State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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Governor

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STATE WELL DRILLERS AND PUMP INSTALLERS
EXAMINING AND ADVISORY BOARD

BOB MARTIN
Commissioner

State Well Drillers and Pump Installers Examining and Advisory Board Meeting Minutes for January 20, 2011

Board Members Present: Anthony Tirro (Vice-Chairman), Richard Dalton, Gary Poppe, Joe Pepe, Karl Muessig, and Carol Graff, Fred Sickels (partial pm)

Board Members Absent: Art Becker (Chairman), Joe Yost

Others Present: Jill Denyes (DAG)

NJDEP Staff Present:
Water Supply Staff - Pat Bono, Tracy Omrod, Steve Reya, Julia Altieri (morning only), John Olko (Enforcement), Michael Schumacher (some of morning, all of afternoon), and Katie Wessling
Other DEP Staff - Charles Maack (Licensing Unit), Andrea Friedman (Office of Climate and Energy), Helen Rancan (NJGS), Dave Pasicznyk (NJGS)

Member(s) of the Public: Ray Smith, licensed well driller (EPI), Len Krimsky (GEM)

1. **Call to Order -** The meeting was called to order by A. Tirro at 9:42 AM with a quorum present.

2. **Review of draft Minutes from November 18, 2010 Meeting** – A motion to approve the minutes without change was made by G. Poppe, seconded by C. Graff and approved unanimously.

3. **Certification of Scores for December 9, 2010 Master, Journeyman B, Monitoring, Soil Borer and Pump Installers Exams–**

   Master – A motion to approve the exam scores was made by C. Graff, seconded by R. Dalton and approved unanimously.
   Journeyman B – A motion to approve the exam scores was made by G. Poppe, seconded by C. Graff and approved unanimously.
   Monitoring – A motion to approve the exam scores was made by G. Poppe, seconded by C. Graff and approved unanimously.
   Soil Borer – A motion to approve the exam scores was made by G. Poppe, seconded by K. Muessig and approved unanimously.

Pump Installer – A motion to approve the exam scores was made by J. Pepe, seconded by R. Dalton and approved unanimously.

4. Licensing Topics

Pump Installer Survey – The Board members presented a post-exam survey to be given to test candidates after taking the pump installer exam. An informal subcommittee consisting of A. Becker, J. Pepe and G. Poppe drafted the survey since the November Board meeting. The purpose of the survey is to determine the reasons the passing rate of the Pump Installer Exam is so low and to develop a strategy to improve the scores and better assist test applicants. J. Pepe explained the emphasis placed on discerning the quality of on-the-job training as well as studying for the exam. G. Poppe noted that part of the high failure rate may be because applicants are taking the exam before they are truly qualified, and suggested that the Bureau reconsider the 1-year minimum experience requirement when revising the well drilling regulations. Both he and J. Pepe also noted that the exam questions do not test applicants on variable frequency drive (VFD) pumping systems, which are becoming increasingly more common within the industry. They felt that including questions on VFD pump systems, which can be complicated, might result in an even higher failure rate. They postulated that the industry tendency to replace pump system parts without first trouble shooting to determine the actual problem may be resulting in trainees never learning the basics of pump systems.

It is envisioned that the proposed survey would be handed out to applicants at the same time the tests are given. J. Pepe suggested that the survey should include a small introduction that describes the purpose of the survey, while making it clear that the answers to the survey do not affect the scoring of the exam. P. Bono noted that she believed the wording of some of the questions and corresponding answer choices were vague. She proposed making some revisions to the subcommittee's draft and providing her suggested revisions to the Board.

Enforcement Activity – John Olko, formerly from the Department's Water Compliance and Enforcement Element, announced that he has recently moved to the Underground Storage Enforcement Element. He has briefed the new Administrator of the Water Compliance and Enforcement Program, Marcedius Jameson, on the enforcement coordination process previously established with the Bureau of Water Systems and Well Permitting regarding well violations. He also updated Mr. Jameson on all pending enforcement documents currently in process. He added that revisions to the program now require the Well Permitting Section to deal with the appropriate enforcement region (North, Central or South) when sending enforcement documents. The region in which a violation occurs will now issue the enforcement documentation.

P. Bono noted that frequent violators must be tracked by the Well Permitting Section, due to the decentralization of the Enforcement Program. She stressed that if a violator has multiple violations spread across different regions, the individuals' violation history must reflect that. J. Olko also mentioned that the Bureau of Water Systems and Well Permitting Staff may initially have to assist the enforcement staff from all three regions because the Enforcement field staff may not know what they are looking at regarding well drilling violations. C. Graff also suggested conducting orientations, meetings or trainings with Bureau Chiefs within the Enforcement Program to disseminate enforcement issues within the well drilling and pump installation community so Enforcement staff will be better able to identify and resolve problems.

Hearing Process – J. Denyes discussed the process of suspending or revoking a driller/pump installer license with Board recommendation. She has looked into past procedures and activities and found that past recommendations by the Board languished because there was no prior coordination with the DEP Commissioner's office. It is important for the Commissioner's office to provide input to the Board on

procedures so that the Commissioner can take action on recommendations to suspend a license. DAG Helene Chudzik has advised that, since the resources of the Board are limited, that their hearings be informal in nature. If a driller disputes the outcome of the Board's recommendations, he/she will have the right to appeal to Office of Administrative Law (OAL) for a full administrative hearing. J. Denyes suggested that someone from the DEP staff contact the Commissioner's Office to discuss the procedure and interaction between the Board and the Commissioner's office. Finally, she added that she plans to talk to F. Sickels to discuss as to who would be the appropriate contact in the Commissioner's office. Board members also discussed the potential of increasing the Board's enforcement authority upon revising the well drilling regulations. K. Muessig suggested looking into the possibility of tying the well regulations into the procedures provided in the Uniform Enforcement Act.

5. **Relevant Department Activities on Geothermal Topics –**
Office of Climate and Energy- Andrea Friedman, from the DEP's Office of Climate and Energy Program, explained that he program plans and develops policies to reduce greenhouse emissions within the state and to encourage the use of various energy saving technologies. Specifically, she noted that their program is supportive of geothermal wells because they reduce usage of fossil fuels. She noted, however, that they are concerned with DX geothermal systems, many of which use refrigerants as a heat transfer medium. She stated that these refrigerants could be a threat to groundwater resources and are highly potent greenhouse gasses (tens of thousands of times more potent than Carbon Dioxide). The Office of Climate and Energy will be willing to assist with review of the refrigerant materials if the rule regulations that are to be proposed for revision are to incorporate DX systems.

New Jersey Geologic Survey (NJGS)-
David Pasicznyk and Helen Rancan, from NJGS, provided an update on a geothermal well data study they have been conducting as a result of a grant from the US Department of Energy. To date, the geothermal industry has been progressing without any oversight from federal or state agencies and this study will provide basic national data for all 50 states. Once the information has been gathered, US DOE will identify the regulatory needs for this field. According to NJ DEP's database, approximately 5,800 permits have been issued for geothermal wells for open loop and closed loop systems combined.

They hope geothermal applications will ultimately become more accessible and hope to provide more information to both homeowners and the geothermal industry. To facilitate this, NJGS envisions developing a website that provides geologic information by region to give a rough estimate of the thermal values to expect in an area, the number of wells/footage required for a given capacity of a geothermal system. They indicated that they hope to promote the industry and increase the number of geothermal-related jobs in New Jersey in the future.

NJGS hopes to receive a second grant to provide for the drilling of three deep wells (approximately 1200 ft.) in New Jersey to enable the collection of detailed thermal information. This will allow NJGS to evaluate how future systems could be made more efficient through design changes or potentially even regulatory changes. G. Poppe suggested that they speak with the Board of Public Utilities (BPU), as they were highly instrumental in promoting this technology year ago by offering incentives and tax credits to those seeking to install such systems. K. Muessig said that the drilling costs associated with the projects are the most expensive cost associated with geothermal systems. He felt the most feasible way to make the systems more affordable would be to cut down on the drilling costs. He noted costs to install DX systems are less expensive to drill and that there may be certain geologic regions of the state, such as the bedrock regions of Northern New Jersey, may be more conducive to their use as they do not typically have low pH groundwater. K. Muessig did

acknowledge however, when questioned by P. Bono, that the NJGS assessment was not comprehensive and factors such as decommissioning had not been evaluated.

6. **DEP Correspondence** – P. Bono discussed A. Becker's December 21, 2010 letter to DEP Commissioner, Bob Martin, which thanked the Department for their changes, especially for taking proactive steps to support Department staff in their efforts to enforce the well drilling regulations and the issuance of enforcement documents to those who violate these regulations. A. Becker's letter also stressed the importance of revising the well drilling regulations and noted that the Board would be willing to assist the Department in any way necessary.

7. **Technical Topics -**

Agreenability Closed Loop Geothermal System - awaiting submission for additional data from R. Jensen. No discussion

Hardin Geothermal Pipe (4.5) After consultation with Board members, the Bureau approved the use of the well casing and center grout tube, provided the center contained .5" holes (one per side) every foot for the entire length of the "loop." S. Reya presented observations made by Bureau staff witnessing the installation of the Hardin Geothermal Pipe (4.5) at a veterinary hospital in Robbinsville, New Jersey. S. Reya and B. Buttari inspected the activity on three different occasions. S. Reya noted that there were some problems installing the pipe in the boreholes in the beginning and that some of the boreholes were not staying open to a sufficient diameter to allow insertion of the pipe to the total drilled depth. All the boreholes at the site were to be drilled to an approximate depth of 400 ft. Once the pipe was installed, there were no problems with pumping the 400-lb sand/50-lb bentonite geothermal grout could be pumped through a tremie inserted in the center pipe of the casing and through the grout ports. S. Reya, B. Buttari and A, Becker all witnessed the functioning of grouting process, displacement of drilling mud from the annulus. S. Reya added that the grout volumes being pumped into the boreholes were in excess of the theoretical volume required to fill the annular space. The values reported by the engineer for this site confirmed similar grout volumes. The presentation included photos taken S. Reya and A Becker and videos forwarded by A. Becker. It was confirmed that the design of the pipe did allow for proper grouting of the casing within the borehole provided the casing and tremie pipe could be installed to the total drilled depth and that a competent borehole is maintained, which is the case with any geothermal well installation. The photos also illustrated the fusing process, which S. Reya seemed to be effective based on the strength of the fused lengths of the pipe witnessed onsite. Hugh Streep of NextGen reported to the Bureau that all wells were passing the pressure tests performed after the wells are grouted. In order for the pipe to be used in bedrock formations, the design will need to use cementitious thermally-enhanced grout (Mix-111). To date this request has not been submitted to the Bureau.

8. **DEP Program Updates –**

Well Searches - P. Bono said that the Bureau has been working to data manage historic well information and also to improve on well document search tools. M Schumacher has been working with staff from DEP's Site Remediation Program to come up with a better search tool to benefit well data users outside the Department. They hope to have a version of the well search that will allow users (well drillers/pump installers, property owners, etc.) to obtain PDF files of well permits and well records. P. Bono noted that the Bureau is still determining whether all of this information is considered to viewable such that the info could be made available through a web-based search. If not, the confidential information must be determined so that a report can be written to redact release of sensitive information. The decision will be made at the Commissioner's level. P. Bono hopes to have this report available soon, since the Bureau is currently providing this information to requestors at the expense of significant staff resources.

Regulation Revisions- P. Bono, A. Becker and Katie Wessling, who will be assisting P. Bono with the revisions to the regulations, met for several hours a couple of weeks prior, to discuss the regulation revision process. P. Bono stated that the proposed regulations must be filed prior to the expiration of the current regulations (March 3, 2012). After proposal, the Department has one year to adopt the regulations. If the regulations are not adopted within this timeframe, the proposal expires. She hopes to solicit industry input through the Bureau's website and through a series of stakeholder meetings. By soliciting input early in the revision writing process, she foresees less resistance as the regulations approach the proposal and adoption stages.

9. **Adjournment -** A motion to adjourn the meeting was made by J. Peppe, seconded by G. Poppe and unanimously approved at 2:40 pm.

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STATE WELL DRILLERS AND PUMP INSTALLERS
EXAMINING AND ADVISORY BOARD

BOB MARTIN
Commissioner

State Well Drillers and Pump Installers Examining and Advisory Board Meeting Minutes for March 17, 2011

Board Members Present: Art Becker (Chairman), Joe Yost, Richard Dalton, Gary Poppe, Joe Pepe, Karl Muessig, and Carol Graff

Board Members Absent: Anthony Tirro (Vice-Chairman), Fred Sickels

Others Present: Christine Piatek (DAG),

NJDEP Staff Present:
Water Supply Staff - Pat Bono, Tracy Omrod, Steve Reya, Julia Altieri (morning only), Michael Schumacher (morning only), Steven Pudney, Kati Wessling (afternoon only), J. Fields (afternoon only)
Other DEP Staff - Charles Maack (Licensing Unit), Jeff Hoffman (Central Enforcement), and Marcidius Jamison (Acting Director of Enforcement)

Member(s) of the Public: Ray Smith, licensed well driller (EPI), Len Krimsky (GEM), and Marty Theys (licensed pump installer/plumber)

1. **Call to Order -** The meeting was called to order by A. Becker at 9:39 AM with a quorum present.

2. **Review of draft Minutes from January 20, 2011 Meeting** – A motion to approve the minutes without change was made by G. Poppe, seconded by J. Yost and approved unanimously. A. Becker asked for additional detail on the hearing process that was detailed in the minutes, as he was not able to attend the January meeting.

3. **Certification of Test Applicants for April 4, 2010 Master, Journeyman B, Monitoring, Soil Borer and Pump Installers Exams–**

   Master – A motion to approve the exam applicants was made by G. Poppe, seconded by K. Muessig and approved unanimously.
   Journeyman – A motion to approve the exam applicants was made by J. Yost, seconded by G. Poppe and approved unanimously.

Journeyman B - A motion to approve the exam applicants was made by K. Muessig, seconded by C. Graff, and approved unanimously
Monitoring – A motion to approve the exam applicants was made by G. Poppe, seconded by D. Dalton and approved unanimously.
Soil Borer – A motion to approve the exam applicants was made by C. Graff, seconded by G. Poppe and approved unanimously.
Pump Installer – A motion to approve the exam applicants was made by J. Pepe, seconded by J. Yost and approved unanimously.

4. Licensing Topics

Enforcement Activity – J. Altieri presented a summary of the Bureau's enforcement activity over the past two months. She also noted that she had recently attended a regional enforcement coordination meeting and will continue to work closely with staff from all three enforcement regions (North, Central and South). Multiple Administrative Order and Notice of Civil Administrative Penalty Assessment (AONOCAPA) letters are currently being issued to drillers with egregious violations, most of which are construction related. Posting violations on the DEP website was also discussed. Once a final enforcement action had been taken by DEP, the violation can be posted online. The Department's Dataminer program can post such information if it is stored in the Department's NJEMS database. Currently the Well Permitting Section does not track violations in NJEMS. This would need to be performed in order to allow the public to view these violations online. J. Hoffman noted that recent violation notices issued through his office (Central Water Compliance and Enforcement) are now being added to the Department's NJEMS database, making them viewable through Dataminer. He and the Board also discussed the fact that his office will now begin copying the Board on their enforcement letters by forwarding these documents through P. Bono in the Bureau of Water Systems and Well Permitting.

Driller/Plumber jurisdiction –As discussed at multiple previous Board meetings, the jurisdictional issue between the Well Driller/Pump Installer licenses and the Master Plumber licensees has been a problem for many years. Additionally, it is believed that the vast majority of those installing water treatment systems are unlicensed, meaning that they not licensed as drillers, pump installers or plumbers. A Becker discussed a recent conference that he, G. Poppe and J. Pepe had with Acting Water Systems and Well Permitting Bureau Chief, John Field regarding installation of these water treatment systems. He suggested that the only way to establish a minimum competency level for installers of treatment system equipment would be to have a separate license, which would be administered by DEP. Potential inclusion into the Safe Drinking Water Act Regulations (N.J.A.C. 7:10) were discussed, however, DEP resources necessary for revising this regulation and developing/administering the treatment license are currently extremely limited.

Revision of Pump Installers Survey – A. Becker, G. Poppe and J. Pepe worked on survey designed to determine the test preparation of Pump Installer Exam applicants and ascertain if the exam was testing the community on material that is relevant to what they are actually learning in the field. P. Bono made some revisions to the survey and presented her revised survey to the Board members. The Board recommended removing one question that would give the applicant a bonus point for providing their name. This question will be removed and the survey will be included with the April Exam.

5. Geothermal Exchange Module (GEM) Presentation by Len Krimsky-
Len Krimsky, mechanical engineer and designer of the Geothermal Exchange Module (GEM), discussed the design and installation of this proposed new system. This system is comprised of

stainless steel pipe assemblies that measure seven (7) inches in diameter, which are to be installed at depths ranging from 12-21 feet. The borehole in which they will be installed will measure ten (10) inches in diameter and 35 feet deep. The borehole would be tremie grouted prior to inserting the modular stainless steel cylinder assembly, which would displace the grout into the annular space. The cylinder is set in the bottom of the over-drilled hole and plumbed to the surface through HDPE pipe. Mr. Krimsky stated that the DEP-approved grouts would suitable for his system. He also noted that the circulating fluid used in his geothermal system is water so they are much more environmentally friendly than the typical closed-loop system that utilizes a certain percentage of anti-freeze. The life expectancy is also claimed to be extremely long for his system, as the materials are stainless steel and polyethylene, which are joined together with PVC fittings. The typical borehole spacing would be approximately twenty (20) feet according to L. Krimsky. He will need to submit a formal request to the Bureau containing all specifications regarding the borehole, pipe materials, grouting, etc. and will have to submit a well permit application, which contains a deviation request. Decommissioning of the system must also be addressed in his documentation. The Board will then review the material and with the intention of recommending a pilot installation if appropriate.

6. Process on Hearings and Suspension of Licenses – Chris Piatek, DAG, discussed the fact that the statute (N.J.S.A. 58:4A) states that the Board can recommend that the Department suspend or revoke licenses from well drillers/pump installers. She suggested that the new regulations should detail a process that must be followed in order to do this. As part of this, criteria would have to be established so the Board would have justification to support any recommendation to suspend or revoke. She noted that informal hearings conducted at the Board's level could produce a workable model. The Board members, however, need to determine whether they wish to participate in lengthy formal hearings rather than forward them to a State DAG. She noted that it may be feasible to have the Board conduct informal hearings and forward formal appeals to the DEP's legal division. She also suggested that a Board sub committee meet with Department staff, including M. Jamison, so as to not form a quorum and tie up the entire Board. A. Becker indicated that he would like to develop such a mechanism, but the immediacy of the issue is now somewhat diminished as he has been pleased with the Department's recent response to enforcing their well drilling regulations. The initial plan for the Board hearings was generated as a result of the perceived failure to enforce the regulations.

7. DEP Program Updates –

Historic Well documents - P. Bono said that the Bureau has been working to data manage historic well information and also to improve well document search tools. At this time, all overtime has been ceased for this project and we have lost another staff member recently. M Schumacher has been working with staff from DEP's Site Remediation Program to come up with a better search tool to benefit well data users outside the Department. They hope to have a version of the well search that will allow users (well drillers/pump installers, property owners, etc.) to obtain PDF files of well permits and well records. Currently, users can view summarized information but not the details of the record or the permits. The new tool cannot be posted on the website until approved by the Commissioner's office due to security concerns associated with posting this information.

Regulation Revisions- P. Bono, A. Becker and Katie Wessling, who will be assisting P. Bono with the revisions to the regulations, met recently to discuss the regulation revision process. The Bureau is holding two stakeholder meetings for the public two for the county and state agencies. The general public meeting will be on April 6th at the DEP building at 401 E. State St., Trenton. April 11th is the licensing and technology meeting which will be held at the Eco Complex in Bordentown. Both meetings are from 1-4 PM. All invitations will be mailed out shortly. C Graff will gather a list of emails from NJGWA members and forward the information to P. Bono and K. Wessling.

Proposed NGWA Licensing and Continuing Education Program –S. Reya, P. Bono, M. Schumacher and other Department staff met with National Groundwater Association (NGWA) director, Kevin McCray, on Feb. 3rd to discuss the proposed new licensing and continuing education program that would be administered by NGWA. The Bureau needs to work with NGWA to finalize their proposal. Staff has worked with DEP's Data Management staff to discuss how the interaction between DEP, NGWA and Treasury will work. P. Bono explained that the NGWA Master test is vastly different from the NJ DEP master exam in terms of scope. The Soil Borer exam also does not have an equivalent level NGWA test which is limited to soil borings exclusively. The closest would be the NGWA augering and monitoring category which is most similar to New Jersey's Monitoring Well Driller License. A. Becker suggested NJ keep the soil borer license class and not combine the two different licenses. If NGWA is not willing to develop a new test for this class, then the Board may consider keeping the NJ test. G. Poppe also agreed with keeping the soil borer license.

The Board members and Well Permitting Program staff agreed that would be preferable to have the Department of Community Affairs (DCA) maintain elevator "shaft" drilling construction requirements. This is consistent with discussions held at previous Board meetings. DEP must make sure the wording is specific pertaining to the Geothermal Drilling License as an open loop geothermal well and that it is understood that this is considered to be a water well. A. Becker suggested that the Department explicitly state that the new license is referred to as a "Closed Loop Geothermal" license. For each license category (both current and those proposed for adoption) the Board recommended the individual exams required for each license. These recommendations are attached as "Table 1."

P. Bono indicated that she would like to have new licensing system up by December of 2011. She also stated that the initial continuing education program would likely mimic the current NGWA requirement of 7 CEU credits per year (21 credits per 3-year license cycle).
A motion to require the exams specified in "Table 1" was made by J. Yost, seconded by R. Dalton and approved unanimously. A. Becker abstained from the motion, as he is the current president of NGWA.

9. Adjournment - A motion to adjourn the meeting was made by G. Poppe, seconded by K. Muessig and unanimously approved at 3:40 pm.

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EXAMINING & ADVISORY BOARD

BOB MARTIN
Commissioner

State Well Drillers and Pump Installers Examining and Advisory Board Meeting Minutes for May 26, 2011

Board Members Present: Art Becker (Chairman), Anthony Tirro (Vice-chair), Richard Dalton, Gary Poppe (morning only)

Board Members Absent: Karl Muessig, Fred Sickels, Joe Yost, Joe Pepe, Carol Graff

Others Present: Jill Denyes, DAG (afternoon only)

NJDEP Staff Present:
Water Supply Staff - Pat Bono, Tracy Omrod, Steve Reya, Julia Altieri (morning only), Michael Schumacher, Brian Buttari, Kati Wessling (afternoon only)

Other DEP Staff - Charles Maack (Licensing Unit, morning only), Jeff Hoffman (Central Enforcement, morning only), Mary Simpson (Southern Enforcement, morning only), Kati Wessling (Water Supply, afternoon only)

Member(s) of the Public: Mike Kavlunas (Total Quality Drilling) (AM only), Donna Kavlunas (morning only), Steve Malone (morning only), Eric Hoffman (SHAW Environmental, Inc., afternoon only)

1. **Call to Order** - The meeting was called to order by A. Becker at 9:37 AM without a quorum present. J. Yost was contacted via phone to facilitate a quorum for review & adoption of the March minutes and certification of applicants for the June 14, 2011 exam (see Items 2 and 3 below).

2. **Review of Minutes from March 17, 2011 Meeting and May 3, 2011 Conference Call Minutes** –.A motion to approve the minutes without change was made by G. Poppe, seconded by A. Becker and approved unanimously.

3. **Certification of Test Applicants for June 14, 2011 Master, Journeyman B, Monitoring, Soil Borer and Pump Installers Exams–**

Master – A motion to approve the exam applicants was made by A. Tirro, seconded by J. Yost and approved unanimously.
Journeyman – A motion to approve the exam applicants was made by G. Poppe, seconded by R. Dalton and approved unanimously.

Journeyman B - A motion to approve the exam applicants was made by A. Tirro, seconded by J. Yost, and approved unanimously
Monitoring – A motion to approve the exam applicants was made by A. Tirro, seconded by G. Poppe and approved unanimously.
Soil Borer – A motion to approve the exam applicants was made by R. Dalton, seconded by A. Tirro and approved unanimously.
Pump Installer – A motion to approve the exam applicants was made by G. Poppe, seconded by A. Becker and approved unanimously.

Note: J. Yost was not "present" via conference call from this point on so the remainder of the meeting was held in the absence of a Board quorum.

4. Licensing Topics-

Pump Installer Survey – S. Reya discussed the Pump Installer Exam Surveys that were to be included with the April 4, 2011 Pump Installer Exam. The purpose of the survey is to assist the Board members in ascertaining the reason for the high failure rate and to revise exams and/or develop study material to assist exam applicants as appropriate. S. Reya noted that he had inadvertently omitted the surveys from the exam packages when making up the exams and later mailed out the surveys with a letter. Two completed surveys, out of six applicants, were then returned to the Bureau. The Board reviewed these two surveys and is also planning to review the surveys that will be included with the June 14th Pump Installer exam. A. Becker, G. Poppe and J. Pepe will meet prior to the next meeting to develop a form to quantify the results of the survey so the members can better learn from the completed surveys.

Enforcement Activity – Jeff Hoffman, from the Department's Central Water Compliance and Enforcement Element, drafted an enforcement advisory, which was posted on the Department's Enforcement website. This advisory warns the public and regulated community that the NJ well drilling and pump installation regulations are being strictly enforced and enforcement activities against violators are being ramped up. J. Hoffman indicated that the advisory was posted recently so it is too early to determine if the advisory has had a positive effect on increasing compliance within the industry. J. Altieri noted that Brian Buttari, in conjunction with the Department's Enforcement staff, had recently been in the field pursuing an individual conducting well drilling operations without the appropriate license. It was also noted that a New Jersey licensed well driller has offered onsite training to the enforcement staff to familiarize them with well drilling operations.

NGWA – S. Reya has been working with the Department's purchasing staff to set up the testing, licensing and continuing education program that would be administered by the National Ground Water Association (NGWA). As discussed at previous meetings, it is anticipated that a partial implementation of this program may be possible prior to the adoption of new well regulations. The Bureau must set aside money for this program before June 30th (the end of the fiscal year).

5. Technical Topics –

Mike Kavlunas, Total Quality Drilling, LLC., Decommissioning Proposal- Mike Kavlunas, Master Well Driller and owner of Total Quality Drilling, LLC, discussed a well decommissioning plan he submitted in response to a Department order requiring the well to be decommissioned. Mr. Kavlunas came to seek the Board members advice regarding the technical merits of the decommissioning method he feels would be most suitable. Present at the meeting in support of Mr. Mr. Kavlunas was his wife, Donna Kavlunas, and the helper who was assisting onsite when the well was constructed, Steve Malone.

The Department has ordered Mr. Kavlunas to decommission the well via over-drilling and grouting the resulting borehole or by removing the well casing to the total depth, and grouting the resultant borehole. The well was drilled without a permit and there fore no well record exists. Mr. Kavlunas submitted his drilling notes to the Department and a well permitting staff person previously inspected the well site. The depth of the well is reported to be 420 feet, according to Mr. Kavlunas. Mr. Kavlunas, however, proposed to utilize hollow stem augers to over-drill the annular space to twelve feet below grade only. Mr. Kavlunas explained that site conditions complicate (safe) access to the well. After listening to Mr. Kavlunas' statement, A. Becker stated that if grout was, in fact, present twelve feet below grade, the proposed method would be an adequate decommissioning method. He stressed, however, that the Board members provide advice to the Department and it is up to the Department's staff to determine whether or not grout is present at that depth and proceed with enforcement as they see fit. He added that the Board was not going to address ways to verify the presence of an adequate grout seal, since that question was never posed to the Board members.

Department staff will respond to Mr. Kavlunas in writing to advise him of their decision regarding his April 14, 2011 decommissioning proposal.

6. Program Updates-

Historical data entry project – P. Bono said that the overtime project for data entry of historic well record data has been approved to continue until the end of the fiscal year (June 30th). The project was shut down for several months due to budgetary constraints. Some DEP staff from other SRP programs are assisting with this effort during their regular work day.

7. Electrodes Decommissioning-

Eric Hoffman, from Shaw Environmental, Inc. (Shaw), discussed a remediation project in Maplewood, NJ in which 81groundwater electrodes were installed via dual rotary, hollow stem auger and sonic drilling methods. His request to the Board was to seek approval to leave certain portions of the borehole un-grouted during decommissioning to enhance residual remediation effects.

The electrodes consist of a graphite/iron mix that surrounds a heating element that is placed within the borehole. E. Hoffman indicated that leaving the graphite/iron backfill material in the ground will continue to benefit the groundwater, as the zero valent iron will continue to donate electrons over time, mitigating the PCE and TCE contamination. He has been working with S. Reya to obtain approval for a decommissioning deviation approval that 1) would allow the graphite/iron backfill material to remain in place, and 2) install grout plugs to prevent vertical migration of groundwater. A deviation is needed since the decommissioning activity would not comply with N.J.A.C. 7:9D 3.1 requirements completely removing all materials within the total depth of the borehole. The decommissioning proposal submitted by ARS Technologies (drilling contractor), on behalf of Shaw, includes utilizing direct push drilling equipment to drive tooling (drill rods) into the center of the borehole and injecting a series of grout plugs at pre-determined intervals within the borehole. This would be performed once the electrode heater element has been removed from the hole, presumably by crane. The direct push tooling would be equipped with a jetting nozzle that would allow the driller to inject grout at 90 degree intervals (4 radial intervals) to better facilitate grout migration at 360 degrees for the full 12-inch borehole diameter. E. Hoffman provided samples of the material for the Board's review and also previously performed a sieve analysis to give the Board and Bureau a better idea of the particle size distribution through which the grout was expected to flow.

E. Hoffman said that the 60 to 76 foot borehole interval contains a different ratio of iron/graphite material (two parts iron to one part graphite). The upper portion of the borehole is a one to one mix. The grout material for the plugs would be Portland cement. A. Tirro questioned the ability to pump the grout into the borehole as proposed since he expects the grout to flow through the path of least resistance and fail to permeate into the backfill material. There was significant discussion regarding whether the grout would flow into the backfill material since the physical material in the borehole would not be displaced through direct push grouting operations. R. Dalton suggested inclusion of another grout plug at the bottom of the deep holes (60-76 feet), as this is a critical depth that must be sealed.

The Board members suggested that E. Hoffman conduct a test in a piece of vertical casing filled with the backfill material (zero valent iron/graphite) to see how well the grouting works by documenting if it migrates through the material. They believed this would demonstrate the feasibility of the proposed method to Bureau staff. Clear PVC pipe was discussed as a potential casing material. A. Becker noted that he would like the Board members to come up with a list of questions that they have for E. Hoffman at a follow-up Board meeting. A Becker also asked E. Hoffman to develop a diagram indicating the maximum amount of grout intervals he feels could be emplaced, while still achieving the benefits of leaving the material in place within the boreholes.

Rule Development-

Kati Wessling talked about the stakeholder meetings that the Department has held in preparation of revising the well regulations. She indicated that general well construction standards and geothermal wells in particular were the primary topics discussed at the "general meeting" that was held. The second stakeholder meeting included representatives from the grout manufacturing community as well as drillers and pump installers. She also noted that the Department has received some follow-up comments from several people since the meetings. Summary notes from each meeting are expected to be posted on the Department's website shortly.

P. Bono said that there has been a change to the Administrative procedures Act wherein rules are now effective for seven years instead of five years. This means that the sunset date for the current well regulations is now March 2014, not March 2012. A. Becker asked what the well drilling community can do to make sure the Department continues to pursue the revisions to the regulations, which are desperately needed. P. Bono and K. Wessling said that they requested management to allow for the rule revisions to move forward on the original schedule (spring 2012).

The Bureau is looking into the registration of drilling companies for inclusion in the regulations and is currently looking into other DEP licenses that utilize a company registration. K. Wessling added that she is now working on the economic analysis, which must be submitted before the regulation draft. P. Bono does not anticipate any significant problems going forward.

8. Technical Topics (continued)-

Schedule date for field demo of Baroid-

S. Reya said that the Baroid representative, with whom he has been speaking, has proposed the week of June 20th for the field demonstration and pumpability test. As with all other mixes approved for use, samples from the mixer and from the borehole return would also have to be tested for permeability in accordance with the same ASTM standard used to obtain the lab permeability values. S. Reya noted that Baroid had originally submitted Barotherm Gold lab permeabilities for the mixes containing up to 400 lbs of sand per 50 lbs of bentonite, which were in compliance with the maximum permeability established in the regulations. The only change between Barotherm Gold and the

Barotherm Gold 1.0 and 1.2 is that it is a pre-packaged blend of the sand (250 and 400 lbs respectively) and bentonite designed to make onsite mixing easier and produce more consistent grout mixes. Therefore, the physical characteristics of the grout mixes will be identical. Baroid has proposed pumping both Barotherm Gold 1.2, which contains the highest sand content within the Barotherm Gold product line, and Barotherm Max. Barotherm Max contains a graphite additive to increase the thermal conductivity of the grout. Baroid has not yet submitted any permeability data for Barotherm Max, however, they would like to test both on the same day with the expectation that the permeability will pass on the Barotherm Max. S. Reya noted that Baroid has informed him that they should have these results within the next week so the Bureau and Board can conduct a preliminary review before the field demonstration.

S. Reya will email all Board members when a date is confirmed to solicit volunteers.

CETCO High TC Geothermal Grout – S. Reya said that NSF certification for this mix was previously requested by DEP, which has since been provided by CETCO. Additionally, S. Reya checked with NSF and confirmed that the High TC Geothermal Grout is certified by NSF and that this association has verified that use of the grout will not cause adverse effects to human health if used in a well borehole. NJDEP will not require the submission of CETCO's proprietary ingredients for review since this review has already been conducted by NSF (to ANSI 60 standard). In his November 15, 2010 letter, CETCO Regional Manager, Todd Tannehill requested a waiver from the field demonstration requirement. This request was based on the fact that the mix is the same as their Geothermal Grout mix that is already approved for use by the Department, with the exception of the two to ten percent proprietary additive included for enhanced thermal conductivity. Mr. Tannehill's letter noted that "the base sodium bentonite (that affects permeability) is the same as CETCO Geothermal Grout and only the proprietary additives (for thermal conductivity) have been altered." The consensus of the Board members was that CETCO should not be relieved from the field test requirement, as all manufacturers have had to perform the test with each new mix that is developed. A. Becker noted that the Board cannot make a motion since there is not a quorum, but based on the members present, the field test is still required since this is a different product.

Rehau Polyethylene Pipe-
This polyethylene pipe is used in closed-loop geothermal well applications. It typically consists of two smaller diameter loops within each borehole. A. Becker questioned if this pipe will comply with the regulations because it is a cross linked polyethylene. Art asked the Department staff to look over the materials submitted by Rehau and to check with the Department of Community Affairs (DCA) for other approved uses. Review of this polyethylene material will be put on the agenda for the next board meeting. A. Becker also asked that a copy of Rehau's submitted documentation be sent to the other board members not present.

Adjournment-
A motion to adjourn was made by R. Dalton, seconded by A. Tirro ad approved unanimously at 3:29 pm (note: a quorum was not present at this point).

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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STATE WELL DRILLERS AND PUMP INSTALLERS
EXAMINING AND ADVISORY BOARD

State Well Drillers and Pump Installers Examining and Advisory Board Meeting Minutes for July 21, 2011

Board Members Present: Art Becker (Chairman), Anthony Tirro (Vice-chair), Gary Poppe, Joe Yost, Joe Pepe, Richard Dalton, Karl Muessig (exited AM session at 10:52; returned for PM session), and Fred Sickels (exited AM session at 10:52; returned for PM session).

Board Members Absent: Carol Graff

Others Present: DAG Jill Denyes, Legal Advisor for the Board (present for morning session starting @ 10:44AM)

NJDEP Staff Present:
Water Supply Staff present for all or part of the meeting - Pat Bono, Steve Reya, Julia Altieri, Michael Schumacher, Brian Buttari, Melia Stoop (BSDW), Terry Pilawski (BSDW), Steve Doughty (DWS), Jeff Hoffman (Water Compliance and Enforcement), Melisa Hornsby (Water Compliance and Enforcement)

Member(s) of the Public: Mark Lombardo from A.C. Schultes, Inc. (until 10:35AM), Robert Jensen and Alex Mayorga from Agreenability, Lance MacNevin and Mike Maher, from REHAU Inc. and Dennis Duty from Baroid.

1. **Call to Order** – A. Becker called the meeting to order at 9:36 am with a quorum present.

2. **Review of Minutes from May 26, 2011 Meeting –**
   A motion to approve the minutes without change was made by A. Tirro, second by R. Dalton and approved unanimously.

3. **Certification of Test Scores for June 14, 2011 Master, Journeyman B, Monitoring, Soil Borer and Pump Installers Exams–**

   Master– A motion to certify the applicant scores was made by G. Poppe, seconded by J. Yost and approved unanimously.
   Journeyman A motion to certify the applicant scores was made by G. Poppe, seconded by F. Sickels and approved uananimously.
   Journeyman B – A motion to certify the applicant scores was made by Dick, Tony
   Monitoring – A motion to certify the applicant scores was made by Joe Y, Karl
   Soil Borer – A motion to certify the applicant scores was made by. Tony, Fred
   Pump Installer – A motion to certify the applicant scores was made by Gary, Joe P

4. **Licensing Topics-**

Pump Installer Exam Challenge-

Mark Lombardo, from A.C. Schultes Inc., discussed a June 15, 2011 letter he submitted to the Board regarding the scoring of his April 4, 2011 Pump Installer exam. Specifically, Mr. Lombardo felt that Question 11 on the technical portion of the exam, which pertains to the proper depth for setting submersible pumps, should have been marked differently. He added that the wording of the question was vague and did not provide enough information for him to answer it properly although he knew the technical material that the question appeared to be designed to test.

A motion to discuss the question in executive session was made by G. Poppe, seconded by F. Sickels and approved unanimously at 9:59 am. The Board returned to open session at 10:32 am.

A. Becker informed Mr. Lombardo that his request to have his grade changed on the technical portion of the exam was denied. He added that although the Board felt that he understood the concept of the question; his answer was incorrect based upon the actual wording of the question. He also informed Mr. Lombardo that the Board shall look into a one year history of this test question to see how many applicants had difficulty with this question and will take steps to revise if necessary.

Supervision of Testing Concerns –

S. Reya stated that he received a phone call while the test was being administered in which the caller said that two other testers were cheating. The caller indicated that two people had open books while taking the test. S. Reya reported that he called the proctor at the test site to relay the caller's concern while the individuals while still working on the test but the proctor could not verify the charge. Since the charge could not be verified, S. Reya proposed that the Board certify all the exam results for the day but suggested appropriate action shall be taken to prevent cheating on future exams. DEP will now ensure that no study material is brought into the testing center to eliminate this problem.

Reappointment board members-

An Administrative Order for reappointment of Board members has been sent to the Commissioner's office, but no official response has been received yet. All members are to be reappointed except for Fred Sickels. He has made the recommendation that Steve Doughty, from the Division of Water Supply, be appointed to the Board in his place. F. Sickels noted that due to increased responsibilities as the Acting Director of Water Supply, his schedule often precludes him from participating fully as a Board member. He thanked the Board members for their service and assistance to him over the time he spent as a Board member.

Regulation Revision Update–

F. Sickels said that the well regulation is his top priority within the Division of Water Supply and that as Acting Director he has placed this regulation's importance above all others within the Division. A. Becker handed out two letters from (one from himself and one from George Strycker, on behalf of the New Jersey Groundwater Association (NJGWA)) that were recently sent to the DEP Commissioner, Bob Martin. Both letters urged the Department to proceed with the regulatory revisions needed for the industry. G. Poppe added that he is also in the process of submitting a letter as president of NJGWA, which essentially reiterates that new regulations are essential to properly oversee the drilling industry. A. Becker said that the industry is dedicated to having the rules updated and not taking "no" for an answer.

Pump Installer Survey –

Four Pump Installer Exam surveys were returned to the Bureau. The Board reviewed the responses in an attempt to determine the reason for the high failure rate of the pump installer test applicants. The survey responses indicate that most application knowledge comes from on-the-job training. J. Pepe suggested that the length of time each applicant has worked in the industry should be included on the survey. S. Reya will revise the survey that is included with all Pump Installer exams and report the results of those surveys at the Board meeting following the exam.

5. **Enforcement Activity –**
J. Altieri and Jeff Hoffman of Water Compliance and Enforcement have been continuing with the enforcement field offices. She noted that Mr. Kavlunas is still waiting for a response regarding the well decommissioning issue that was brought before the Board at their last meeting. S. Reya will go out to the site to check current conditions at the site (overhead power lines and reports of washouts due to adjacent farm irrigation) to determine the validity of Mr. Kavlunas' concerns.

Out of seven drilling companies that received Administrative Orders and Notice of Civil Administrative Penalty (AONOCAP) letters, five have responded and requesting hearings. There is a significant backlog of Department hearing requests and J. Altieri has been notified of that any have been scheduled as yet. All documents currently being sent to enforcement are for chronic, repeat offenders or serious construction violations.

J. Hoffman, from the Department's Central Region of Water Compliance and Enforcement, said that well drilling enforcement is now a line item in Enforcement's annual work plan. This is the first time well drilling violations has been listed, which equates to it being a higher priority within the Department's enforcement program. He added that they are also currently attempting to pursue license suspensions and revocations for well drillers with egregious violations. J. Hoffman indicated that the Board needs to be involved in the license suspension/revocation and that the DEP cannot proceed without the Board based on provisions in the current regulations.

6. **Board Process for Conducting a Hearing-**
J. Denyes, DAG, developed a procedure to conduct hearings, which she believes to be in accordance with both the wording of the statute and the rights of the licensed individual. She provided a handout labeled "Well Drillers and Pump Installers Advisory Board Hearing Procedure," which detailed the procedure. J. Denyes stated that a court stenographer is not required and that the Board hearing is an informal process. Rules of evidence and motions are also not needed at a Board hearing. The end result of the hearing would be that the Board's recommendation to the Department (Commissioner) would be recorded as a resolution. As discussed at previous meetings, the Board has authority to recommend license suspension/revocation to the DEP commissioner while the Department has the authority to issue fines and other required corrective action. M. Schumacher suggested that hearings before the board should be audio recorded.

7. **National Ground Water Association (NGWA) Certification Program Update-**
The DEP purchase order to utilize the services of NGWA was recently approved. S. Reya indicated that the funds have been approved will allow the Bureau to begin to setting up the proposed testing, licensing and continuing education program that would be administered by NGWA. A partial implementation of this program is envisioned prior to a full mandatory implementation, which cannot occur until after the new regulations become effective. P. Bono noted that NGWA needs to file some forms with the New Jersey Treasury, which they are currently in the process of doing.

8. **Program Updates-**

Historic Well Document Project– The historic well record data entry project is currently on hold with regard to the work being performed on overtime, as was the case with the vast majority of the work on the project. Some staff members within the DEP's Site Remediation Program have recently been working on this project with the Well Permitting staff. P. Bono anticipates that this project will take approximately two more years to complete if work progresses uninterrupted.

Rule development– P. Bono listed the main sections of the regulations that are slated to be changed and noted that she would like to have one or two licensed well drillers from the Board included on the rule writing team if permitted by the Department.

Well Searches– M. Schumacher provided an update on a new public well search tool he has been developing, which would allow users (well drillers, pump installers, health departments and homeowners) to access the Department's well permits and well records through the DEP website. There are still data security concerns associated with releasing some of this information. The question of what information is public information and what is not is currently still under discussion.

9. **Agreenability Geothermal System-**

Robert Jensen, President of Agreenability, discussed his re-designed geothermal system. Mr. Jensen summarized the geothermal design presentation he made at the Board's at the September 2010 meeting. At that meeting he requested approval to install his geothermal system in the New Jersey. At that time the Board recommended that the Bureau allow a single well installation for use as a pilot program for conducting thermal testing, which Mr. Jensen indicated was necessary to investigate the efficiency and economic viability of the design. The Board did not recommend approval of the system for use throughout the state, as several members expressed concerns about the ability to grout the entire annular space around the geothermal loops. The Agreenability system consists of four polyethylene loops (eight pipes) and one center pipe, which the loops surround in a spiral pattern. Approval of the total system for use throughout the state was not to be granted until Agreenability demonstrates that complete grouting of the system can be accomplished without creating vertical conduits in the grout column. It was believed that loop orientation could potentially lead to channeling of the grout seal. Mr. Jensen stated that as a result of the meeting, he redesigned to the system to allow complete bottom to top grouting and ensure the elimination of voids.

Changes to his original design include a larger center pipe (2-inch diameter) and increased spacing between the outer pipes (of which there are eight). Additionally, Mr. Jensen stated that the center pipe is now ported to allow grout to flow out through the holes. His current design calls for the ported center pipe to be constructed from polyethylene pipe, but he requested flexibility with the material used for the center pipe. Future designs may call for corrugated pipe material for the center pipe. Mr. Jenson noted that this is a non-pressure bearing part of the system so the material strength specifications are not relevant. His current design calls for center pipe holes measuring .5 inches in diameter. Two holes would be placed every linear foot of the pipe. Mr. Jensen explained that the outside diameter of the geothermal pipe assembly measures approximately 4.475 inches in diameter and the outer pipes are .75 inch. He also discussed a design schematic he submitted to the Bureau on July 15, which detailed eight holes in the center pipe. He indicated that this number of holes is not necessary, and would like to propose the installation containing two holes per interval, as discussed above. Mr. Jensen's assistant, Alex Mayorga, confirmed this through computer modeling and presented a printout of the estimated grout flow characteristics to the Board. The required flow rate of the grout (estimated at 25

gallons per minute) would not necessitate any more that two half inch holes every foot according to Mr. Mayorga's computer modeling results.

The center pipe would not be used as a tremie pipe; a tremie would actually be inserted inside the center pipe and gradually removed during the grouting process. Mr. Jensen noted that he hopes to install his system in a borehole measuring 5 7/8" in diameter. He believed the spacing from one of the outer pipes to another to be approximately .5" and nearly infinitely long, so he didn't believe this spacing would restrict the flow of grout any more than the perforated holes in the center pipe. He also said that Geothermal Services Inc., a NJ drilling contractor, installed a test well installation in New York. This system was based on his original design, but demonstrated that the product was both easy to install and achieved the required efficiency numbers. Therefore, he is now ready to proceed with obtaining state-wide approval for his system, rather than the previous approval, which was for the purpose of installing one test well.

Several Board members noted that they would like to see an actual sample of the system material before recommending approval. Mr. Jensen stated that it would be several weeks before an actual section of material will be available for inspection. The Board members also suggested that if approval of the system is granted, a trial site-wide installation containing a reasonable number of wells (not several hundred) should be approved. It was suggested that Bureau staff arrange to be onsite and check the grout volumes used onsite to verify that the boreholes are taking the required, theoretical volume of grout material.

Motion:

K. Muessig made a motion that the system be approved for a site-wide installation, provided the Board inspects the design and that it meets the specifications detailed by Mr. Jensen. The motion was seconded by G. Poppe and approved unanimously.

It was also noted that the schematic provided by Mr. Jensen should be revised to include the actual layout of the grout holes in the center pipe and the spacing distance between the outer pipes should be listed on the schematic. Mr. Jensen will coordinate with S. Reya.

10. Baroid Geothermal Grout Mix Field Demonstration-

Dennis Duty, from Baroid Industrial Drilling Products, stated that he had arranged for the Geothermal Services to pump several Baroid Geothermal Grout products at Ocean county College on August 9, 2011. These pumpability tests will be conducted with the presence of Board members to verify that the mixes are abl;e to be pumped in the ratios specified by Baroid. Independent lab permeability values have been submitted for Barotherm Gold and Barotherm Max, which have both been demonstrated to not exceed the Department's maximum allowable permeability value. Pumpablity tests of Barotherm Max (which contains graphite as a thermally conductive material), Barotherm Gold (which contains 400 lbs. of sand and 50 lbs of bentonite) and Barotherm Gold 1.2 (which is identical to the Barotherm Gold 400 lbs of sand mix, but the sand and bentonite are pre-packaged). R. Dalton asked that the full lab sheets for the permeability tests be submitted to S. Reya, as the previous submissions contained only the lab summary table. Grout samples will be obtained onsite and again tested for permeability. If the pumbability demo and permeability values are acceptable, the Department will approve all mixes.

Mr. Duty also discussed a product similar to the DEP-approved cementitious thermally enhanced grout (Mix-111) that is being designed for rock wells, but will be a more pumpable mix for deep geothermal well installations. Mr. Duty stated that the new product will still be cement based and will have similar permeability and thermal conductivity values, but will be easier to mix and

pump. A. Becker instructed Mr. Duty to submit a letter to the DEP requesting consideration for this grout to be used in NJ.

11. **REHAU Inc.**– PEXa Cross-linked Polyethylene Geothermal Piping-
Mike Maher and Lance MacNevin, from REHAU Inc. stated they are requesting approval to use PEXa cross-linked polyethylene piping for geothermal well installations in NJ. They noted that the International Ground Source Heat Pump Association (IGSHPA) approved PEXa piping in 2008. PEXa eliminates the weld at the bottom of the loop since it is able to be bent in a very small radius. This means there are no seams within the vertical portion of the geothermal loop. The wall thickness of PEXa is reportedly maintained during bending. PEXa cannot be butt-fused but a compression fitting can be used. The ribs on the brass portion of the compression fitting are pressed into the pipe. The joints in the horizontal piping are also wrapped in a sleeve through heatshrinking as an added protection. These compression fittings are specific to PEXa piping, which was reportedly a requirement of the IGSHPA approval. A second way to join sections is via electrofusion. This joining material can join PEXa to PEXa or PEXa to High Density Polyethlene (HDPE) material, whereas the mechanical compression fitting can only join PEXa to PEXa.

They added that the burst pressure of the pipe is 800 psi and that the pipe is rated at 160 psi at 73.4 degrees F, which is equal to the pressure rating of HDPE currently approved for use in NJ. Additionally, PEXa is rated at 180 and 200 degree F. According to the REHAU representatives, HDPE does not have a rating at these elevated temperatures and that at higher temperatures, PEXa is stronger than HDPE. A glass polyester loop tip is installed on every loop, which both aids in installation of the loop and protects the loop material during insertion. REHAU also has a loop tip that allows installation of two loops within on borehole. Finally, they noted that their product has not yet been certified by NSF International, their certification program is under development. Mr. MacNevin stated that he very much aware of the criteria being developed as he is a member of the NSF Certification Board. An exact date of when the certification will be obtained is currently unknown.

A. Becker asked if this material conforms to the closed loop geothermal piping material specified in the well drilling regulations, N.J.A.C. 7:9D-2.5(a)4.1 (located on page 35). Lance MacNevin stated that although PEXa is made from HDPE, the ASTM standards cannot be applied. The material is HDPE, however, once it is cross-linked it must be evaluated using a different set of ASTM standards. He stated that the pipe is not deficient with regard to materials listed, however, it is different than that material so it cannot be evaluated using the same tests and criteria. A. Becker questioned whether there are any characteristics of PEXa that would be considered to be lower than HDPE.

Mr. MacNevin noted that there are two characteristics of PEXa that would be considered to be lower than HDPE:

1) UV resistance rating for PEXa is currently rated at 1 year. This is achieved via a gray coating that is applied to the material. This rating is less than HDPE, however, the Board members indicated that the UV protection is not relevant for a pipe that is installed to be installed within the ground (other than outdoor storage considerations).
2) The Hydrostatic Design Basis (HDB) of PEXa is listed at 1250psi. Mr. MacNevin indicated that this is due to the fact that the PEXa (crosslinked HDPE) is less dense than typical HDPE. The strength gained by crosslinking allows the pipe material to be less dense. He added that the pipe material is still rated at 160 psi at 73.4 degrees F, which would be more relevant than the HDB since it is much more comparable to a working pressure rating.

He indicated that in all other respects, specifications for PEXa meet or exceed those of standard HDPE.

A Becker suggested that REHAU provide comparative document comparing PEXa and HDPE. He noted that he would like them to provide corresponding ASTM tests for PEXa and HDPE to demonstrate to the Board and Bureau that the pipe material meets or exceeds the relevant criteria specified in the well drilling regulations. It was also noted that some of the referenced standards in the regulations are out of date and need to be revised when the new regulations are drafted.

Motion – A motion was made to grant conditional approval for PEXa piping if REHAU's side by side comparison demonstrates that the product meets or exceeds the standards for HDPE as per N.J.A.C. 7:9D-2.5(a)4. G. Poppe made the motion, F. Sickels seconded and all were in favor.

12. **Shaw Environmental Inc.-**
S. Reya updated the Board on the electrode decommissioning method proposed by Eric Hoffmann at Shaw Environmental at the last meeting. He showed the Board members a copy of the proposal entitled "electrode Abandonment Bench Scale Test Methodology Grout Injection Test." S Board members agreed that the methodology that was described was consistent with the discussions at the meeting. S. Reya noted that Mr. Hoffmann recently indicated to him that he plans to conduct the bench test shortly and report the results to the Board at the September meeting.

13. **Cement/Grout Additives-**
Dennis Duty, Baroid representative, raised the issue of plasticizers and other cement additives. He questioned whether each brand and chemical components of superplasticizer or other cement additives (such as retardars/water control agents) need to approved. Additionally, he felt that additives are not truly the grout material and make up a very small percentage of the overall mixture. He stated that although the cementitious thermally enhanced grout (Mix 111) was approved by NJDEP and it contains a superplasticizer additive, there are many additives available on the market and having the Department review each one before it can be used is onerous. Finally, he posed the question about what criteria are used to determine if one additive meets/exceeds standards.

14. **Board Member Appointments- Steve Doughty-**
S. Doughty addressed the Board and provided some information about his background and history with the Department. He noted that the Commissioner's Office has not yet signed off on the Administrative Order that would officially appoint him to the Board in place of Fred Sickels. It is anticipated that it will be signed within the next few weeks. S. Doughty stated that he is looking forward to working with the Board on issues in the future.

15. **A Motion to Adjourn** was made at 3:08 was made by K. Muessig, seconded by R. Dalton and approved unanimously

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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STATE WELL DRILLERS AND PUMP INSTALLERS
EXAMINING AND ADVISORY BOARD

BOB MARTIN
Commissioner

State Well Drillers and Pump Installers Examining and Advisory Board Meeting Minutes for September 15, 2011

Board Members Present: Art Becker (Chairman), Anthony Tirro (Vice-chair), Gary Poppe, Joe Yost, Joe Pepe, Richard Dalton, Karl Muessig , Carol Graff.

Board Members Absent: Fred Sickels

NJDEP Water Supply Staff Present:
Pat Bono, Steve Reya, Julia Altieri, Michael Schumacher (second half of meeting), Brian Buttari (second half of meeting), Tracy Omrod, Melia Stoop (BWAWP), Terry Pilawski, Steve Doughty

NJDEP Enforcement Staff: Jeff Hoffman (morning only), Melissa Hornsby (morning only)

Member(s) of the Public: Gus Schultes from A.C. Schultes, Robert Jensen from Agreenability.

1. **Call to Order** – A. Becker called the meeting to order at 9:36 am with a quorum present.

2. **Review of Minutes from July 21, 2011 Meeting –**
   A motion to approve the minutes without change was approved unanimously.
   Review of Executive Minutes from July 21, 2011-
   A motion to approve the minutes without change was approved unanimously.

3. **Certification of Exam Scores for October 4, 2011 Master, Journeyman, Journeyman B, Monitoring, Soil Borer and Pump Installers Exams–**

   Master – A motion to certify the applicant scores was made by G. Poppe, seconded by A. Tirro and approved unanimously.
   Journeyman - A motion to certify the applicant scores was made by J. Yost, seconded by C. Graff and approved unanimously. S. Reya noted that Mr. Killip has two pending enforcement issues with the Department. His exam scheduling letter will note that should he be successful in passing his Journeyman Exam, a license will not be issued until all pending enforcement actions are resolved.
   Journeyman B – A motion to certify the applicant scores was made by C. Graff, seconded by A. Tirro and approved unanimously.
   Monitoring – A motion to certify the applicant scores was made by G. Poppe, seconded by J. Yost and approved unanimously.

Soil Borer – A motion to certify the applicant scores was made by A. Tirro, seconded by D. Dalton and approved unanimously.
Pump Installer – A motion to certify the applicant scores was made by K. Meussig, seconded by C. Graff and approved unanimously.

4. **Testing & Licensing Issues-**
Pump Installer Survey
S. Reya conducted a review of a one year history of the pump installer question that was challenged by Mark Lombardo from A.C. Schultes at the previous meeting. He found that this question, which pertained to the correct depth at which a submersible pump should be set, was answered correctly by only 18.5% of all applicants (five of twenty-seven applicants answered the question correctly). Additionally, he noted that four of the applicants wrote comments adjacent to the multiple choice selections, which indicates that there is confusion as to exactly what the question is asking. The Board members agreed that the question should be re-worded.

A motion to go into Executive Session to revise the question was made by G. Poppe and seconded by C. Graff.

The Board returned to open session at 10:15 am.

5. **Board Business –**
Reappointment of Board Members – Status Update
P. Bono said that the Board member appointment approvals have not been formalized, as the Administrative Order has not yet been signed by the Commissioner's office.

Reschedule Conference Call Originally Scheduled for November 8, 2011. – It was noted that the conference call scheduled for the purpose of approving the October 4 call is scheduled for a state holiday. The conference call will now be rescheduled for Wednesday, November 9th at 10:30 am. Bureau staff will send out updated public notices to the newspapers originally notified about the call as required.

6. **Licensing Topics –**

Enforcement Activities –
M. Kavlunas/Total Quality Drilling Update (Mr. Kavlunas Originally Addressed the Board on May 26, 2011)-
S. Reya noted that he returned to the site in question on August 23, 2011 to check on Mr. Kavlunas' claim that the well is located too close to power lines, which prohibits him from drilling out the well and placing grout to the total borehole depth upon abandonment. Mr. Kavlunas' second assertion was the fact that the high volume of irrigation runoff from the adjacent farm caused grout to washout from around the casing. The irrigation runoff also reportedly caused a washout and sinkhole around a second well that was drilled later by another drilling contractor to replace the well drilled by Mr. Kavlunas. S. Reya stated that the well drilled by Mr. Kavlunas, which has been ordered sealed by DEP, is approximately 40 ft. from overhead power line along the street and approximately 20 ft. from the overhead power line that runs to the residence. He also reported that the newer replacement well is surrounded by a depression that is a few feet long along the side in which the water line and electric line were trenched. This depression measured approximately 10 inches below grade.

S. Reya noted that the new well was not washed out and that since Mr. Kavlunas chose the well location, it is ultimately his responsibility to coordinate with the power company to shut off th epwer temporarily should he feel that the proximity to the well is not a safe distance when decommissioning the well. Finally, Mr. Reya noted that he used a hand auger to sample the annular space around the well drilled by Mr. Kavlunas and found only a few inches of bentonite grout below the pitless adapter elevation and encountered voids and cuttings below this point. The Department will be sending correspondence to Mr. Kavlunas notifying him that the Order to Seal is still in effect and that he will still have to drill out the well to the depth and diameter of the original borehole.

Mr. Kavlunas requested an administrative hearing on this matter, which has been granted by the Department but may not take place for quite some time due to a backlog in the administrative hearing schedule. Several options were discussed regarding concern over the length of time the well would exist until the hearing takes place. It is not possible for the DEP to go ahead and pay to decommission the well and charge Mr. Kavlunas for the cost; the Department lacks this regulatory authority. G. Poppe stated that this situation incurs danger to the homeowner's drinking water posed by the abandoned well. A. Becker stated that the current enforcement system is not working properly and that the Board and Department need to take a look into correcting the problem. J. Hoffman stated that the well drilling regulations would have to contain the regulatory authority to actually do this. He also noted that the only option to speed up the process of the physical well decommissioning would be to attempt to separate the violations into two Administrative Orders. One would contain fines, which could wait for a hearing and the other would pertain to the physical onsite remediation work that is required and attempt to expedite that portion.

NGWA Certification Program – Update – Kevin McCray, National Ground Water Association (NGWA) Executive Director, recently contacted P. Bono to begin to work on setting up the testing, licensing and continuing education process. P. Bono indicated that the holdup in working with the NGWA is that lack of a solid design concept for the new licensing and continuing education program. Since efforts to work on the rule have resumed, this should become possible in the near future. She and S. Reya will continue to work with NGWA to set up the program.

7. **Technical Topics -**

Robert Jensen, President of Agreenability, brought in a sample of his geothermal pipe design, which was requested by the Board members at the July 21, 2011 meeting. The six foot long showed the central grout tube (2" diameter) and the orientation of the eight surrounding geothermal pipes (3/4" diameter) that make up four geothermal loops that surround the center pipe in a spiral arrangement. Mr. Jensen handed out a September 12, 2011 report of a grouting bench test he conducted entitled "Report: Validation of 2" Center Pipe Twisted Pipe Bundle (2TPB), grouting (p)rocess." He also provided samples of the Twisted Pipe Bundle that had been surrounded by grout material (Cementitious Thermally Enhanced Grout/Mix 111) in a six (6) inch diameter, four (4) foot long section of PVC pipe that was selected to simulate the well borehole. R. Jensen noted that two holes measuring .5" in diameter are to be placed in the center line and will act as grout ports. A tremie pipe is to be placed to the bottom of the well through this hole. He also stated that they anticipate being able to pump 12 to 24 gallons per minute through the grout ports.

R. Jensen confirmed that the piping, grout and circulating fluid all conform to the standards of N.J.A.C. 7:9D. The reason for his visit was to ask about the ability to properly grout the pipe

bundle within the borehole. He added that the typical installation depth would be between 200 and 350 feet. Board members expressed interest in being onsite to observe the installation and ensure that the design would in fact, facilitate adequate grouting of the borehole. R. Jensen agreed to coordinate the permit application with S. Reya who will contact interested Board members who wish to view the installation.

A motion to advise the Department to approve the pilot program installation and that Board members witness the installation, was made by G. Poppe and seconded C. Graff and approved unanimously.

8. **Program Updates-**
Historic Well Document Project– Water Supply staff has resumed working on the historic well record data entry project. P. Bono also noted that the Well Permitting staff is currently working more closely with the with other groups within the element (Bureau of Safe Drinking Water and Water Systems Engineering staff) to better coordinate well permitting and well construction issues that overlap multiple DEP programs.

Rule development – P. Bono stated that she is in the process of preparing a draft revision to the well regulations, N.J.A.C. 7:9D. One important issue that is not addressed in the current regulations is the registration of drilling companies. P. Bono noted that she feels as though the Department would be better able to hold companies accountable for habitual improper well construction practices if companies were required to register with DEP. She also noted that she intends to set up a work session to solicit suggestions and feedback regarding revisions to the current regulations, including the NJGWA subcommittee formed for this purpose. She agreed to set a date in time for G. Poppe to announce at the upcoming NJGWA meeting next week. R. Dalton suggested that DEP update their regulations on a more frequently to keep up with codes and standards being set by other agencies. This could allow for incorporation of new technologies as they arise and keep the well regulations up to speed with newer technologies. Unfortunately, the schedule fore revising regulations is not within the control of the Division and must accommodate the Department's rules schedules.

J. Pepe suggested that P. Bono provide a copy of the draft regulations, which notes the changed/added text in bolded text to allow those who are reviewing the proposed regulations to quickly identify the items that are new. He indicated that he has seen this layout in other regulations and will attempt to find a sample for her to review.

9. **Enforcement Update-**
Board Hearings-
J. Denyes, DAG, stated that the Department and Board appear ready hold a hearing for unsettled enforcement violations at an upcoming meeting. She suggested that one well driller be identified by the Department and brought to the Board through a referral. The hearing will need to be posted as part of the public notice and follow the procedures outlined by J. Denyes at the previous meeting. When the individual is identified by the Well Permitting program, the Department's Enforcement program will issue a notice to the individual, which will require the person to appear at the Board hearing.

J. Altieri asked whether all documentation of an individual's violation(s) would be required to be presented in front of the board. J. Denyes stated that it is the Board's decision regarding how much documentation the members feel is required. A. Becker indicated that he would prefer a

summary of the violations and enforcement actions rather than large document containing every piece of documentation regarding a particular case. J. Denyes also noted that the individual will have the right to go to the Office of Administrative Law after board hearing to appeal the decision of the DEP commissioner (after recommendation was made by the Board).

A. Becker noted that the well drilling and pump installation community is fairly small and that members of the Board know many other individuals within the regulated community. Therefore, he requested guidance on when a Board member must recues himself/herself from participating in the Board hearing. J. Denyes said she would provide guidance to board members at the upcoming meeting.

Enforcement Correspondence-
J. Altieri provided an Enforcement update regarding all recently sent Administrative Order notices that have been sent by the Department, as well as noting that several additional people have requested hearings. These individuals, therefore, will not comply with the Administrative Order until the hearing is held. Hearing request backlogs further complicate the problem since it is often months or years before the hearing occurs.

10. **Technical Topics - (Continued)**
Electrode Decommissioning-
S. Reya said that he had recently heard from the Shaw Environmental staff concerning the bench test that was proposed to obtain a deviation for the decommissioning of multiple electrodes on a contaminated site. The bench test had not yet been conducted due to a delay in ordering backfill materials for the test. Shaw Environmental staff will contact S. Reya prior to the next meeting to provide documentation of the bench test and/or will attend the next Board meeting to present the results of the test.

REHAU Geothermal Piping– S. Reya discussed a September 14, 2011 letter from Terry Pilawski, Chief of the Bureau of Water Allocation and Well Permitting, which approved the use of REHAU's PEXa crosslinked polyethylene piping for use as geothermal ground loop piping material. This was a result of REHAU staff providing the Department with the documentation requested at the Board meeting they attended on July 21, 2011. R. Dalton and S. Reya reviewed the documentation and agreed that the piping material met or exceeded the standard required by the regulation, N.J.A.C. 7:9D, in all relevant categories. R. Dalton also noted that the specifications listed in the regulation are outdated and need to be updated in the new regulations that are to be proposed shortly.

Baroid field demo – The permeability data results for the recent field demonstration of Baroid's Barotherm Gold 400/Barotherm 1.2 and Barotherm Max are not yet available according to a September 14, 2011 email sent by Dr. Charles Landis, Halliburton Industrial Drilling Products Technical Director. Preliminary values for some of the samples were provided in this email, which was sent to S. Reya. R. Dalton noted that he will check the ASTM standards for conducting the permeability test to ensure that Baroid's independent lab is conducting the tests within the proper time frame of the sample collection date.

11. **Board Meeting Rescheduling-** The meeting scheduled for November 29, 2011 will be rescheduled for November 22, 2011 due to scheduling conflicts of several Board members. Public notice of the new meeting date will be posted in all newspapers used to publish the original date.

12. **A Motion to Adjourn** was made at 12:07 pm by C. Graff, seconded by A. Tirro and approved unanimously.

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

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STATE WELL DRILLERS AND PUMP INSTALLERS
EXAMINING AND ADVISORY BOARD

BOB MARTIN
Commissioner

State Well Drillers and Pump Installers Examining and Advisory Board
Meeting Minutes for November 22, 2011

Board Members Present: Art Becker (Chairman), Anthony Tirro (Vice-chair), Gary Poppe, Karl Muessig, Fred Sickels (morning only)

Board Members Absent: Richard Dalton, Carol Graff, Joe Yost, Joe Pepe

Legal Staff Present: Jill Denyes, DAG

NJDEP Bureau of Water Allocation & Well Permitting Staff Present:
Pat Bono, Steve Reya, Michael Schumacher, Brian Buttari, Melia Stoop, Terry Pilawski,(morning only)

Other Division of Water Supply & Geoscience Staff Present: Steve Doughty

Member(s) of the Public: none present

1. **Call to Order** – A. Becker called the meeting to order at 10:08 am with a quorum present.

2. **Review of Minutes from September 15, 2011 Meeting –**
A motion to approve the minutes without change was made by G. Poppe, seconded by A. Tirro and approved unanimously with F Sickels abstaining. (F Sickels was not present for the September meeting.)

3. **Review of Executive Minutes from September 15, 2011-**
A motion to approve the minutes without change was made by G. Poppe, seconded by K. Muessig approved unanimously.

4. **Review of November 9, 2011 Conference Call Minutes-** A motion to approve the minutes without change was made by K. Muessig, seconded by G. Poppe and approved unanimously.

5. **Testing & Licensing Issues-**

Certification of Exam Applicants for the December 15, 2011 Master, Journeyman, Journeyman B, Monitoring, Soil Borer and Pump Installers Exams–

Master – A motion to certify the exam applicants was made by A. Tirro, seconded by G. Poppe and approved unanimously.
Journeyman - A motion to certify the exam applicants was made by G. Poppe, seconded by A. Becker, and approved unanimously.
Journeyman B – A motion to certify the exam applicants was made by F. Sickels, seconded by A. Tirro and approved unanimously.
Monitoring – A motion to certify the exam applicants was made by G. Poppe, seconded by K. Muessig and approved unanimously.
Soil Borer – A motion to certify the exam applicants was made by K. Muessig, seconded by A. Tirro and approved unanimously.
Pump Installer – A motion to certify the exam applicants was made by G. Poppe, seconded by A. Becker and approved unanimously.

Pump Installer Test Survey Discussion – S. Reya presented the most recent Pump Installer Exam Surveys, which were collected from applicants at the October 4, 2011 exam. He noted that the voluntary survey, which is being used to evaluate how the Board can better assist applicants in preparing for the exam and/or revise exam questions, was completed by four (4) applicants. A. Becker stated that two (2) of the surveys, in which the applicants had a combined 18 years of field experience, noted that the test was difficult. Since more than half of the questions on the test relate to the field experience of the applicant, the Board expressed concern with the passing score percentage, which was again low on this exam cycle. The Board discussed the possible inclusion of questions regarding Variable Frequency Drive (VFD) pumping equipment, as a larger and larger percentage of the industry is now utilizing this technology. S. Reya will continue to report the results of the surveys from each test cycle at subsequent Board meetings.

6. **Board Business –**
Reappointment of Board Members – Status Update-
P. Bono said that the Board member appointment approvals have not been formalized since the Administrative Order has not yet been signed by the Commissioner's office.

7. **The dates for the 2012 Board Meeting Schedule have been set as follows:**

Thursday-January 26th, 2012
Thursday-March 15th, 2012
Thursday-May 24th, 2012
Thursday-July 19th, 2012
Thursday-September 13th, 2012
Thursday-November 29th, 2012

Conference Calls, which are to be held for solely for the approval of well driller and pump installer exam scores, are scheduled for:
Thursday, May 3rd, 2012
Wednesday, November 7th, 2012

8. **Baroid Geothermal Grout Discussion** – S. Reya discussed a November 7, 2011 independent laboratory permeability report, which submitted by Dr. Charles Landis, from

Baroid Industrial Drilling Products. This report contained the final permeability values for Baroid's geothermal grout products, which were installed at a New Jersey site in the presence of Board and Department representatives on August 9, 2011.

The products that were installed and tested for permeability were: Barotherm Max (which contains graphite as a thermally conductive material), Barotherm Gold (which contains 400 lbs. of sand and 50 lbs of bentonite in its most thermally conductive form) and Barotherm Gold 1.2 (which is identical to the Barotherm Gold 400 lbs of sand mix, except that the sand and bentonite are pre-packaged by the manufacturer rather than mixed onsite). S. Reya noted that nine of the ten samples tested were below the maximum permeability value specified in the well construction regulations ($1x10^{-7}$ cm/sec). The only value that exceeded the required value was one sample of Barotherm GOLD 1.2, which was taken from the "end of tremie last batch." Two other tests of this same product and four tests of Barotherm Gold – 400 lb. mix exhibited acceptable permeability. S. Reya questioned whether the Board wished to approve all three products since the field demonstration showed that the products could all be pumped and placed in accordance with manufacturer specifications and that the thermal compound (sand or graphite) remained in suspension within the grout slurry. Additionally, the only lab permeability value that does not meet the required value is from what was believed to be the final batch of grout, which may have contained excess water.

A. Becker suggested that R. Dalton review the permeability data before the Board recommends that the Department approve the mixes for use in New Jersey.

G. Poppe made a motion recommending approval of the products provided R. Dalton reviews the recent lab submission and agrees that the products meet the requirements of the state well drilling regulations. A. Tirro seconded the motion and all members were in favor.

S. Reya will forward the data to R. Dalton for his review.

9. Licensing Topics –

Enforcement Activities –P. Bono informed the Board of the Bureau's recent field activity. Both B. Buttari and M. Schumacher inspected and oversaw the installation of a public non-community well being drilled at a day care center in Northern New Jersey. This well was being drilled to replace the existing well, which had repeatedly exhibited bacterial contamination. P. Bono indicated that both B. Buttari and M. Schumacher's presence onsite ultimately ensured that the casing was properly grouted in place to minimize the chance of vertical contaminant migration.

Terry Pilawski, Chief of the Bureau of Water Allocation and Well Permitting, expressed the high value she places on field enforcement activities and noted that she wants an increased field presence within the program. G. Poppe agreed and said that this was the New Jersey Groundwater Association's loudest outcry; that with increased DEP presence the individuals constantly violating the state's regulations would be brought under control. T. Pilawski confirmed that she will be working with the Division of Water Supply and Geoscience staff, as well as Compliance and Enforcement staff, to increase the on-site presence.

Proposed National Ground Water Association (NGWA) Licensing Program -

S. Reya said that the regulation revisions, which are currently being drafted have delayed being able to develop the testing, licensing and continuing education program that will be administered by the National Ground Water Association. He did indicate, however, that he had recently spoken with NGWA Director, Kevin McCray about using one category of license (likely the Monitoring Well/Environmental Driller) to develop a pilot program that applicants could begin to use shortly. Upon adoption of the newest regulations, a full program could then be implemented and all applicants would then sit for the exam administered by NGWA. This would allow the Bureau to focus on other important tasks rather than administering the testing and licensing program for the Department.

10. **Regulations Update by Division of Water Supply & Geoscience presented by Acting Director Fred Sickels-**
F. Sickels said that the well regulations are the highest regulatory priority within the Division. As the Department intends to adopt nearly 20 different regulations in the upcoming year, he indicated that it is imperative that the well regulations are drafted as soon as possible to ensure that adoption of the regulations is not delayed. Finally, he noted that any changes to the regulations must be concise and streamlined to avoid delays in the process of updating the regulations.

A. Becker and F. Sickels discussed the fact that the adoption of new and updated regulations has been delayed for far too long. They both stressed that the new regulations will have to focus on existing technologies that are currently in use within the industry and also create a process for review of new technologies as they become available in the future. It is envisioned that the regulations will specify criteria and groundwater protection standards that new technology must meet, rather than specifying exact materials, which essentially prohibits the use of all materials not expressly approved in the regulations. The regulations will have to address the concerns of geothermal wells, but not restrict new and appropriate technologies as they become available.

11. **Field Program-** T. Pilawski, Chief of the Bureau of Water Allocation and Well Permitting, said that she intends to work with K. Muessig's staff, which has recently been merged into the Division, to assist with field inspections. She noted that an increased field presence would constitute a proactive approach to enforce the Department's regulations and focus on construction standards, rather than relying on paperwork review to catch violations of the well drilling regulations. G. Poppe stressed the importance of this approach and stated that he believes that the industry is aware that the Department currently conducts very few inspections, which has given many contractors the impression that they can violate the regulations with very little chance of any repercussion.

T. Pilawski also mentioned that she would like to coordinate some field training for NJDEP's enforcement staff as well as inspectors from county and municipal health departments. G. Poppe volunteered to assist with this effort.

12. **Proposed Revisions to the Regulations (N.J.A.C. 7:9D)-**
A. Becker suggested that Soil Borers & Monitoring Wells should be put into a new license category that would combine both existing license categories into one license. He felt that the industry has evolved to the point where there is a high degree of overlap between the environmental and geotechnical industries. Additionally, the skills required to drill and grout a soil boring (as is required for those drilled to depths greater than 25 ft.) are quite similar to those required of Monitoring Well Drillers. He also said that he

suspects that there are permanent monitoring and other environmental wells put in each day by individuals licensed as Soil Borers, as it is often impractical for companies to bring a second licensed driller out to a site to install the permanent wells. Combining the licenses, and corresponding well categories within the regulations, would also allow those with the new license to install cased geotechnical wells, such as inclinometers. The existing license structure prohibits Soil Borers from installing any type of well that has a permanent casing. A. Becker stated that the groundwater protection concerns and techniques are the same between Soil Borers and Monitoring well drillers so the Department would not be sacrificing any environmental protection by combining the two licenses. P. Bono noted that she intends to address this issue and streamline the appropriate sections of the regulations.

11:45 AM F. Sickels left the meeting as he had to attend another meeting. Therefore, a quorum was no longer present after this point. The remaining Board members continued to discuss potential changes to the well regulations (N.J.A.C. 7:9D).

Topics that were discussed included:

Licensing:

- Creating a vertical closed loop geothermal well driller license.
- Combining the Soil Borer and Monitoring Well Driller Licenses.
- Whether or not the Journeyman B license should be kept in place.
- How to "Upgrade" existing Soil Borers to Monitoring Well Drillers (it was suggested that a training course be offered.
- Whether or not to continue the testing and licensing program for the Journeyman Class B license.
- Should the experience requirement for a driller license be decreased from three (3) years to two (2) years.
- Should the experience requirement for a pump installer license be increased from one (1) year to two (2) years.
- It was proposed that a Master Well Driller applicant would still need to have five (5) years of documented experience. The requirement would be that the applicant would have to have a Journeyman license for three (3) years before sitting for the exam. This would include out-of-state drillers, who would be required to pass the Journeyman exam and then wait three (3) years before sitting for the Master exam. P. Bono explained that the regulatory portion of the exam would test out-of-state applicants on specific state requirements.
- Whether or not the submission of proof of assisting a licensed driller in the drilling of five (5) wells is still adequate and appropriate documentation for well drilling exam applicants.
- A specialty license for elevator borehole drillers must be created.
- A. Becker noted that the wording of the definition of "appurtenances" must be clarified. The jurisdictional issue concerning what licensee can install and repair water treatment and conditioning devices must be addressed in the regulations.
- G. Poppe noted that requirements should be set forth to detail the appropriate license that is required for sanitization and disinfection of wells.
- Appropriate licenses must be specified for those who are allowed to winterize water lines.
- A distinction needs to be made between permanent pumping equipment installation vs. sampling that are used in the environmental industry. This is especially important when individuals are working on recovery wells.

Well Categories:

- Clear distinctions between types of geothermal wells (open loop, standing column and closed loop) must be made. The regulations governing each type must be protective of groundwater. Each type of geothermal well must also be clearly defined within the definitions section of the regulations.
- Environmental and Geotechnical wells should be listed together in the new regulation since it is proposed that the new category of license that combines both existing Monitoring and Soil Boring licenses will be able to drill all of these wells. Distinction will be made between cased wells and uncased wells, however, to better stipulate appropriate construction standards. Methane gas wells should be moved into this category. They are not really category 4/special use wells as they are currently categorized. New remediation technologies, such as electrodes and other heating elements and temperature monitoring probes, should be specifically listed in this category.
- Wick drains and certain dewatering wells must be defined and regulated to prevent surface water from being injected directly into groundwater. G. Poppe and A. Tirro noted that a large volume of wick drains are drilled each year in New Jersey and they are all installed in a manner that directly contradicts the intent of the well drilling regulations, which is to protect groundwater. Very few wick drains have ever been permitted by the Bureau.

General Provisions:

- S. Doughty noted that section 1.6(e) refers to maintaining a well drilling area in a "sanitary condition" and that "proper containment" must be provided. It was suggested that these terms be clarified to describe exactly what they mean.
- The need for a company registration was discussed. This could potentially serve as an effective enforcement tool, if the Department is able to cease issuance of permits to registered drilling companies that repeatedly demonstrate violations of the well drilling regulations.
- There was a discussion of section 1.8(a) – it was suggested that the Department closely examine what type of proof will be required of an applicant to submit adequate documentation of his or herwell drilling experience.

13. Technical Topics- Geothermal System Updates:

Agreenability:

S. Reya spoke briefly on the redesigned high efficiency closed loop geothermal system, which had previously been presented to the Board by the system's designer, Robert Jensen, from Agreenability. As recommended by the Board, a single site pilot project installation will be approved by the Bureau. Mr. Jensen will be informing S. Reya prior to the installation. S. Reya will then forward the information along to interested Board members so those interested can witness the installation.

Hardin:

S. Reya noted that he and B. Buttari observed a second installation of the Hardin GEX.4 specially shaped High Density Polyethylene (HDPE) geothermal well casing. A pilot installation of this system was conducted in Robbinsville Twp., with varied results. S. Reya stated that both Department staff and Board members observed various phases of that installation. The HDPE pipe in the pilot installation utilized two (2) .5" holes every two feet through which grout would flow to grout the annular space.

In the second installation, installed in Voorhees Twp., the pipe contained a revised grout port measuring .5" wide by 1.75" long. This pipe along with a typical HDPE u-bend loop was installed in one borehole while B. Buttari and S. Reya were onsite for purposes of studying the thermal properties of both the Hardin loop and standard u-bend. B. Buttari and S. Reya believed that the enlarged grout port size greatly increased the ability to properly grout the pipe in the borehole. The geothermal grout used onsite contained 200 lbs. of silica sand and 50 lbs. of bentonite. The larger opening of the grout port should be especially beneficial when using even higher sand content geothermal grouts, as well as cementitious thermally enhanced grout (Mix 111) for wells installed in consolidated formations.

One notable problem, however, is that a large number of the Hardin casings installed at the Robbinsville site have either been replaced by typical u-bends or have been proposed for replacement with the newest GEX.4. The reason for this was that the original Hardin pipes had a problem with the extrusion process, according to the Hardin representatives onsite during the Voorhees Twp. installation. They also reportedly indicated that the extrusion process has been refined to ensure that each half of the distinctively shaped loop meets the required pressure rating.

14. The meeting was adjourned at 3:28pm.