EPA Permit# PAS2D020BLCE
DEP Permit# 37-033-27255-00-00

E-FILED
02/18/2020

COMMONWEALTH OF PENNSYLVANIA
ENVIRONMENTAL HEARING BOARD

COPY

DARLENE MARSHALL	:	
	:	
v.	:	**EHB Docket No. 2018-034-L**
	:	**(Consolidated with 2019-036-L)**
COMMONWEALTH OF PENNSYLVANIA, DEPARTMENT OF ENVIRONMENTAL PROTECTION and WINDFALL OIL & GAS INC., Permittee	:	**Issued: February 18, 2020**

ADJUDICATION

By Bernard A. Labuskes, Jr., Judge

Synopsis

The Board dismisses an appeal of a Pennsylvania permit authorizing a company to drill a well to conduct underground injection disposal activities in accordance with its federal permit. The Appellant has not satisfied her burden of proof to show that the issuance of the Pennsylvania permit was unlawful, unreasonable, or not supported by the facts established at the hearing on the merits.

FINDINGS OF FACT

1. The Department of Environmental Protection (the "Department") is the agency with the duty and authority to administer and enforce the Oil and Gas Act, Act of February 14, 2012, P.L. 87, No. 13, 58 Pa.C.S. §§ 3201 – 3274; the Clean Streams Law, Act of June 22, 1937, P.L. 1987, as amended, 35 P.S. §§ 691.1 – 691.1001; Section 1917-A of the Administrative Code of 1929, Act of April 9, 1929, P.L. 177, as amended, 71 P. S. § 510-17; and the rules and regulations promulgated thereunder.

2. Windfall Oil & Gas Inc. ("Windfall"), is a Pennsylvania corporation with a business address of 63 Hill Street, Falls Creek, PA 15840. (Appellant Exhibit No. ("A. Ex.") 29 (at 1); Department Exhibit No. ("DEP Ex.") AS.)[1]

3. Windfall proposes to drill an underground injection control (UIC) disposal well located on property owned by Frank and Susan Zelman in Brady Township, Clearfield County. (Hearing Transcript Page No. ("T.") 99, 444; A. Ex. 29; DEP Ex. K, X, Y, AS.)

4. The Appellant, Ms. Darlene Marshall, resides in DuBois, Pennsylvania in an area known as the Highland Street Extension. (T. 372.)

5. Her home and private drinking water well are located to the northwest and topographically downslope from Windfall's Zelman UIC well, slightly beyond one-quarter of a mile away. (T. 344, 381-83; A. Ex. 1, 27.)

6. Marshall drilled a new private water well for her residence in October 2017 to a depth of 360 feet. (T. 347-48; A. Ex. 1.)

7. Windfall's application materials say that the Zelman UIC well is in a recharge area for nearby water wells, including Marshall's. (T. 380; A. Ex. 29 (at 16-17).)

8. In Pennsylvania, the United States Environmental Protection Agency (EPA) directly implements the federal Underground Injection Control regulations and issues permits for such wells because Pennsylvania has not assumed primacy over the UIC program. 40 CFR §§ 147.1951 – 147.1955. (T. 449, 551-52.)

---

[1] The Appellant presented a set of exhibits at the hearing numbered 1-32. She also presented a set of exhibits that were identical to the exhibits the Department attached to its motion for summary judgment filed in March 2019; these exhibits are labeled A-Z and AA-BC (with demonstrative exhibits BD and BE being drawn at the hearing by a Department witness). Accordingly, even though both sets of exhibits were presented by the Appellant, the numbered exhibits will be designated as the Appellant's, and the lettered exhibits will be designated as the Department's. Windfall did not present any of its own exhibits.

9. State-specific requirements applicable in Pennsylvania for the UIC program are set forth in the federal regulations at 40 CFR §§ 147.1951 – 147.1955.

10. In April 2012, Windfall submitted an application to the EPA to obtain a permit to operate a Class II UIC well. (A. Ex. 29.) Class II wells are defined as:

> Wells which inject fluids: (1) Which are brought to the surface in connection with natural gas storage operations, or conventional oil or natural gas production and may be commingled with waste waters from gas plants which are an integral part of production operations, unless those waters are classified as a hazardous waste at the time of injection; (2) For enhanced recovery of oil or natural gas; and (3) For storage of hydrocarbons which are liquid at standard temperature and pressure.

40 CFR § 144.6(b).

11. Windfall's federal UIC permit application addressed, *inter alia*: (1) the proposed well's location; (2) well construction details; (3) the method of operating and monitoring the well; (4) existing drinking water and gas production wells in the surrounding area; (5) the geologic and hydrogeologic conditions surrounding the proposed well, including the proposed injection and confining zones; (6) the plugging and abandonment plan; and (7) Windfall's financial assurances. (A. Ex. 29; DEP Ex. B, C.)

12. The injection zone depth of the Zelman UIC well is proposed to be at 7,306 feet below ground surface. (T. 109, 120.)

13. The target geologic formations for injection are the Huntersville Chert and the Oriskany Sandstone, which are beneath the Onondaga Limestone, a 14-foot thick cap rock. (T. 120-21, 151-52; DEP Ex. AM.)

14. Windfall proposes to inject liquids from four potential waste streams: shallow production fluids, fluids from the Oriskany formation, production fluids from the Marcellus shale formation, and Marcellus shale frack fluids. (T. 100, 106.)

15. On February 14, 2014, the EPA issued UIC well permit number PAS2D020BCLE to Windfall for the Zelman UIC well, authorizing Windfall to construct a Class II disposal injection well and inject fluids produced in oil and gas operations into the Huntersville Chert and Oriskany Sandstone formations. (DEP Ex. I, J, K.)

16. The permit was subsequently reissued on October 31, 2014 with one change regarding the addition of a string of well casing. (T. 477-80; DEP Ex. I, J, K.)

17. The casing and cementing requirements for the well include the installation of a 24 ½-inch conductor pipe to be set at 8 feet and cemented to the surface, a 16-inch water string casing set to a depth of 170 feet and cemented to the surface, an 11 ¾-inch coal protection string casing set to 425 feet and cemented to the surface, an 8 ⅝-inch surface casing set to 1,000 feet and cemented to the surface, and the installation of a 4 ½-inch long string production casing to be set to the injection zone depth of 7,306 feet and cemented to approximately 5,000 feet in the well annulus. (T. 110-16, 567-68, 661-62; DEP Ex. AO (at 1), AX (at 18).)

18. Even though EPA administers the UIC program in Pennsylvania, the Department still requires operators to obtain a well permit from the Department before commencing UIC operations. (T. 551-52, 741-42.)

19. On September 10, 2015, Windfall submitted a permit application to the Department to drill and operate its UIC well. (DEP Ex. X.)

20. Even though Windfall had obtained a permit from the EPA, the Department proceeded to review Windfall's application and subsequent submissions over the course of two and a half years. (T. 535; DEP Ex. Z, AD, AE, AF, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AR.)

21. The Department used Windfall's application as a means by which to develop a new procedure for reviewing UIC well permit applications in Pennsylvania. (T. 533, 741-42; DEP Ex. BB.)

22. The Department's review process changed around 2014 to, among other things, account for the prohibition in 25 Pa. Code § 91.51 that the underground disposal of waste not be detrimental to the public interest. (T. 507-08, 587.)

23. Although EPA administers Pennsylvania's UIC program and Windfall obtained a permit from the EPA, the Department nevertheless conducted a geologic review, a seismic review, a mechanical integrity review, and a review of Windfall's erosion and sediment control and control and disposal plans. (T. 533, 548-52, 741-42; DEP Ex. AJ, AM, AO, AR, BB.)

24. Ms. Marshall provided comments on the Zelman well to the Department at a public hearing held on March 7, 2016. (DEP Ex. AQ.)

25. In its March 21, 2018 technical review memorandum, the Department concluded

> that the application/project meets all applicable statutes, regulations and guidance manuals related to the permitting of a disposal well in Pennsylvania. The Department concludes that underground disposal into the proposed Zelman well would be for an abatement of pollution by providing a lawful alternative to other disposal options. Windfall's proposed operation is sufficient to protect surface water and water supplies, and it is improbable that disposal into the proposed Zelman well would be prejudicial to the public interest. In consideration of the proposed well's mechanical protections and the injection zone's distance and geologic separation from public natural resources, this project is unlikely to substantially degrade natural resources.

(DEP Ex. AR (at 3).)

26. On March 21, 2018, the Department issued Well Permit No. 37-033-27255-00-00 to Windfall for the Frank & Susan Zelman 1 Injection Disposal Well. (DEP Ex. AS.)

27. The Department's permit for Windfall's Zelman UIC well consists of three pages and contains 24 conditions mostly pertaining to seismic monitoring and mechanical integrity. (DEP Ex. AS.)

28. The Department's permit "is conditioned upon the existence" of Windfall's federal EPA permit. (DEP Ex. AS (at 3).)

29. An element of the review conducted by the Department and the EPA for a UIC well is to assess potential pathways that could serve as conduits for the migration of injected fluids into underground sources of drinking water, such as geologic faults or oil and gas wells penetrating the target injection formation. (T. 455-56, 539-42.)

30. The geographic area in which potential pathways to underground sources of drinking water are evaluated for a given UIC well is called the area of review. (T. 304.)

31. The area of review is a radial distance extending away from a UIC well that is calculated using either a zone of endangering influence equation, or by selecting a fixed radius of no less than one-quarter mile. 40 CFR § 146.6.

32. The zone of endangering influence (ZEI) is the pressure at which injected fluids could potentially reach an underground source of drinking water. 40 CFR § 146.6(a)(1)(i). (T. 553.)

33. Windfall selected a quarter-mile fixed radius area of review in its application to the EPA. (A. Ex. 29 (at 2).)

34. The EPA calculated the ZEI to be approximately 400-450 feet from the wellbore and so it elected to use the fixed radius one-quarter mile area of review to be more conservative, a decision with which the Department concurred. (T. 451-52, 536-37, 552, 744-46.)

35. One of the Department's ZEI calculations utilized a different input for reservoir pressure to obtain an output of approximately 700 feet, which is also less than the 1,320 feet in a quarter mile. (T. 753-55.)

36. There are six conventional gas wells drilled in the early 1960s that are located just outside of the quarter-mile area of review. (T. 46-47, 52-53, 157-75, 558-59; A. Ex. 27, 28, 29 (at 34-61, 140-55).)

37. The six conventional gas wells removed gases from the Oriskany formation, which created space for the injection of fluids. (T. 276-78, 305-06, 321, 554-55.)

38. Gas wells drilled into the target injection formation can serve as conduits for the migration of fluids if the injection pressure is high enough. (T. 319, 455-56, 496.)

39. The two conventional gas wells closest to Marshall's property are known as the Ginter and Carlson wells. (T. 338-39; A. Ex. 27, 28.)

40. The plugging record for the Carlson well reflects that it was plugged with a cast iron bridge plug and four cement plugs. (T. 130-34, 442-43, 684-85, 695; A. Ex. 29 (at 34).)

41. The Ginter well is still active. (T. 181-82.)

42. The Department's mechanical integrity reviewer evaluated the Ginter and Carlson wells, as well as the four other conventional gas wells, as if they were located inside the quarter-mile area of review even though other Department personnel viewed them as not a concern. (T. 584, 648-49, 683-84, 695-96; DEP Ex. AO.)

43. For an injection well, mechanical integrity involves looking at the construction of the well where pressure is being applied to pressurize the well and whether it has the potential to fail along the pressure profile. (T. 648-49.)

44. The permit requires Windfall to monitor mechanical integrity and submit monthly reports to the Department containing a record of injection pressures, annular pressures, injection rates, injection volumes, and cumulative volumes. (T. 657, 705; DEP Ex. AS (at 3).)

45. Windfall is required to install automatic high- and low-pressure shutoff valves on the Zelman well and it intends to add a pressure monitoring and pump shutdown device to the annular space for added protection in the event of a mechanical integrity failure. (T. 142-47, 212, 673; DEP Ex. K (at 7).)

46. Windfall's EPA permit and automatic shutoff devices require Windfall to keep its injection pressure below the fracture gradient, which is the geologic term for the pressure at which a rock will fracture. (T. 281, 468-69, 607-08, 672; DEP Ex. K (at 12-13).)

47. The significance of exceeding the fracture gradient is that existing faults and fractures in the rock could open up and convey fluids or cause seismic activity. (T. 607-08, 611, 615.)

48. A geologic fault is a break in the rock where there is or has been movement along a slip plane. (T. 251.)

49. A fault can be transmissive, meaning it would allow gas or fluid to cross it, or a fault can be non-transmissive, meaning it functions as a structural barrier to the movement of fluid. (T. 611, 629.)

50. The Department evaluated a fault oriented northeast-southwest approximately 1400-1500 feet away from the Zelman well, beyond the quarter-mile area of review, and determined it to be non-transmissive. (T. 249-52, 280, 537-38, 611; A. Ex. 27.)

51. A second, closer fault is reflected in Windfall's permit application, but the Department found no geologic record of the fault's existence. (T. 250-51; A. Ex. 27.)

52. Pursuant to its Pennsylvania permit, Windfall's UIC well is to be monitored with a small seismic network or with a component seismometer, which will be tied into the Pennsylvania State Seismic Network. (T. 220, 266-68, 270-71; DEP Ex. AS.)

53. The seismic monitoring will monitor for "induced seismicity," or earthquakes, that are believed to be caused by injecting fluids into faults or basement rock. (T. 268-71, 323, 457, 485, 558, 607, 609-10; DEP Ex. AM.)

54. Among other conditions, the permit requires the well to be shut down if the monitor detects a seismic event of 2.0 or greater on the Richter Scale. (T. 274; DEP Ex. AS.)

55. Windfall's EPA permit application contains a plan to monitor certain private water well supplies and surface water features on a monthly basis during well construction and semi-annually during operations. (T. 227-28, 380-81; A. Ex. 29 (at 16, 31).)

56. Windfall's emergency response plan identifies the Adrian Sandy Fire Department as the emergency responder because Windfall believes it is geographically the closest fire department to Windfall's proposed UIC well. (T. 224; DEP Ex. AI (at 7-8).)

57. Windfall's emergency response plan does not contain an evacuation plan for neighboring residents. (T. 225, 736; DEP Ex. AI (at 7-10).)

58. Windfall has obtained a standby trust agreement and an irrevocable standby letter of credit in the amount of $30,000.00 for the plugging and abandonment of the Zelman UIC well. (A. Ex. 29 (at 257-65).)

DISCUSSION

Darlene Marshall, proceeding *pro se*, has filed this appeal from Well Permit No. 37-033-27255-00-00 issued by the Department of Environmental Protection (the "Department") to Windfall Oil & Gas, Inc. ("Windfall") to drill and operate the Zelman 1 underground injection

control ("UIC") well in Brady Township, Clearfield County. The well will receive injected waste fluids derived from the production of oil and gas. Windfall previously obtained a permit for the UIC well from the United States Environmental Protection Agency (EPA). (DEP Ex. K.) The Department requires UIC operators to also obtain a Pennsylvania permit before drilling and operating the well. The permit from the Department was issued in March 2018 and required well drilling to commence within a year. (DEP Ex. AS.) The Department renewed Windfall's permit in March 2019 since drilling had not yet begun. Ms. Marshall also appealed the renewed permit and the parties agreed that the appeals should be consolidated for the merits hearing. We consolidated the appeals on July 1, 2019. The merits hearing began on September 30, 2019, lasting three days and encompassing both appeals.

The Environmental Hearing Board's role in the administrative process is to determine whether the Department's action was lawful, reasonable, and supported by our *de novo* review of the facts. *Logan v. DEP*, 2018 EHB 71, 90; *Friends of Lackawanna v. DEP*, 2017 EHB 1123, 1156. In order to be lawful, the Department must have acted in accordance with all applicable statutes, regulations, and case law, and acted in accordance with its duties and responsibilities under Article I, Section 27 of the Pennsylvania Constitution. *Ctr. for Coalfield Justice v. DEP*, 2017 EHB 799, 822; *Brockway Borough Mun. Auth. v. DEP*, 2015 EHB 221, *aff'd*, 131 A.3d 578 (Pa. Cmwlth. 2016). As a third party appealing the issuance of the Zelman UIC permit, Marshall bears the burden of proof. 25 Pa. Code § 1021.122(c)(2); *Joshi v. DEP*, EHB Docket No. 2017-116-L, slip op. at 9 (Adjudication, May 17, 2019); *Jake v. DEP*, 2014 EHB 38, 47.

In order to be successful in her appeal, Marshall must prove her case by a preponderance of the evidence. *United Refining Co. v. DEP*, 2016 EHB 442, 448, *aff'd*, 163 A.3d 1125 (Pa. Cmwlth. 2017); *Shuey v. DEP*, 2005 EHB 657, 691 (citing *Zlomsowitch v. DEP*,

2004 EHB 756, 780). The preponderance of evidence standard requires that Marshall meet her burden of proof by showing that the evidence in favor of her proposition is greater than that opposed to it. *United Refining*, 2016 EHB 442, 449. Marshall's evidence must be greater than the evidence supporting the Department's determination that the issuance of the Zelman UIC permit was reasonable, appropriate, and in accordance with the applicable law. *Del. Riverkeeper Network v. DEP*, 2018 EHB 447, 473. The evidence must be sufficient to satisfy an unprejudiced mind as to the existence of the factual scenario sought to be established by Marshall. *Clean Air Council v. DEP*, EHB Docket No. 2016-073-L, slip op. at 49 (Adjudication, Jan. 9, 2019); *Noll v. DEP*, 2005 EHB 505, 515.

The Department's permit consists of three pages comprised of 24 special conditions. Seventeen of those special conditions deal with seismic monitoring and mitigation, five deal with mechanical integrity, and the last two are miscellaneous conditions, one of which says that the Department's permit is conditioned on the permit issued by the EPA. (DEP Ex. AS.) At the outset we note that it is not exactly clear to us what the Department's role is in evaluating UIC wells and issuing permits. The EPA directly implements the UIC program in Pennsylvania, but the Department requires operators to obtain a state permit before drilling the well. There was testimony from a Department witness that the Department merely handles the siting of the well and verifies the information contained in the federal UIC permit (T. 552), but the Department reviewed Windfall's permit application for two-and-a-half years. There was also testimony that the Department's review of UIC permits changed in 2014, becoming more extensive, and that the Windfall application was used to develop a new review procedure. (T. 507-08, 533, 741-72.)

We are, of course, focused on the action under appeal—the Department's permit—and not the EPA permit or any process before the EPA or the federal Environmental Appeals Board

relating to that permit. But some discussion of the EPA permit seems unavoidable given the Department's reliance on it and the overlap with the Department's review. Windfall's EPA permit establishes, among other things, casing and cementing requirements, injection volumes and pressures, and sampling and monitoring requirements for the well. (DEP Ex. K.) The Department evaluated some of these same things during its geologic and mechanical integrity reviews. (DEP Ex. AM, AO, AR.) If the Department considered an issue in its evaluation of a permit then it is likewise appropriate for us to review the same issue. However, it seems to us that some aspects of the UIC process are more than a little redundant.

The Department tells us there are two regulations that serve as the backbone for the Department's review of Windfall's permit—25 Pa. Code §§ 78.18 and 91.51. Section 78.18 provides in relevant part:

> (a) A person may not drill a disposal or enhanced recovery well or alter an existing well to be a disposal or enhanced recovery well unless the person:
> (1) Obtains a well permit under § 78.11 (relating to permit requirements).
> (2) Submits with the well permit application a copy of the well permit, approved permit application and required related documentation submitted for the disposal or enhanced recovery well to the EPA under 40 CFR Part 146 (relating to underground injection control program).
> (3) Submits a copy of a control and disposal plan for the disposal or enhanced recovery well and related facilities that meets the requirements of § 91.34 (relating to activities utilizing pollutants).
> (4) Submits a copy of an erosion and sedimentation plan for the disposal or enhanced recovery well site that meets the requirements of Chapter 102 and § 78.53 (relating to erosion and sediment control; and erosion and sedimentation control).

25 Pa. Code § 78.18. Thus, under Section 78.18, an entity seeking to conduct UIC activities must submit to the Department a control and disposal plan and an erosion and sediment control plan, along with the UIC permit the entity obtained from the EPA.

Section 91.51 in turn provides:

> (a) The Department will, except as otherwise provided in this section, consider the disposal of wastes, including stormwater runoff, into the underground as potential pollution, unless the disposal is close enough to the surface so that the wastes will be absorbed in the soil mantle and be acted upon by the bacteria naturally present in the mantle before reaching the underground or surface waters.
>
> (b) The following underground discharges are prohibited:
>
> (1) Discharge of inadequately treated wastes, except coal fines, into the underground workings of active or abandoned mines.
>
> (2) Discharge of wastes into abandoned wells.
>
> (3) Disposal of wastes into underground horizons unless the disposal is for an abatement of pollution and the applicant can show by the log of the strata penetrated and by the stratigraphic structure of the region that it is improbable that the disposal would be prejudicial to the public interest and is acceptable to the Department. Acceptances by the Department do not relieve the applicant of responsibility for any pollution of the waters of this Commonwealth which might occur. If pollution occurs, the disposal operations shall be stopped immediately.

25 Pa. Code § 91.51. We are not entirely sure what the phrase "prejudicial to the public interest" means in 25 Pa. Code § 91.51(b)(3), but it does not seem to be fundamentally much different than the judgment we bring to bear during the review of any permit to determine if the Department's decision is lawful, reasonable, supported by the facts, and otherwise consistent with its obligations under Article I, Section 27 of the Pennsylvania Constitution.

Ms. Marshall's arguments throughout this appeal have not always been clear, but we have endeavored to give an appropriate assessment of her concerns as we understand them. Although we do not specifically address each and every point raised in Marshall's papers, we have given all of them due consideration and we find that she has not met her burden of proof with respect to the issues she has raised. *See, e.g., Big B Mining Co. v. DER*, 1987 EHB 815, 867, *aff'd*, 554 A.2d 1002 (Pa. Cmwlth. 1989); *Lower Providence Twp. v. DER*, 1986 EHB 802, 821; *Del-Aware Unlimited, Inc. v. DER*, 1984 EHB 178, 328, *aff'd*, 508 A.2d 348 (Pa. Cmwlth. 1986). With that, we now turn to a discussion of what we view as her main arguments.

Water Well Contamination

Marshall says her main concern is the protection of her private water well. Both she and her husband testified that they recently drilled a new well and they have good quality water. (T. 343-45, 350, 420.) Marshall is concerned about the potential for the injected fluids from the Zelman UIC well to migrate into and contaminate her water well. The possibility of fluid migration is evaluated by the EPA and the Department by assessing potential migration pathways within a certain radius from the proposed UIC well. This radius is called the area of review, and it is determined either by (1) running an equation to determine the zone of endangering influence (ZEI), which is the area in which injection pressures may cause fluid to reach an underground source of drinking water, or (2) selecting a fixed radius of no less than one-quarter mile from the well. 40 CFR § 146.6. For the Zelman well, Windfall selected a fixed radius of one-quarter mile. The EPA during its review accepted the quarter mile, as did the Department, because the zone of endangering influence calculations yielded a smaller radius of several hundred feet. (T. 451-52, 536-37, 552, 744-46.)

Initially, Marshall contests the selection of the area of review, saying that the quarter-mile area of review is a minimum, and it excludes six oil and gas wells drilled in the 1960s that fall just outside of the quarter-mile radius from the Zelman well. She says that the old oil and gas wells were drilled through the UIC well's target injection formation, the Oriskany Sandstone, and that the well bores provide a conduit for injected fluids to migrate up and into shallower formations that provide the source for Marshall's drinking water. Windfall and the Department do not dispute the concept in the abstract of fluid migration up old wellbores that are not plugged and abandoned. But they say that one needs to look at the pressure buildup in the injection formation and whether the injection of fluids creates enough hydrostatic head to cause the fluid

to migrate up the wellbores. (T. 455-56, 465-66.) They say that fluids can extend beyond the quarter-mile area of review but the key is to ensure that it is not at a pressure that would affect a source of drinking water. (T. 553.) This is as true for wells outside of the area of review as wells only a few hundred feet away from a UIC well, they say. (T. 466.)

Underlying Marshall's concern is her assertion that the plugging and casing of the old gas wells may have been inadequate. She also questions the efficacy of plugging techniques from several decades ago. She focuses on the plugging record for the Carlson well, which is the well closest to her property but beyond a quarter mile from the Zelman UIC well. The plugging record for the Carlson well reflects that it was plugged beginning on July 31, 1979 and concluded on August 8, 1979. (A. Ex. 29 (at 34).) However, Marshall points to a note in the plugging log that says: "Unable to cut 5-1/2" casing any lower than 2500' because casing was stuck in hole." (*Id.*) She also points to a handwritten note on the well location map for the Carlson well that says: "Partial plug 7-20-79." (*Id.* at 38.) Marshall says that this indicates that the Carlson well was never fully plugged and will therefore provide a pathway for fluid migration. She also says the plugging record shows that the well is only plugged with gelled water from the depth of 2,500 feet to 7,120 feet.

Without any testimony from anyone involved with the plugging of the Carlson well, we do not want to speculate what the "partial plug" notation on July 20, 1979 means (assuming "7-20-79" is indicative of a date), and how that relates to the plugging that was apparently begun on July 31, 1979. Marshall does not explain why we should rely on the handwritten "partial plug" notation on the well location map over other portions of the well record that seem to indicate that it was in fact plugged. The witnesses from the Department and Windfall who have experience with reading well plugging records all testified that, according to the well record, the Carlson