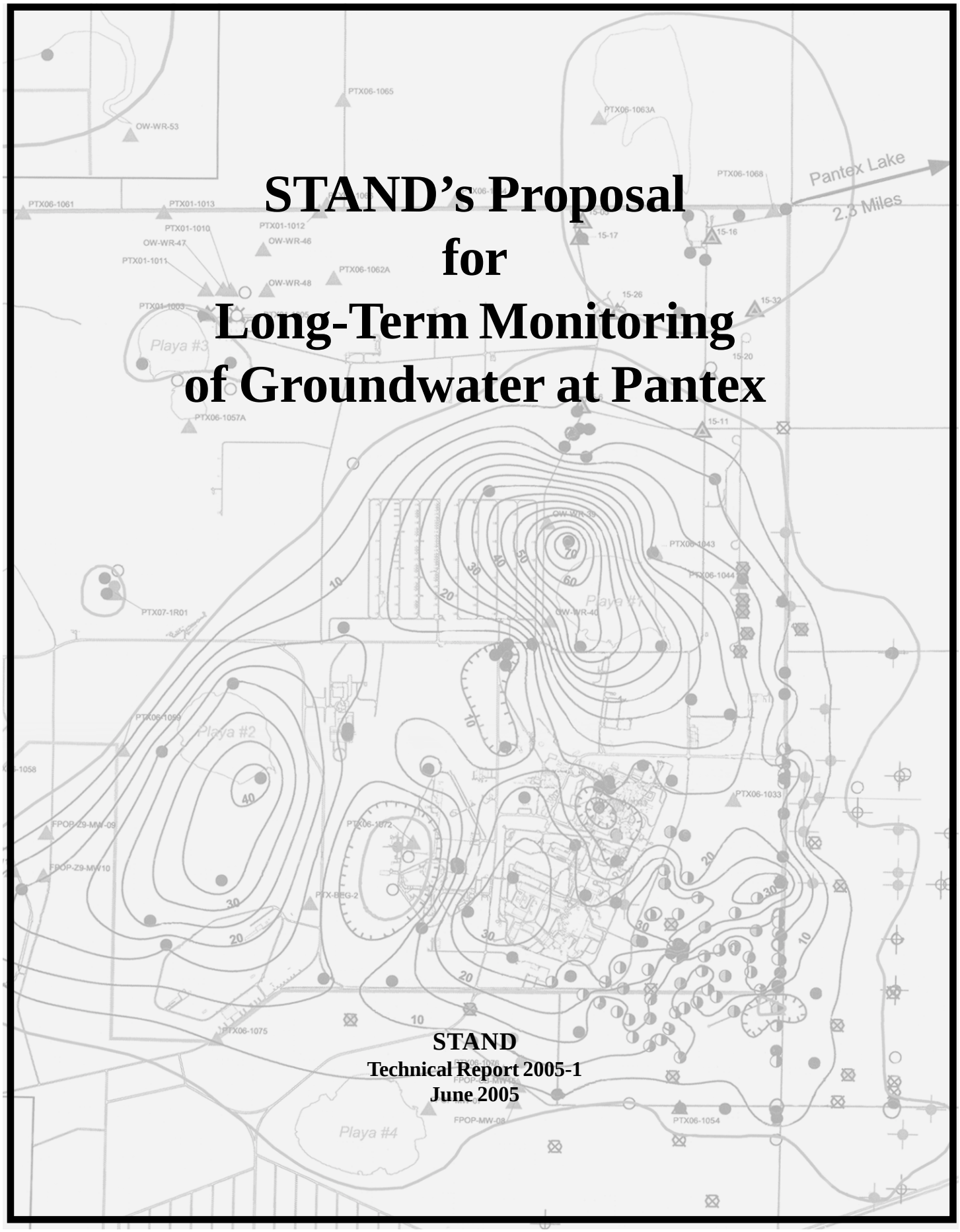

STAND's Proposal for Long-Term Monitoring of Groundwater at Pantex

STAND

Technical Report 2005-1

June 2005

STAND is a 501(c)3 non-profit grassroots organization
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STAND's goal is the protection of human health and the long-term preservation of the natural resources entrusted to our care.

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STAND's Proposal for Long-Term Monitoring of Groundwater at Pantex

by

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STAND's Proposal for

Long-Term Monitoring of Groundwater at Pantex

This report identifies wells that STAND believes should be included in a long-term monitoring plan for the Ogallala and perched aquifers at the Pantex Plant. Most of these wells already exist[1]. To enable managing the (1) uncertainties that result from known data gaps and (2) the contaminant plume, STAND recommends installing a number of additional wells, which are prioritized in Table 1. Well locations are shown on accompanying maps (Figures 1 and 2 illustrating monitoring wells in Ogallala and perched aquifers, respectively).

Samples from all wells should be analyzed for metals, VOCs, SVOCs, high explosives, perchlorate, pesticides, herbicides, PCBs, and dioxins/furans.[2]

Recommendations on placement of these wells and others are based on our current understanding of the extent of the perched aquifer. Monitoring locations, monitoring frequency, and sample analytes should be adjusted based on information obtained as monitoring continues.

Ogallala Aquifer

Areas without monitor wells

Groundwater conditions beneath large areas of Pantex are unknown because they contain no monitor wells. DOE should install enough monitor wells in these areas to determine groundwater conditions in the Ogallala Aquifer. These areas include:

Approximately one mi^2 between the Burning Grounds and the Pantex supply wells[3].

> One well should be installed between wells PTX06-1062A and 15-6 (well #1, Figure 1).

Approximately two mi^2 in the western portion of Pantex.[4]

> Three wells should be installed in this area. One between the western boundary and PTX01-1011, one between the western boundary and PTX06-1057A, and one between wells PTX06-1074 and PTX07-1R01 (#s 2, 3, 4, Figure 1).

Approximately one mi^2 south of the Burning Grounds, near the southwestern corner of Zone 4 West. This area contains only one Ogallala Aquifer well (PTX06-1057A)[5].

> One well should be installed between wells PTX07-1R01 and OW-WR-40 (#5, Figure 1).

Upgradient Ogallala wells

DOE should monitor a network of wells that is upgradient of both the Pantex boundary and the overlying perched aquifer. These wells would serve as background wells. They would be meant to detect

contaminants being transported from private property to the west or from the Texas Tech Research Farm to the south.

Western boundary

Two existing wells along the western boundary currently serve as background wells and should be included in the long-term monitoring plan:

PTX06-1060
PTX06-1074

However, two wells are not sufficient to monitor the 2.7 mile-long boundary. Two additional wells should be installed; one between PTX06-1060 and PTX06-1074, and another between PTX06-1074 and the northwest corner of the plant (#s 6, 7, Figure 1).

Southern boundary

In the southern portion of Pantex, water in the perched aquifer flows beyond the plant boundary to the south, southeast, and southwest[6]. Thus, contaminants that leak from the perched aquifer may enter the Ogallala Aquifer upgradient of the Pantex boundary. Therefore, to serve as background monitor wells, Ogallala wells must be upgradient of the overlying perched aquifer.

There are only five Ogallala monitor wells upgradient of the perched aquifer. Two of them are near Zone 9 and the southwest lobe of the perched aquifer (FPOP-Z9-MW-08 and FPOP-Z9-MW-12), and three are near Playa 5 (FPOP-MW-04, FPOP-MW-05, and FPOP-MW-06).

No information was found for wells FPOP-Z9-MW-08 or FPOP-Z9-MW-12. There are no analytical results for these wells in the Environmental Monitoring Quarterly Reports.[7]

Wells FPOP-MW-04, FPOP-MW-05, and FPOP-MW-06 are more than a mile upgradient of the perched aquifer. These wells are too far away to act as effective upgradient monitor wells.

A line of five Ogallala monitor wells should be installed upgradient of the southernmost extent of the perched aquifer. Wells FPOP-Z9-MW-08 or FPOP-Z9-MW-12 may be included in this line (instead of proposed well #8) if they can be shown to be suitable (#s 8, 9, 10, 11, 12, Figure 1).

Burning Grounds/Playa 3

Replace wells PTX01-1003 and PTX01-1005. These wells have been abandoned. However, many organic contaminants were found in samples from these wells[8]. The new wells should be installed as close as practical to the abandoned wells to determine whether contaminants still exist in this area.

Upgradient well PTX06-1057A and downgradient wells PTX01-1010 and PTX06-1062A should be included in the monitoring plan. Contaminants have been found in samples from each of these wells[9].

Northern boundary

Contaminants have been detected in all of the wells installed along the northern boundary (PTX01-1012, PTX01-1013, PTX06-1061, PTX06-1064, PTX06-1066, PTX06-1068)[10]. All of these wells, except PTX06-1066, should be included in the monitoring plan. PTX06-1066 is close to PTX01-1012 and samples from this well would not contribute important additional information.

Contaminants have also been detected in all of the wells installed north of the boundary (PTX06-1063A, PTX06-1065, and PTX06-1067)[11]. All of these wells should be included in the monitoring plan.

Zone 4

Well OW-WR-39 is downgradient of Zone 4. Contaminants have been detected in this well[12] and it should be included in the monitoring plan. An additional well should be installed north of Zone 4, beneath the contaminant plume in the perched aquifer[13] (# 13, Figure 1).

Zone 10

Well PTX-BEG-2 is downgradient of Zone 10. This well should be included in the monitoring plan.

Zone 11

Well PTX06-1072 is in Zone 11. Contaminants have been detected in this well[14] and it should be included in the monitoring plan. An additional well should be installed downgradient of Zone 11 (# 14, Figure 1).

Zone 12/Southeast quadrant of plant

High concentrations of contaminants exist in the perched aquifer in the southeast quadrant of Pantex. The contaminant plume extends beyond the plant boundary to the east and southeast. [15] There are only three Ogallala wells beneath this contaminant plume (PTX06-1033, PTX06-1044, and PTX06-1056). Contaminants have been detected in all of these wells and all of them should be included in the monitoring plan.[16]

Four additional wells should be installed in the southeast quadrant. One should be near well PTX06-EW-01, and three should be east of the plant boundary (#s 15, 16, 17, 18, Figure 1).

Playa 1

Wells OW-WR-40 and PTX06-1043 are upgradient and downgradient or Playa 1, respectively. Contaminants have been detected in both of these wells[17] and both wells should be included in the monitoring plan.

Playa 2

Well PTX06-1059 is upgradient (or perhaps cross-gradient) of Playa 2. Contaminants have been detected in this well[18] and it should be included in the monitoring plan. An additional well should be installed downgradient of Playa 2 (# 19, Figure 1).

Runoff from industrial areas in the southeast portion of Pantex drains to Playa 4.[19] Well FPOP-MW-07 is downgradient of the playa. Contaminants have been detected in this well[20] and it should be included in the monitoring plan.

Playa 5

Wastes from Amarillo Air Base were discharged to Playa 5. The upgradient well (FPOP-MW-04) and one downgradient well (FPOP-MW—05) should be monitored. Contaminants have been detected in samples from both of these wells.[21]

Landfill 13

Organic contaminants have been detected in well PTX07-1R01[22]. This well should be included in the monitoring plan.

Water supply wells

Contaminants have been detected in wells 15-20 and 15-26[23]. These wells should be included in the monitoring plan. Note: because these are supply wells, the way they were constructed may make them unsuitable as monitor wells (e.g., long screen intervals, lack of access for low flow sampling devices). If this is the case, monitor wells should be installed near wells 15-20 and 15-26.

Pratt Lake

Runoff from the northeastern portion of Pantex drains to Pratt Lake[24], and contaminants in the runoff may enter the perched aquifer or the Ogallala Aquifer.

DOE has installed only one Ogallala well near Pratt Lake. This well, PTX06-1063A, is immediately upgradient of the lake. Thus, it may not intercept any contaminants emanating from the Lake. A well should be installed downgradient of Pratt Lake. This new well should be included in the monitoring plan (#20, Figure 1).

Pantex Lake

From 1942 to 1970 wastes from the Old Sewage Treatment Plant (OSTP) at Pantex were discharged to Pantex Lake. The OSTP treated sewage and industrial wastes[25].

The DOE installed monitor well OW-WR-53 at Pantex Lake. However, no records of sample analyses for this well have been found in the analytical data posted on the Pantex website.[26] STAND does not know whether well OW-WR-53 has been sampled. In addition, it is not clear whether well OW-WR-53

is downgradient of Pantex Lake. If it is downgradient of Pantex Lake, and is suitable, it should be included in the monitoring plan. Otherwise, a downgradient well should be installed and included in the monitoring plan (#21, Figure 1).

Table 1
Prioritization of Additional Ogallala Monitor Wells
(Highest priority = 1)

Priority	Well Location (see map)
1	9
2	11
3	18
4	15
5	replace PTX01-1003
6	20 (Pratt Lake)
7	21 (Pantex Lake)
8	16
9	17
10	3

Perched Aquifer

The full extent of the perched aquifer near Pantex is unknown. The monitoring plan may need to be modified as additional information is obtained. The monitoring network proposed below is based on our current understanding of the extent of the perched aquifer.

Areas without monitor wells

Groundwater conditions beneath large areas of Pantex are unknown because they contain no monitor wells. DOE should install enough monitor wells in these areas to determine groundwater conditions in the perched aquifer. These areas include:

Approximately 1 mi^2 between the Burning Grounds and the Pantex supply wells[27].

One well should be installed between wells PTX06-1062A and 15-6 (well A, Figure 2).

Approximately 3 mi^2 in the western portion of Pantex.[28]

Four wells should be installed in this area. One between the western boundary and PTX01-1011, one between the western boundary and well PTX06-1057A, one between wells PTX06-1074 and PTX07-1R01, and one near well PTX08-1011A (B, C, D, E, Figure 2).

Approximately one mi^2 south of the Burning Grounds[29].

One well should be installed south of well PTX06-1057A (F, Figure 2).

Burning Grounds/Playa 3

Contaminants have been detected in monitor wells PTX01-1001 and PTX01-1008.[30] Both of these wells should be included in the monitoring plan.

Contaminant Plume

A large contaminant plume extends beneath extends beneath the eastern portion of Pantex.[31] The following wells are completed in or near this plume, and should be included in the monitoring plan.

PTX06-1002A	PTX06-1036	PTX06-1050
PTX06-1003	PTX06-1037	PTX07-1O01
PTX06-1005	PTX06-1040	PTX07-1P06
PTX06-1030	PTX06-1041	PTX08-1002
PTX06-1031	PTX06-1042	PTX08-1006
PTX06-1035	PTX06-1046	OW-WR-38

Landfill 13

Contaminants have been detected in well PTX07-1R03.[32] This well should be included in the monitoring plan.

Water supply wells

Contaminants have been detected in the perched aquifer near the Pantex water supply wells[33]. The following wells should be included in the monitoring plan:

PTX07-1O06	PTX06-1080
PTX04-1002	PTX08-1010

Northern boundary

DOE has not installed perched aquifer wells along most of the northern boundary of Pantex, although contaminants have been detected in all of the Ogallala Aquifer wells installed near the boundary. Nor has DOE installed perched aquifer wells near the monitor wells north of the boundary. Contaminants have also been detected in these wells. Six new monitor wells should be installed in the vicinity of the

northern boundary. These wells should be near existing wells PTX06-1067 (G), PTX06-1061 (H), PTX06-1013 (I), PTX01-1012 (J), PTX06-1064 (K), PTX06-1065 (L), illustrated on Figure 2.

Pratt Lake

DOE has not installed a monitor well near Pratt Lake. A monitor well should be installed near existing well PTX06-1063A, or near proposed well #20 (M, Figure 2).

Pantex Lake

High concentrations of nitrate and selenium have been found in the perched aquifer at Pantex Lake. The organic compound bis(2-ethylhexyl)phthalate has also been detected[34]. Wells PTX06-1082 and PTX06-1083 should be included in the long term monitoring plan.

Note: no records of sample analyses for Pantex Lake perched well PTX06-1084 have been found in the analytical data posted on the Pantex website.[35] If this well has been sampled, DOE should post the analytical results. Otherwise, DOE should explain why the well has not been sampled.

South central area

The following wells should be included in the monitoring plan:

PTX06-1049	PTX07-1Q02
PTX06-1085	PTX10-1007 or 1008

References

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BWXT, 2004a, *Final RCRA Facility Investigation Report, Groundwater, U.S. Department of Energy Pantex Plant, Amarillo, Texas,* March 15, 2004.

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DOE, 1998a; *Environmental Information Document*, October 1998.

DOE, 2004a; *Risk Reduction Rule Guidance to the Pantex Plant RFI*, Final Report, March 2004.

STAND, 2004a, *Contaminants in the Ogallala Aquifer at Pantex*, STAND Technical Report 2004-1.

Endnotes

[1] Some wells may not be suitable for monitoring. In these cases, they should be replaced with properly constructed wells. A well is unsuitable for monitoring if it is completed in more than one unit (e.g., Ogallala and Dockum), is constructed of materials that could alter water chemistry, or has deteriorated. A well is also unsuitable if well construction records are unavailable.

[2] The individual analytes in each category are listed in DOE, 2004a, table 3-13.

[3] BWXT, 2004a, figure 3-17.

[4] BWXT, 2004a, figure 3-17.

[5] BWXT, 2004a, figure 3-17.

[6] BWTX, 2004a, figure 3-27.

[7] DOE, 1998 – 2004.

[8] STAND, 2004a, pages D-1 and D-2.

[9] STAND, 2004a, pages D-2, D-8, and D-9.

[10] STAND, 2004a, pages D-3, D-4, D-5, D-9, D-10, D-12, and D-14.

[11] STAND, 2004a, pages D-9, D-11, and D-13.

[12] STAND, 2004a, page D-16.

[13] BWXT, 2004a, figure 10.2.2-2.

[14] STAND, 2004a, page D-14.

[15] BWXT, 2004a, figure 10.2.2-2.

[16] STAND, 2004a, pages D-7 and D-8.

[17] STAND, 2004a, pages D-7 and D-16.

[18] STAND, 2004a, page D-8.

[19] BWXT, 2004a, figures ES-4 and 9.0-1.

[20] STAND, 2004a, page D-16.

[21] STAND, 2004a, pages D-15 and D-16.

[22] STAND, 2004a, page D-14.

[23] STAND, 2004a, page D-17.

[24] BWXT, 2004a, figure 9.0-1; and ATSDR, 1998, section IV.C.3.b.

[25] DOE, 1998a, page 5-5.

[26] DOE, 1998 – 2004.

[27] BWXT, 2004a, figure 3-17.

[28] BWXT, 2004a, figure 3-17.

[29] BWXT, 2004a, figure 3-17.

[30] BWXT, 2004a, figure 10.2.9-8.

[31] BWXT, 2004a, figures 10.2.2-2 and 10.2.2-10.

[32] BWXT, 2004a, figure 10.2.2-2.

[33] BWXT, 2004a, figures 10.2.2-2, 10.2.4-6, and 10.2.9-8.

[34] DOE, 1998 – 2004.

[35] DOE, 1998 – 2004.

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