FBAG Comments on URS Work Plan Dated August 24, 2012

Fields Brook Superfund Site, Ashtabula, Ohio

Summary

Detrex has submitted an updated work plan for undertaking a DNAPL recovery pilot test at the Detrex facility. The scope of work presented in the work plan includes: the inspection of existing DNAPL recovery wells, installation of six new DNAPL recovery wells, and completion of a DNAPL recovery pilot test at the existing and new recovery wells.

Based on a review of the work plan, the Fields Brook Action Group (FBAG) believes that the DNAPL recovery pilot test proposed in the work plan is a necessary step towards improving DNAPL recovery rates and collecting data necessary for the effective design of a full-scale DNAPL remediation system at the Detrex facility. The proposed approach for the pilot test in the Detrex work plan includes the simultaneous testing of the following three DNAPL recovery configurations: 1) intermittent application of vacuum at the new recovery wells using a mobile DNAPL recovery unit (MDRU); 2) the existing Detrex approach of two-phase vacuum enhanced DNAPL recovery; and 3) the FBAG-recommended approach of continuous dual-phase vacuum-enhanced DNAPL extraction. Consequently, three recovery wells will be installed in each of the two selected testing areas at the Detrex facility. In addition, each recovery well would have a network of four radial monitoring points for data collection. While the pilot test work plan contains all of the necessary elements (installation of new recovery and monitoring wells, testing of vacuum enhanced DNAPL recovery mechanisms, collection of monitoring data, *etc.*), the overall approach and design of the pilot test will not provide the data needed to evaluate and compare the performance of the three DNAPL recovery configurations being tested, *i.e.*, the pilot test will not be able to meet its design objectives. In the following sections, we provide specific recommendations to improve the design and implementation of the DNAPL recovery pilot test.

Comments

1. ***Operational Configuration***: The Detrex-proposed simultaneous testing of all three types of recovery methods on individual wells in a given area could potentially result in overlapping zones of influence and unintended confusion with respect to assessing each recovery method's effectiveness. With the Detrex approach, it would be challenging to sort and interpret the results of the pilot test, *i.e.*, the observations and data recorded at a given monitoring point may be attributable to more than one recovery well/configuration. The inability to test each type of recovery well in isolation would interfere with the need to objectively evaluate the performance of that recovery well configuration and compare its DNAPL recovery rate to that of the other approaches. In addition, there may be heterogeneities in the formation and DNAPL distribution variability – factors that could impact the DNAPL recovery rate at a location, but would not be accounted for in the Detrex-proposed approach. In order to "normalize" the effect of such heterogeneities and/or variability on the estimated DNAPL recovery rates and allow for the unbiased evaluation of the three proposed DNAPL recovery configurations, the FBAG proposes that the pilot test be reconfigured in the following manner.
    - The pilot test should test each well individually in a given configuration, and then operate all three wells concurrently in the same configuration to provide data that allows a simple evaluation of effectiveness, mass removal, area of influence, and the economics of the full-scale DNAPL remediation system. During the testing of each DNAPL recovery configuration/method at a given well, monitoring data should be collected at all monitoring points in the well field. For example, all three recovery wells should be

operated using the MDRU approach, with data collection at all monitoring points, until steady state is achieved (i.e., DNAPL recovery rates become stable), before the operational configuration of all three recovery wells is switched to an alternative recovery method. This approach for the pilot test would yield a defensible data set that would allow for a thorough and unbiased comparative evaluation of the three DNAPL recovery alternatives under consideration.

- Although unclear in the Detrex work plan, it is recommended that a common well design be used for the six proposed recovery wells. The well design proposed by Detrex (short well screens, wells screened below the water table, etc.) is appropriate, but modifications will need to be made to the well head before switching configurations, especially when the configuration is switched from the Detrex-preferred two-phase vacuum enhanced recovery to the FBAG-recommended dual-phase vacuum enhanced recovery.
- Each recovery alternative should be tested on all wells in a given testing area, starting with the least aggressive method and concluding with the most aggressive method. The testing should be conducted in the following order: 1) intermittent vacuum application using the MDRU; 2) existing two-phase vacuum enhanced approach; and 3) FBAG-preferred approach, since they represent increasing level of stress application on the aquifer.
- The layout of the DNAPL recovery wells and associated monitoring points should be modified so that they are closer in proximity to each other and aligned in a manner that would allow for overlapping zones of influence and simulation of the full scale DNAPL remediation system. The schematic of the layout of recovery and monitoring points recommended by the FBAG is shown in the attached figure (Figure 1 – a modification of Figure 2-6 of the URS work plan).

2. ***Location of Testing Areas***: The FBAG agrees with the Detrex-proposed approach of installing recovery wells both within and outside the backfilled lagoon area so that DNAPL recovery rates may be measured in both types of sub-surface deposits. However, a more important consideration is that the recovery wells be installed in impacted areas, which have previously shown evidence of potentially mobile DNAPL. The proposed testing area within the backfilled lagoon is appropriate, given that significant evidence of DNAPL contamination was observed at GP-15 and GP-16 during the recent Membrane Interface Probe (MIP) investigation. The FBAG also recommends that recovery wells be installed in the northern portion of the lagoon area (Figure 2 – a modification of Figure 2-2 of the URS work plan), where significant thicknesses of DNAPL have been consistently observed in the past (monitoring wells RMW-1 and RMW-3), and evidence of significant DNAPL contamination was found during the recent MIP investigation (GP-49). This would be a preferred location to the proposed area south of the lagoons.

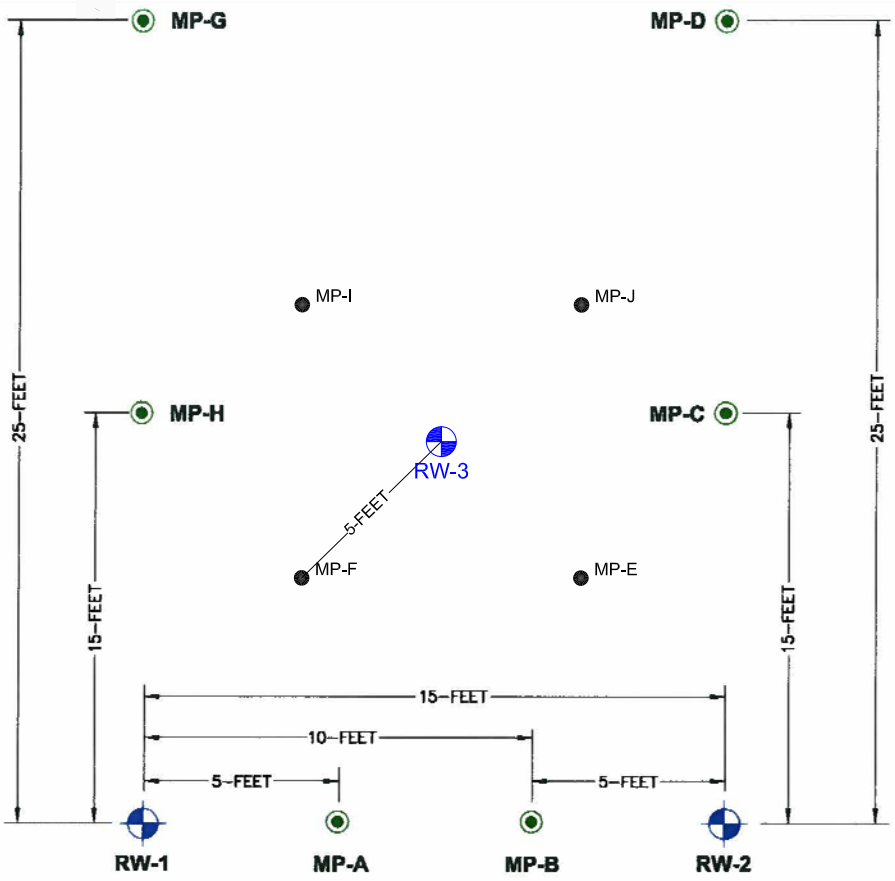
3. ***Equipment Specification***s: The work plan does not provide sufficient detail and specifications regarding the equipment that Detrex plans to use to test the three DNAPL recovery configurations. It is unclear if the equipment for which specifications are included in Appendix B is to be used to operate all three types of recovery wells or only the FBAG-preferred dual-phase recovery wells. Regardless, the FBAG has the following recommendations to ensure that all wells are properly operated and DNAPL recovery is optimized:

   - The work plan proposes the use of an MDRU for the testing of the first of the three recovery methods. However, the work plan also indicates that existing equipment and pumps will be used to test this method, since the MDRU has not yet been built. If the MDRU equipment is comparable to the existing equipment, the work plan should specify as such and this approach is appropriate. If not, Detrex should plan to use equipment in

the pilot test that is comparable to the planned MDRU, otherwise the collected information will have limited utility.

- The FBAG has repeatedly raised issues regarding the inadequacy of the current equipment (*i.e.*, the existing vacuum pump is undersized) used by Detrex for DNAPL recovery (approach #2). If Detrex chooses to test their approach at the new recovery wells with the same equipment, it is likely that there will be no measurable improvement in the performance (*i.e.*, DNAPL recovery rates). In order to properly operate the DNAPL recovery wells in the existing Detrex configuration, the FBAG recommends that Detrex consider using a vacuum pump rated at much higher capacity.
- The ability of product and liquids removal pumps to operate in a strong vacuum environment must be confirmed in the equipment selection process. For example, operating conditions in the FBAG preferred alternative will have pumps operating with negative suction pressure, even though the suction is submerged (due to vacuum applied to the well bore). Thus, it should be confirmed that the proposed pumps for this method can operate under these conditions before they are procured.
- Additional detail regarding equipment should be included in the work plan to allow confirmation that the proposed configuration is designed to assure the highest probability of a successful test. In addition, a process and instrumentation diagram (P&ID) should be developed for each recovery method to define equipment and process monitoring associated with each technology.

4. ***Data Collection and Analysis Plan:*** An effective data collection and analysis plan is critical to the successful design of the full-scale remediation system. The Detrex work plan has adopted the general data collection guidelines provided by US EPA and FBAG in previous correspondence. However, the work plan should include a detailed data collection plan, which should include data quality objectives, methodology for data collection, frequency of data collection, and a sampling and analysis plan. In addition, the work plan should discuss how the data and sampling results obtained from the pilot test will be analyzed and used to design the full-scale DNAPL recovery system.



NOTES:

1. 3 RECOVERY WELLS AND 8 OBSERVATION WELLS PER ZONE (SHALLOW OR DEEP)
2. DRAWING NOT TO SCALE

URS

DETREX CORPORATION

ASHTABULA, OHIO

DNAPL AND GROUNDWATER RECOVERY WELL AND MONITORING POINT ARRAY LAYOUT

DRAWN BY:	CHECKED BY:	PROJECT No:	DATE:	FIGURE No:
AMH	MLS	13814865	8/16/12	2-6

Gradient

Proposed Well Layout

Fields Brook Superfund Site - Ashtabula, Ohio

FIGURE 1

Date: 09/10/2012

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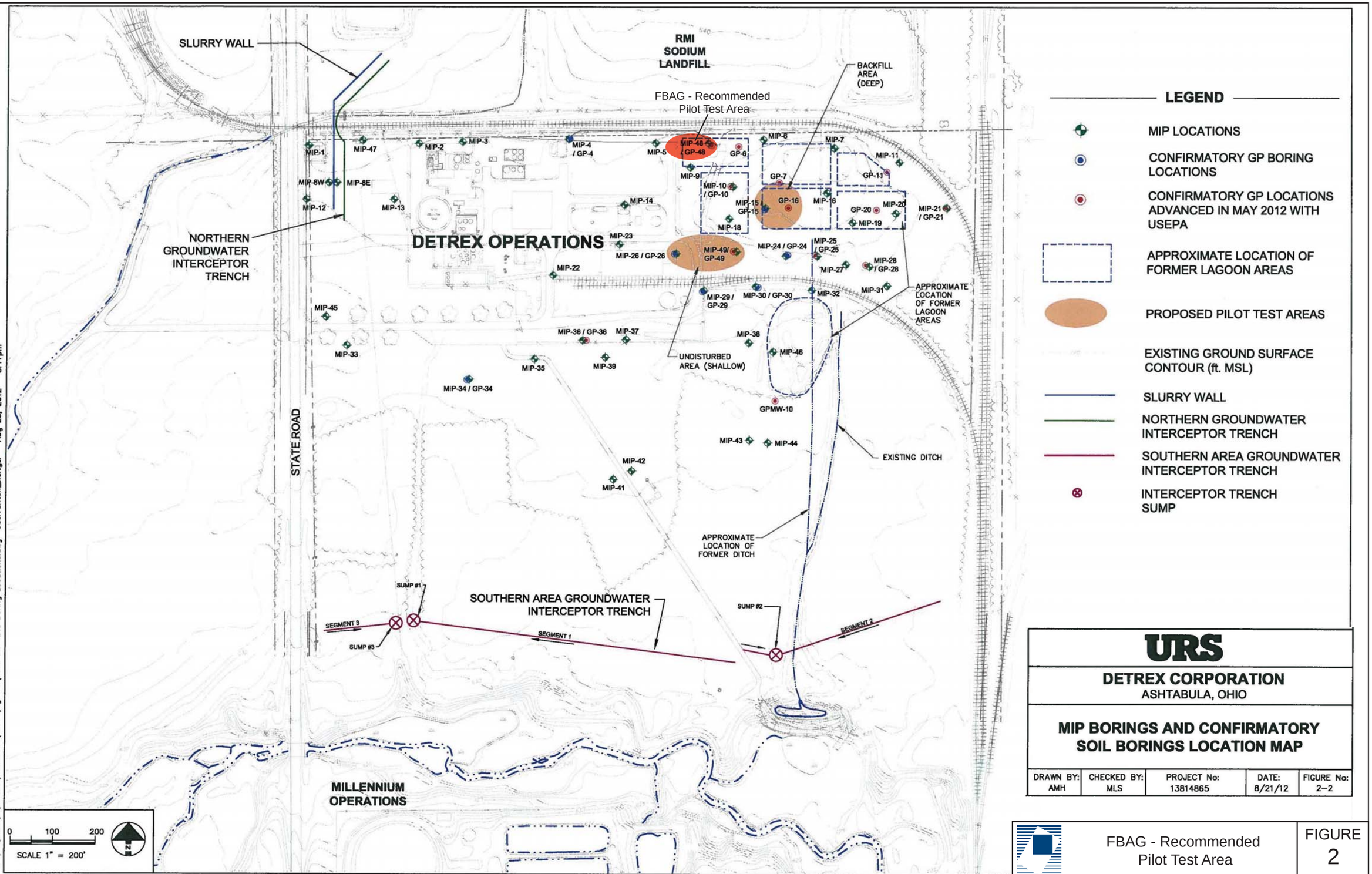
SLURRY WALL
RMI SODIUM LANDFILL
FBAG - Recommended Pilot Test Area
BACKFILL AREA (DEEP)
NORTHERN GROUNDWATER INTERCEPTOR TRENCH
DETREX OPERATIONS
MIP-1
MIP-47
MIP-2
MIP-3
MIP-4 / GP-4
MIP-5
MIP-48 / GP-48
GP-6
MIP-6
MIP-7
MIP-11
GP-11
MIP-9
MIP-10 / GP-10
GP-7
GP-16
MIP-16
MIP-8W
MIP-8E
MIP-12
MIP-13
MIP-14
MIP-15 / GP-15
MIP-18
GP-20
MIP-20
MIP-19
MIP-21 / GP-21
MIP-23
MIP-26 / GP-26
MIP-49 / GP-49
MIP-24 / GP-24
MIP-25 / GP-25
MIP-27
MIP-28 / GP-28
MIP-22
MIP-29 / GP-29
MIP-30 / GP-30
MIP-32
MIP-31
APPROXIMATE LOCATION OF FORMER LAGOON AREAS
MIP-45
MIP-36 / GP-36
MIP-37
MIP-38
MIP-33
MIP-35
MIP-39
UNDISTURBED AREA (SHALLOW)
MIP-46
MIP-34 / GP-34
GPMW-10
MIP-43
MIP-44
EXISTING DITCH
MIP-42
MIP-41
STATE ROAD
APPROXIMATE LOCATION OF FORMER DITCH
SUMP #1
SOUTHERN AREA GROUNDWATER INTERCEPTOR TRENCH
SUMP #2
SEGMENT 3
SEGMENT 1
SEGMENT 2
SUMP #3
MILLENNIUM OPERATIONS
0 100 200
SCALE 1" = 200'
N
LEGEND
MIP LOCATIONS
CONFIRMATORY GP BORING LOCATIONS
CONFIRMATORY GP LOCATIONS ADVANCED IN MAY 2012 WITH USEPA
APPROXIMATE LOCATION OF FORMER LAGOON AREAS
PROPOSED PILOT TEST AREAS
EXISTING GROUND SURFACE CONTOUR (ft. MSL)
SLURRY WALL
NORTHERN GROUNDWATER INTERCEPTOR TRENCH
SOUTHERN AREA GROUNDWATER INTERCEPTOR TRENCH
INTERCEPTOR TRENCH SUMP
URS
DETREX CORPORATION
ASHTABULA, OHIO
MIP BORINGS AND CONFIRMATORY SOIL BORINGS LOCATION MAP
DRAWN BY: AMH
CHECKED BY: MLS
PROJECT No: 13814865
DATE: 8/21/12
FIGURE No: 2-2
Gradient
FBAG - Recommended Pilot Test Area
Fields Brook Superfund Site - Ashtabula, Ohio
FIGURE 2
Date: 9/10/2012
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