

WORK PLAN FOR IDENTIFICATION, ABANDONMENT, AND REPLACEMENT OF CERTAIN PRIVATE WATER SUPPLY WELLS

June 24, 2005

INTRODUCTION

Purpose

The *Order Prohibiting Groundwater Use* (Order) was entered by Judge Shelton, (Washtenaw County Circuit Court), on May 17, 2005, in the matter of *Granholm v Gelman Sciences Inc.* (File No. 88-34734-CE). Paragraph 6 of the Order requires, among other things, that Pall Life Sciences (PLS) submit to the Michigan Department of Environmental Quality (MDEQ), for review and approval, a work plan for identifying, or verifying the absence of, any private wells within the Prohibition Zone established by the Order. Paragraph 6 also states that the work plan should also address abandonment of any such private wells and for replacement of private drinking water wells with connection to the municipal water supply, subject to subparagraph 5(e) of the Order. This work plan is being submitted in accordance with Paragraph 6 of the Order.

PLS and the MDEQ conducted a preliminary meeting to discuss the scope of this work plan on May 20, 2005. This work plan includes elements discussed at that meeting.

I. IDENTIFICATION OF EXISTING PRIVATE DRINKING WATER WELLS WITHIN THE PROHIBITION ZONE

Prior to entry of the Order, PLS had undertaken an initial investigation to determine the presence or absence of drinking water supply wells within the (then) proposed Prohibition Zone. PLS contacted local units of government and reviewed available well record databases maintained by the MDEQ and Michigan Center for Geographic Information. PLS also consulted current zoning maps and identified all areas within the Prohibition Zone that were located outside the zoning jurisdiction for the City of Ann Arbor (City). Properties within the Prohibition Zone, but not zoned as part of Ann Arbor, could potentially have legal water supply wells (wells that are not already considered “abandoned” by state and/or county regulations and are, therefore, required to be plugged by the owner).

Table 1 sets forth the properties identified in this portion of the investigation. Seven properties were identified with drinking water wells. Thirty-one other properties were identified with township zoning, but either have municipal water already or are vacant and undeveloped parcels.

At the May 20, 2005, meeting, the MDEQ expressed its concern that properties formerly in the townships, within the Prohibition Zone, that were annexed to the City in the past, may yet have wells that are being used. It was agreed that PLS should focus investigation on known sensitive areas, where neighborhoods have been identified as converting from wells to municipal supplies in recent years, and that a further investigation into the progress of development of the City's municipal supply and legal requirements be conducted.

Additional investigation of possible private water supply wells shall consist of the following tasks:

Task 1: Door-to-Door Survey of Vulnerable Neighborhoods

PLS has determined that one neighborhood within the Prohibition Zone, the Westover Subdivision, has been converted from private wells to the City's municipal system. Another area, Wagner Road, between Jackson and the southern end of the Prohibition Zone, is also an area having a potential for water wells.

PLS will conduct a survey of each building within the Westover Subdivision and Wagner Road area for which there is no abandoned well plugging record available. The survey will consist of one or more of the following: mailings, postings, and/or door-to-door in-person contacts. The survey will determine: (1) the source of drinking water for each structure surveyed; (2) the presence or absence of a water well; (3) if present, whether the water supply well is abandoned or being used. If any non-abandoned wells are identified, PLS will review the available well records/logs, monitoring data, and all relevant hydrogeological information to determine if the well is located in a formation that is not likely to become contaminated by 1,4-dioxane from the Gelman Sciences, Inc. facility. If the well is unlikely to become contaminated, PLS will submit the information demonstrating this conclusion to the MDEQ. If the well is already contaminated, or is likely to become contaminated, and the property is not already connected to municipal water, PLS will follow the procedure identified in Section III (Connection to Municipal Water Supply) and, upon consent of the owner, plug the well as described in Section II.

Task 2: Research and Preparation of Chronology Regarding the Availability of Municipal Water within the Prohibition Zone

PLS will research government records and available public documents to develop a chronology showing roughly when neighborhoods within the Prohibition Zone became part of the City's municipal water supply system. The chronology will be prepared and submitted to the MDEQ for review. Based on this chronology, if other vulnerable neighborhoods are identified by PLS and the City, additional steps may be necessary to determine if there are existing water supply wells in those neighborhoods. In that event, PLS will propose a supplement to this work plan to address those neighborhoods, if any.

Task 3: Research and Preparation of Memorandum Regarding Ordinances Regulating Connection to Municipal Water

PLS will review the available current and past ordinances for the City and prepare a memorandum for MDEQ review outlining the ordinances regulating provision of municipal water and connection requirements as they have evolved over time within the City. This task will be conducted simultaneously with Task 2.

Reporting:

- Task 1: Report of survey of vulnerable neighborhoods.
- Tasks 2 and 3: Chronology and Memorandum regarding provision of municipal drinking water within the Prohibition Zone.

Project Schedule:

Tasks 1, 2, and 3 will be completed within six months of approval of this work plan by the MDEQ.

II. PLUGGING OF IDENTIFIED WATER SUPPLY WELLS

Water wells to be plugged pursuant to Paragraph 6 of the Order shall be plugged using the following procedures:

Plugging Procedures

Wells shall be plugged in accordance with Michigan Administrative Code R 325.1663, Rule 163, Abandoned wells and dry holes; plugging method, and R 325.1664, abandonment of wells; plugging material, of the Michigan Water Well Construction and Pump Installation Code.

- A. Slurry mixture and pumping - When neat cement slurry or concrete slurry is used, it shall be placed into the well by pumping down a tremie pipe of at least one-inch inside diameter, which has been placed to the bottom of the well to avoid segregation or dilution of sealing materials. The slurry will be applied in one continuous operation until the well is filled. The tremie pipe shall be submerged in the slurry at all times during slurry placement. Equipment used for pumping cement grout shall be of the diaphragm, piston, gear, or helical type. Appendix IV of the Michigan Water Well Construction and Pump Installation Code will be used as a guide to determine the amount of slurry required to plug the well.
- B. Cement slurries - Neat cement or concrete slurries shall be prepared by adding cement or sand-and-cement to the calculated required volume of clean water. The material shall be mixed in the mixing equipment until it is adequately mixed and free of lumps, then immediately pumped into the well without delay.

- C. Coarse grade or pelletized bentonite - Where coarse grade or pelletized bentonite is used, it shall be poured slowly into the top of the well to avoid bridging of material in the abandoned well casing. Pellets or coarse bentonite shall be placed into the well by pouring at an even rate, not to exceed five (5) minutes per fifty (50) pounds of materials. Fine bentonite particles that accumulate in the bottom of the shipping container shall not be used. A 1/8-inch mesh hardware cloth screen shall be used to separate the fines from the bentonite chips.

A work pipe or weighted drop string shall be placed in the well, and the height of accumulated plugging material measured after each 50 pounds of bentonite is placed in the well. If measurement indicates that bridging of plugging material has occurred, a work pipe, drill rods, or other weighted device shall be run into the casing to break the bridge. The plugging operation shall continue until the bentonite appears at the surface. Chips are typically poured into a casing where water is visible or apparent. Where no water is apparent in the abandoned well casing, water shall be poured into the casing after every 5 feet of plugging material is added to promote expansion of the bentonite above the static water level.

Reporting

Upon completion of all work, PLS contractors will complete an MDEQ abandoned well plugging record for each well plugged and provide it to the MDEQ.

III. CONNECTION TO MUNICIPAL WATER

Properties within the Prohibition Zone that have been identified as possessing water supply wells, and that do not have a connection to the municipal water supply, shall be evaluated and connected, if necessary, in accordance with the following procedure:

- Task 1: PLS will determine at its expense, on a case-by-case basis, whether or not the water supply well must be plugged and the property connected to municipal water in conformity with Paragraph 5(e) of the Order, and, if necessary, following the dispute resolution procedures in the Consent Judgment, should the need arise.
- Task 2: For wells within the Prohibition Zone to which Paragraph 5(e) does not apply, PLS will notify the owners that they are entitled to be connected by PLS to the municipal water supply, and to have the current well plugged by PLS, in accordance with the terms of the Order. The owners must execute a consent for connection on a form acceptable to PLS and the MDEQ.
- Task 3: If the owner executes the consent, PLS will connect the structure, at its sole cost and expense, to the City municipal water service. Costs shall include all water connection and inspection fees assessed against the property, but shall not include any fees associated with other utilities, annexation, or changes in property taxes or valuation.

PLS may request, with MDEQ approval, that certain wells be retained as monitoring points. Wells that are to be used for monitoring will be subject to access from the property owner and will be plugged by PLS, as per Section II, when the well is removed from the monitoring program.

Project Schedule

PLS anticipates that the project schedule for plugging of wells and connection to municipal water will vary depending on the owner, access and well location, and City requirements. Timeframes may vary depending on approvals from the City, including annexation and resolution of any other site-specific issues that may arise.

**Table 1: Identification of Properties
Within Prohibition Zone with Township Zoning**

Twp	Property ID	Address	Owner(s)	City water?
Ann Arbor	I-09-30-290-005	402 S. Glendale Dr.	Sarah A. Chamberlain	yes
Ann Arbor	I-09-30-290-006	404 S. Glendale Dr.	Michael J. Barrett	yes
Ann Arbor	I-09-30-250-001	2101 Arborview Blvd	Herbert C. Frederick	yes
Ann Arbor	I-09-30-250-004	2020 Dexter Ave	Mary E. Mandeville	yes
Ann Arbor	I-09-30-250-006	2106 Dexter Ave	Bruce Janiszewski	yes
Ann Arbor	I-09-30-250-004	Dexter Ave VACANT	Bruce Janiszewski	N/A
Ann Arbor	I-09-30-250-005	2200 Dexter Ave	William & Christina Levleit	yes
Ann Arbor	I-09-30-260-004	2340 Dexter Ave	Schultz Holdings LLC	no
Ann Arbor	I-09-19-470-002	1645 Miller Avenue	Ellen Quart	yes
Scio	H-08-24-473-003	Valley Dr. VACANT	Chas & Emma Wright	N/A
Scio	H-08-24-473-002	Valley Dr. VACANT	Chas & Emma Wright	N/A
Scio	H-08-24-485-001	Valley Dr. VACANT	Annabelle Ehnis	N/A
Scio	H-08-24-485-003	2615 Valley Dr.	Milledge D. & Phyllis D. Bullard	yes
Scio	H-08-24-486-002	Valley Dr. VACANT	Harold Ray Harris	N/A
Scio	H-08-25-242-005	Wagner Rd VACANT	Hattie E. Powell	N/A
Scio	H-08-25-242-007	Wagner Rd VACANT	Hattie E. Powell	N/A
Scio	H-08-25-242-008	175 S Wagner VACANT	Pall/Gelman Sciences	N/A
Scio	H-08-25-249-009	Westover Ave VACANT	Michael & Carol Fox	N/A
Scio	H-08-25-243-011	Westover Ave VACANT	William A. Bernard	N/A
Scio	H-08-25-247-003	Porter Ave VACANT	Marianne K. Martin	N/A
Scio	H-08-25-243-003	Wagner Rd VACANT	William F. Ager Jr.	N/A
Scio	H-08-25-243-004	Wagner Rd VACANT	William F. Ager Jr.	N/A
Scio	H-08-25-243-006	Wagner Rd VACANT	Kathleen Powell	N/A
Scio	H-08-25-243-007	Wagner Rd VACANT	Camilla A. Mauzy	N/A

Twp	Property ID	Address	Owner(s)	City water?
Scio	H-08-25-243-014	Westover Ave VACANT	Kathleen Powell	N/A
Scio	H-08-25-249-011	Porter Ave VACANT	Michael & Carol Fox	N/A
Scio	H-08-25-247-008	Westover Ave VACANT	David H. & Stella M. Koutnik	N/A
Scio	H-08-25-244-008	Wagner Rd VACANT	Douglas W. Richardson	N/A
Scio	H-08-25-244-013	Westover Ave VACANT	Douglas W. Richardson	N/A
Scio	H-08-25-244-014	Westover Ave VACANT	Douglas W. Richardson	N/A
Scio	H-08-25-350-001	591 S. Wagner Rd	Rayer Development LLC	no
Scio	H-08-25-350-002	597 S. Wagner Rd	Rayer Development LLC	no
Scio	H-08-25-350-003	603 S. Wagner Rd	Wilma I (Staggs) Christo	no
Scio	H-08-25-350-004	609 S. Wagner Rd	Wilma I (Staggs) Christo	no
Scio	H-08-25-350-006	S. Wagner Rd. VACANT	City of Ann Arbor	N/A
Scio	H-08-25-350-008	679 S. Wagner Rd	Ireta Fleischmann	no
Scio	H-08-25-350-009	685 S. Wagner Rd	Matthew C. Finley	no
Scio	H-08-25-350-018	W. Liberty VACANT	Killins Concrete Co.	N/A