SDMS DocID 550386

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UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF CONNECTICUT

Site: SRS
Break: 10.9
Other: 004583

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UNITED STATES OF AMERICA, et al. Plaintiff,	
v.	Civil Action No. H-79-704 (JAC)
SOLVENTS RECOVERY SERVICE OF NEW ENGLAND, INC., Defendant.	

CERTIFICATION OF WILLIAM S. ("Pete") DUNCAN, III

I, William S. ("Pete") Duncan, III, certify as follows:

1. I am the President of the Stephen B. Church Company ("S.B. Church"). I have been employed by S.B. Church since 1971. S.B. Church's business involves the construction and installation of ground water wells, including recovery wells, monitoring wells and water production wells.

2. Prior to joining S.B. Church, I worked with the U.S. Army Corps of Engineers from 1969 to 1971 and was stationed in Vietnam where my responsibilities included drilling and installation of groundwater wells.

3. I am a past President of The Groundwater Institute, an international organization of groundwater contractors and well drillers.

4. I obtained a B.S. in Civil Engineering from Norwich University in 1969. Subsequently, I conducted graduate work at the School of Public Health, University of Minnesota, where I studied well drilling.

5. I have installed hundreds of groundwater wells, including recovery wells, monitoring wells and water production wells, in the State of Connecticut.

6. S.B. Church was retained by Solvents Recovery Service of New England, Inc. ("SRSNE") in 1985 to construct and install the twenty-five (25) recovery wells which were to comprise the on-site multi-point shallow well system at SRSNE's facility in Lazy Lane, Southington, Connecticut. I was responsible for carrying out S.B. Church's construction and installation of the 25 recovery wells.

7. The complete installation of a groundwater well, including a recovery well, involves several discrete steps as discussed below:

(a) First, the well is constructed by inserting a well casing into the ground by one of several available methods, for example, the drive and wash and the hollow stem auger methods. These methods allow the penetration of the softer soil and related geological formations ("overburden") which lie above the underlying bedrock.

(b) Second, if required, the underlying bedrock is then drilled with special rock drilling equipment. As a general matter, it is unusual to drill into the bedrock for construction of groundwater pumping wells since sufficient water available to pump a well usually occurs in the softer overburden material lying above the rock. The design of the recovery wells at the SRSNE facility, however, called for drilling the bedrock to at least a depth of three (3) feet.

(c) Third, the well points, the well screen and piping required to draw water from the well are installed within the well casing. The well casing is then pulled back to expose the well point and well screen to the surrounding soil and any water contained therein.

(d) Fourth, the well is developed. The purpose of well development is to remove water, sand and grit which is present in the well due to well drilling and construction activities, and also to remove the fine grit and sand present in the soil surrounding the well screen. Development is conducted with a pumping device, such as an air-operated diaphragm pump, which both pumps the well and agitates the water therein to loosen the fine soils and silt for removal. This ensures that sand-free water will be recovered from the well when it is fully operational and minimizes the potential or damage to the pump and associated equipment due to abrasion by soil and sand particles which may otherwise be present in the water.

(e) Fifth, a pumping test is conducted and the well yield determined. The pumping test is conducted with a pump capable of smoothly pumping the water from the well, that is, without the agitation required during development. Well yield is the volume of water which can be pumped from the well over a period of time without pumping the well dry or decreasing the water level in the well below a defined level, and is usually reported in gallons per minute ("gpm"). The well must be pumped for several hours before a yield measurement is made. The duration of the pumping test depends on the design flow rate of the well. For wells designed to deliver a flow rate of less than 10 gpm, as in the case of the SRSNE recovery wells, the usual duration of the pumping test is at least four (4) hours. This duration of pumping is necessary to allow the well to reach steady flow conditions so that reliable yield measurements can be made. Well yield can fluctuate over longer periods of time due to changes in the water level in the well occasioned by natural events such as rainfall and drought conditions.

8. As the contractor hired to construct and install the on-site multi-point shallow well recovery system, my responsibilities included the following:

(a) Constructing the recovery wells by the drive and wash method to a depth sufficient to penetrate the overburden until the underlying bedrock was encountered;

(b) Drilling the bedrock to at least a depth of 3 feet;

(c) Installing the well points to the maximum depth possible;

(d) Selecting and installing 10 foot long well screens of appropriate slot size in each well; and

(e) Connecting the wells to pumps selected by YWC in clusters of five wells per pump.

9. The construction and installation of the well system was directly supervised by Wayne A. Thomas and Brian Armet of York Wastewater Consultants, Inc. ("YWC"). In addition to Wayne Thomas and Brian Armet of YWC, Charlie Miller and John Sujat from the Army Corps of Engineers and Dave Webster from the U.S. Environmental Protection Agency were also present from time to time at the site during well construction activities.

10. Wayne Thomas of YWC was responsible for measuring and/or recording the depths of the various formations encountered during well installation and confirming that each well was drilled at least three (3) feet into the underlying bedrock after fully penetrating the overburden.

11. Well points and screens were installed in each well after confirmation by Wayne Thomas that each well met these requirements. The well points were installed as close to the bottom of the wells as possible. Frequently, well points can not be installed at the bottom of a well because debris from drilling activities collects at the bottom during the retraction of drilling equipment. Most likely that phenomenon explains what occurred at SRSNE.

12. The 25 recovery wells at the SRSNE facility were constructed in the overburden by the drive and wash method followed by drilling of the bedrock as required by the approved design. See Hoagland Exhibit 10, page 11. Installation of wells by the drive and wash method entails hammering of case-hardened pipe (the "well casing") into the ground with a hydraulic or cable tool rig. After the well casing is hammered into the ground, a high pressure water chisel is used to wash out the soil and overburden material inside the casing. The wash water consists of a composite of the overburden materials in the casing and may be collected in a bucket for a qualitative evaluation of the overburden materials encountered at the location of a well. Any fine material present in the overburden is, however, lost during this process resulting in a soil sample which is not representative of the overburden as a whole. Accordingly, sieve analysis of samples obtained from the drive and wash method is generally inexact for the determination of the slot size of a screen to be installed in the well. A representative sample of overburden materials may be obtained if the wells are installed by, for example, the hollow-stem auger method as initially proposed by SRSNE to EPA. See Hoagland Exhibit 8 at 10 (Part 4). A hollow-stem auger is a mechanical screw with a hole down the center of the screw. When the auger is screwed into the earth, the overburden material comes up this hole and an undisturbed sample of the overburden may be collected with a split spoon sampler. Such a

sample is representative of the overburden as a whole, and may be utilized for sieve analysis, because the discrete geological strata, including the fine materials, are preserved in the core obtained with the split spoon sampler.

13. I selected a 0.006 inch slot size for the well screens installed in each well based on my experience and the design of the well system approved by USEPA. The approved design required the selection of appropriate slot size by the construction contractor. See Hoagland Exhibit 10, page 11. There was no requirement to conduct sieve analysis prior to selection of the slot size. As mentioned above, the drive and wash method does not provide discrete soil samples suitable for sieve analysis. The method provides wash water consisting of a composite of the materials present within the well casing only, which is not representative of the soils at any discrete location within the well, and is an inexact sample for sieve analysis.

14. The 10 foot long well screens were installed partly in the bedrock and partly in the overburden. In selecting the slot size for the well screens, I considered two principal factors. First, I wanted the screen slot size to be small enough to screen out from the well the fine silt and clay likely to enter the boring in the rock. Second, I wanted a slot size large enough to transmit water at a capacity greater than the design flow rate of the system, that is, 0.3 to 1.0 gpm.

15. Accordingly, I selected a 0.006 inch slot size screen. This slot size is fine enough to screen out silt and clay and has a water transmitting capacity of 15 gpm, which I deemed to be adequate given the design flow rate of each well of the recovery well system.

16. After installation of the well screens and associated piping, the SRSNE recovery wells were developed with an air-operated diaphragm pump. As mentioned above, such a pump both pumps and agitates the water in the well and sucks out all the water present in the well. The sand and grit present in the well, and the fine grit and sand in the soil surrounding the well screen, are also removed during this step. The volume of this water, sand and grit mixture sucked from each SRSNE recovery well was recorded by a S.B. Church field technician/ well driller. See Hoagland Exhibit 26. These data represent merely the yield of water, sand and grit collected during well development at a given point in time, and do not represent the well yields of the SRSNE recovery wells which could only be determined after pumping the wells for an appropriate duration with a pump capable of smoothly pumping the water in the well.

17. After development of the recovery wells was completed, S.B. Church requested permission from Brian Armet of YWC to conduct a pumping test of the wells so that well yield measurements could be made before deciding which wells would be combined in each cluster of five wells to be connected to a common pump.

18. S.B. Church was not allowed to conduct a pumping test for these wells and, therefore, could not determine appropriate well yield data for the wells. I was informed by Brian Armet that USEPA and/or Corps of Engineers refused to grant the permission due to the lack of a water discharge permit from the State of Connecticut and/or USEPA and, accordingly, no well yield test was ever conducted.

19. S.B. Church then manifolded each cluster of five (5) recovery wells to one pump based on proximity. To assure that wells connected to the same 5 well cluster could pump with similar flow rates, S.B. Church installed in each well cluster vacuum gauges and throttling valves to adjust suction and provide uniform flow from each well in the cluster when the system was operating.

20. To the best of my knowledge, USEPA and Army Corps of Engineers inspected the completed system on May 20, 1985 and approved the installation as complete and according to the approved design and specifications.

21. In December, 1985 I was asked to examine the pumps used in the on-site multi-point shallow well recovery system because there was less water in some of the recovery wells than expected. As a result of lower than expected water levels in the wells, the seals in the pumps attached to the recovery system had burnt out. I recommended the installation of smaller pumps to accommodate the lower flow rates and installed smaller pumps in January 1986.

22. In January, 1990, I was asked to examine a well screen that had been pulled from one of the recovery wells at the SRSNE facility. The well screen was coated with a black, slimy material. I have observed similar black, slimy material on well screens pulled from numerous wells at various locations around the State of Connecticut regardless of the slot size of the well screens installed. Based on these observations, the black, slimy material most likely is bacterial growth common on wells in the State of Connecticut, and is not related to any defects in construction or installation of the SRSNE recovery wells.

23. In January, 1990, I also observed that water was draining from a well point and well screen which had been pulled from one of the recovery wells at the SRSNE facility. See, for example, Hoagland Exhibit 29. This is not unusual. I have observed water draining from well points and well screens which have been pulled from groundwater wells regardless whether the well screen is clogged or not. It takes some time for the water contained within the well point, the well screen and associated piping to drain out after the well point, well screen and associated piping have been pulled out from the well since the screen acts as a partial barrier to flow of the water. This is the case even with a new well screen and the presence of water draining from a well point of a pulled well is not by itself indicative of a clogged screen.

I hereby certify that the foregoing statements made by me are true. I am aware that if any of the foregoing statements are willfully false, I am subject to punishment.

William S. Duncan III

William S. ("Pete") Duncan, III

Dated: September 26, 1990.