to comment on any agenda item.

Lillian Jones, Columbia County said they also have had a problem with advance notification.

The meeting was adjourned at 3:15 p.m. by Chairman Wiley.

55-EFSCmisc
MD

