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| Change Number | FEDERAL FACILITY AGREEMENT AND CONSENT ORDER CHANGE CONTROL FORM<br>Do not use blue ink. Type, or print using black ink. | Date |
|---|---|---|
| M-24-91-2 | | March 15, 1991 |

Originator: R. R. Thompson

Phone: 376-9988

Class of Change

☐ I – Signatories (Section 13.0) ☒ II – Project Manager ☐ III – Unit Manager

Change Title

1324-N/NA Monitoring Well Location Changes

Description/Justification of Change

See Attachment A

9413149.1275

Impact of Change

See Attachment A

Affected Documents

Hanford Federal Facility Agreement and Consent Order, Volume 2 of 2, Calendar Year 1990 Annual Update (March 1990) Table D-3, Figure D-1/

| Approvals | X Approved | — Disapproved |
|---|---|---|
| James E. Rasmussen<br>DOE | 12/18/91<br>Date | |
| Paul Ice Day<br>EPA | 12/18/91<br>Date | |
| Ecology | 12/18/91<br>Date | |

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A-6000-376 (05/89)

# HANFORD FEDERAL FACILITY AGREEMENT AND CONSENT ORDER
# CHANGE CONTROL FORM M-24-91-2

**DESCRIPTION /JUSTIFICATION OF CHANGE:**

Change Milestone M-24-17 to read as follows:

"Install 3 additional RCRA wells around the 1324-N/NA and 1 **around the 1325-N** Ponds" (Change in bold).

9413149.1276

Milestones M-24-17 calls for 4 wells to be installed in 1991 for the 1324-N/NA facilities. The change proposes 3 wells for 1324-N/NA and 1 well for 1325-N, resulting in no changes for the total number of monitoring wells in CY 1991,

The groundwater mounds formerly present beneath the 1324-N/NA and 1325-N facilities have dissipated, so the monitoring network design for these facilities had to be changed. Wells proposed for 1991 installation are:

<u>2 shallow downgradient wells for 1324-N/NA.</u> Groundwater no longer flows radially outward from the 1324-N/NA facilities, so fewer wells are needed to monitor the aquifer downgradient of the ponds. Two new downgradient wells will be installed to replace existing wells that have gone dry.

<u>1 upgradient well for 1324-N/NA.</u> One new upgradient well will be installed for the 1324-N/NA facilities, as originally planned.

<u>1 upgradient well for 1325-N.</u> A new upgradient well for the 1325-N crib, located closer to the facility than the existing upgradient well, will better reflect background water quality.

The justification for these changes is discussed further in the recently released groundwater monitoring plan for these facilities (Hartman, 1991, pages 3-9 to 3-15 attached).

**IMPACT OF CHANGE:**

The monitoring networks for the 1324-N/NA and 1325-N facilities will be improved by the change. The change does not affect the number of wells to be installed in the 100-N Area, so the schedule is not impacted.

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Hartman, M.J., 1991, <u>Ground Water Monitoring Plan for the 1301-N, 1324-N/NA, and 1325-N Facililites,</u> WHC-SD-EN-AP-038, Westinghouse Hanford Company, Richland, Washington.

Two of the original downgradient wells for the 1324-N/NA facilities went dry during 1990, and another is expected to have too little water to sample. These wells will be replaced (see Section 3.3.3.3).

### 3.3.3 Proposed Additional Monitoring Wells

This section describes the wells proposed to be added to the monitoring networks for the 100-N RCRA sites. A total of seven new wells will be installed for the 100-N RCRA sites. Their locations are shown in Figure 3-2 and the approximate Hanford coordinates are listed in Table 3-2. The final well locations will depend on field conditions and will be determined by the project scientist.

3.3.3.1 Additional Wells for the 1301-N LWDF. Three wells will be added to the monitoring network for the 1301-N LWDF. One existing well, N-57, will be monitored as an upgradient well instead of N-4. Well N-57 has been used in the assessment program for 1301-N and 1324-N/NA. It is completed at the top of the uppermost aquifer. Construction details are summarized in Table 3-1. An as-built diagram is included in Appendix A.

Two new wells (NR-5 and NR-6) will be installed downgradient of the 1301-N LWDF to fill in a gap in the network. These wells will be completed at the top of the uppermost aquifer.

3.3.3.2 Additional Wells for the 1325-N LWDF. The current upgradient well for the 1325-N LWDF (699-81-58) was drilled in 1962 and is constructed of carbon steel casing with 55 ft of perforations. The construction of this well may not be suitable for RCRA monitoring. A new upgradient well (NR-4) will be installed. The well will be completed at the top of the uppermost aquifer.

3.3.3.3 Additional Wells for the 1324-N/NA Facilities. The four downgradient wells in the 1324-N/NA network were installed when there was a large ground water mound beneath the facility. Since waste discharges nearly ceased in early 1990, the mound has been declining. Wells N-58 and N-61 went dry in 1990; well N-60 was also nearly dry as of December 1990. Two new wells (NR-2, NR-3) will be installed to monitor the top of the aquifer. The wells will be completed at a depth of approximately 80 ft to intercept the lower water table. Another new well (NR-7), completed at the base of the uppermost aquifer, will be installed next to one of the shallow downgradient wells. The current upgradient well for the 1324-N/NA facilities (699-81-58) will be replaced with a new well (NR-1).

### 3.3.4 Justification for Locations of New Wells

The objective of ground water monitoring is to detect adverse impacts to ground water quality caused by the facilities. This involves monitoring background ground water quality in upgradient wells and downgradient water quality to detect potential impacts. Upgradient wells should be located out of the influence of the facility but in the path of ground water flow beneath the facility. Downgradient wells should be placed close enough to the facility and to each other to monitor the aquifer adequately.

Figure 3-2. Proposed Revised Monitoring Networks for the 1301-N, 1324-N/NA, and 1325-N Facilities.

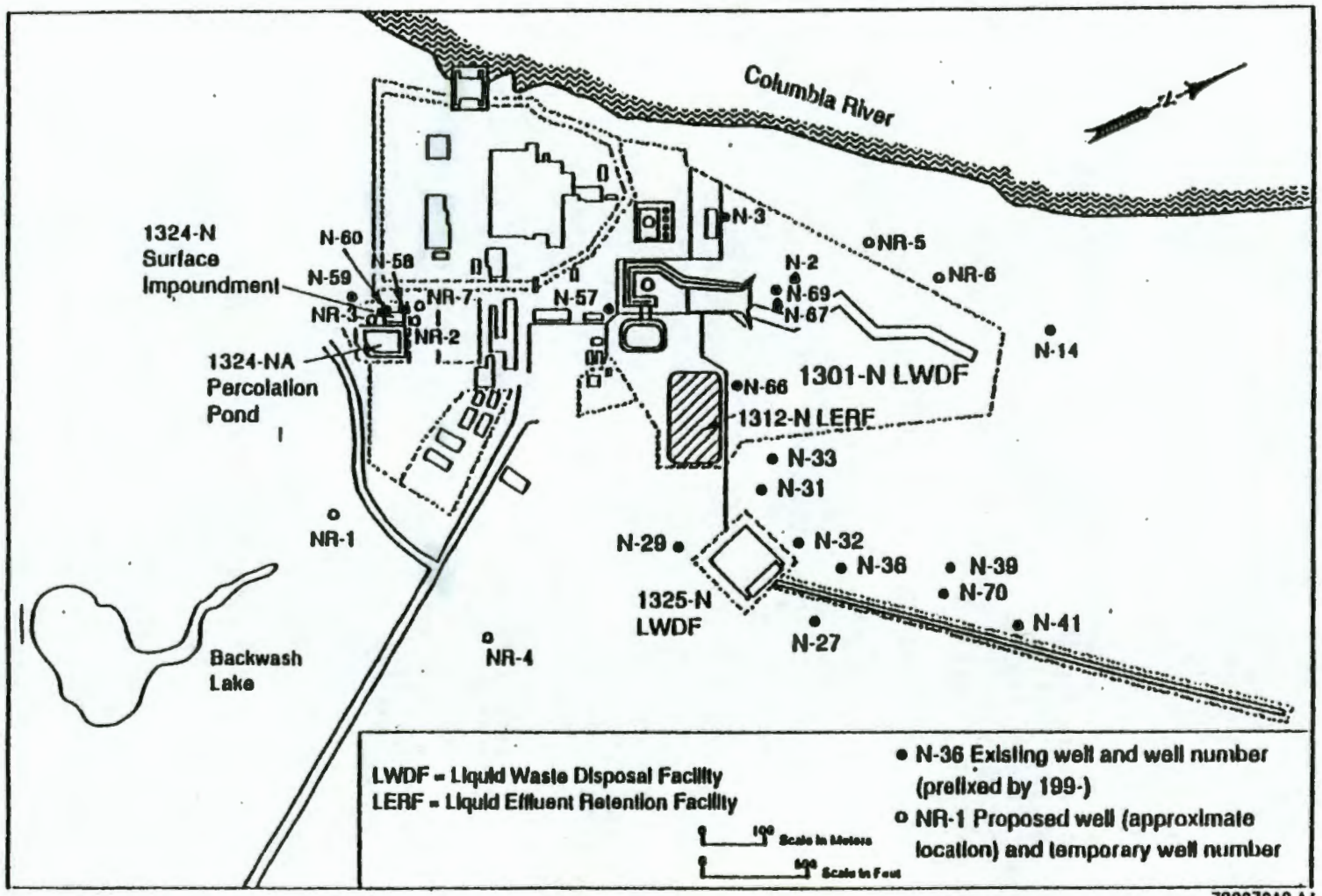


Table 3-2. Proposed RCRA Wells in the 100-N Area.

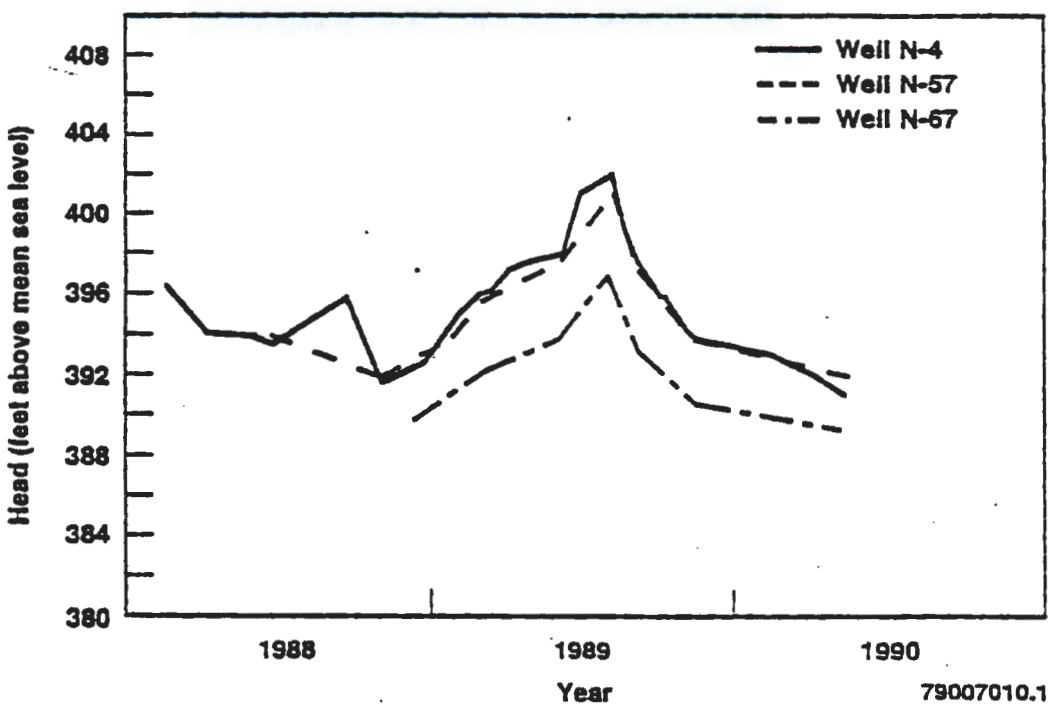
| Well | Year | Facility | Approximate Hanford coordinates | | Screened interval[a] |
|---|---|---|---|---|---|
| NR-1[b] | 1991 | 1324-N/NA | 60,300 W; | 83,500 N | top 10-20 ft of aquifer |
| NR-2 | 1991 | 1324-N/NA | 59,800 W; | 87,200 N | top 10-20 ft of aquifer |
| NR-3 | 1991 | 1324-N/NA | 60,900 W; | 84,400 N | top 10-20 ft of aquifer |
| NR-4[b] | 1991 | 1325-N | 59,100 W; | 84,300 N | top 10-20 ft of aquifer |
| NR-5 | 1992 | 1301-N | 60,200 W; | 87,000 N | top 10-20 ft of aquifer |
| NR-6 | 1992 | 1301-N | 59,800 W; | 87,200 N | top 10-20 ft of aquifer |
| NR-7 | 1992 | 1324-N/NA | 59,800 W; | 87,200 N | bottom 10 ft of aquifer |

[a]Screened interval will chosen by the project scientist and well site geologist.
[b]Upgradient well.

Due to changes in waste disposal in the 100-N Area, ground water flow directions have changed since monitoring began in December 1987. The original ground water monitoring networks have been modified in response to those changes. Some additional wells are needed to correct deficiencies in the current networks. This section presents justification for the location of the new wells and, in some cases, for removing old wells from the network.

3.3.4.1 Justification for 1301-N Well Locations. The current monitoring network for the 1301-N network does not adequately monitor upgradient water quality. Ground water has flowed in various directions through time, depending on the relative sizes of ground water mounds beneath the 1325-N and 1324-N/NA facilities. The two wells currently used as upgradient wells (N-4 and N-66) do not reflect the influence of the 1324-N/NA facilities on ground water quality. This resulted in a false indication that the 1301-N LWDF was affecting ground water quality. Well N-57 may be a suitable substitute for well N-4. It is located upgradient of the facility as interpreted from recent water table maps and hydrographs (Figure 3-3). It is possible that well N-57 is located too close to the facility to provide representative background data. When the 1301-N LWDF was in operation, well N-57 was most likely downgradient because of a ground water mound at the site. Data from this well will be examined to see if it appears to be affected by the 1301-N LWDF. If not, indicator parameter data from N-57 and N-66 will be used to determine background ground water quality. If N-57 is influenced by the 1301-N LWDF, a new up-gradient well will be installed. A change to this ground water monitoring plan would then be issued.

Figure 3-3. Water Levels in Wells N-4, N-57, and N-67, January 1988 to April 1990.



Two new wells will be installed to monitor the 1301-N trench (NR-5 and NR-6; see Figure 3-2). Several alternatives were considered for the locations of wells NR-5 and NR-6:

1. Adjacent to the trench
2. Just inside the fence surrounding the 1301-N LWDF
3. Outside the 1301-N fence.

The first alternative is precluded by the presence of a large mound of gravel and earth, which would not allow drill rig access. The difference in distance between alternatives 2 and 3 is 100 to 200 ft. The 1301-N LWDF has not been used since 1985. If dangerous waste constituents from the facility entered the ground water, it is likely that they have migrated beyond the immediate vicinity of the trench, and could be detected by the wells outside the fence. Drilling in this location has the added advantage of being outside a radiation zone, thus limiting the exposure of the drilling and sampling crews to radioactive contamination.

**3.3.4.2 Justification for 1325-N Well Locations.** The direction of ground water flow in the 100 N Area has varied with waste disposal practices. Ground water mounds have existed beneath the 1324-N/NA and 1325-N facilities at times, causing water to flow radially outward from the mounds. At times the height of these mounds have been greater than the water level in the "upgradient" well [699-81-58 (Figure 3-4)]. However, a water table map of the larger area suggests that well 699-81-58 is outside the area of influence of 1324-N/NA and 1325-N (see Figure 2-4). This conclusion is backed up by the chemical data from well 699-81-58. The constituents associated with 1324-N/NA (primarily sulfate) or 1325-N (primarily strontium-90) are not elevated in well 699-81-58.

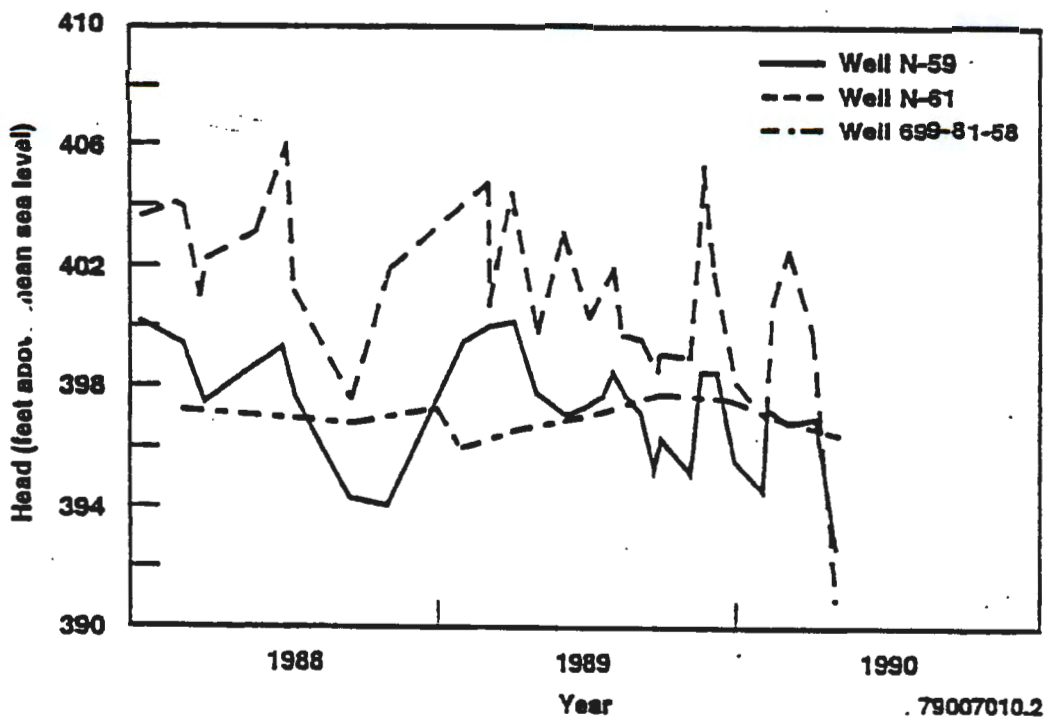
The 100-N ground water mounds have largely dissipated, so a new upgradient well (NR-4) will be installed closer to the 1325-N facility. This location is believed to be directly upgradient of the facility under current and expected ground water flow conditions. Well NR-4 is at the same location as a monitoring well proposed in DOE-RL (1990). Well construction and sampling will be coordinated between the two programs.

Ground water in the vicinity of proposed well NR-4 may have been affected by effluent disposal to the 1325-N LWDF in the past, and there is some risk that the aquifer or vadose zone still contains contaminants. If sampling of well NR-4 indicates contamination from the 1325-N LWDF, a new upgradient well will be installed further from the facility.

Several wells monitored in the original, downgradient monitoring network for the 1325-N LWDF are no longer useful in monitoring the site. Wells N-42 and N-52 are not downgradient of the facility under current or expected water table conditions, and were removed from the network in 1990.

Wells N-36, N-39, and N-41 may go dry, due to the declining water table in the 100-N Area. No new wells are proposed to replace these wells, for the following reasons: wells N-39 and N-41 are located at the middle or far end of the 1325-N trench, where no effluent was discharged; none of these wells has shown trends in chemical data different from the other downgradient wells;

Figure 3-4. Water Levels in Wells N-59, N-61, and 699-81-58, January 1988 to April 1990.



hazardous constituents are not evident in any of the downgradient wells for the 1325-N LWDF; the LWDF currently does not receive any hazardous effluent, and even the discharge of non-hazardous, low-level radioactive effluent has virtually ceased. It is unlikely that new chemical contamination will be observed.

**3.3.4.3 Justification for 1324-N/NA Well Locations.** Because the mounds beneath the 1324-N/NA and 1325-N facilities are dissipating, a new upgradient well (NR-1) will be installed. The proposed location is believed to be directly upgradient of the 1324-N/NA facilities, and is closer to the facilities than is the existing upgradient well. The proposed location is also better than the existing well because it will monitor impacts of the backwash lake. Ground water in the vicinity of proposed well NR-1 may have been affected by effluent disposal to the 1324-N/NA facilities in the past, and there is some risk that the ground water or sediments still contains contaminants. If sampling of well NR-1 shows contamination from the 1324-N/NA facilities, a new upgradient well will be installed.

As discussed above, three of the four current downgradient wells for the 1324-N/NA facilities are dry or virtually dry and will not consistently provide ground water samples or water levels measurements, assuming the water table does not rise significantly. Two new wells will be installed (NR-2 and NR-3) so there will be at least three downgradient wells monitoring the facility.

A new well will be installed adjacent to one of the shallow downgradient wells. This new well (NR-7) will be completed at the bottom of the unconfined unit, just above the clay-rich layer that is believed to act as the base of the aquifer. This deeper well is designed to detect any contaminants that are heavier than water (not anticipated at the 1324-N/NA site). It will also provide geologic and hydrologic data on the base of the aquifer beneath the 1324-N/NA site. Finally, the shallow/deep well pair will provide information on the vertical ground water gradient in the vicinity of 1324-N/NA.

### 3.3.5 Drilling and Well Installation

Four wells will be installed in 1991, and three in 1992. The first wells to be installed will be the shallow, downgradient wells for the 1324-N/NA facilities and the new upgradient wells. The downgradient wells for the 1301-N LWDF and the deep well for the 1324-N/NA facilities will be installed during 1992. Generic specifications for drilling, installation, and related activities are described in WHC (1990c). Details will be specified on data sheets (Figure 3-5).

The new wells will most likely be drilled with a cable tool rig. If another method of drilling is chosen it will have the same advantages as the cable tool method. These advantages include: (1) drill cuttings can be easily contained (important in potentially contaminated material); (2) representative geologic samples can be collected; (3) moisture samples can be collected from above the water table; (4) disturbance to the borehole wall is minimized; (5) a straight, plumb borehole is produced; and (6) ground water quality is not affected by drilling fluids other than water or air.