WELL FIELD

CONTINGENCY PLAN

METROPOLITAN UTILITIES DISTRICT
WELL FIELD, NEBRASKA

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STANDARD LIST - GLOSSARY OF TERMS AND ABBREVIATIONS

Alluvium: Unconsolidated terrestrial sediment composed of sorted or unsorted sand, gravel, and clay that has been deposited by water.

Aquifer: An underground geological formation, or group of formations, containing water. Are sources of groundwater for wells and springs.

bgs: Below Ground Surface

CENWK: Kansas City District Corps of Engineers

CENWO: Omaha District Corps of Engineers

COCs: Chemicals of Concern

Drawdown: The drop in the water table or level of water in the ground when water is being pumped from a well.

FNOP: Former Nebraska Ordnance Plant

gpm: Gallons per minute

mgd: Million gallons per day

MODFLOW: Groundwater flow model developed by McDonald and Harbaugh (1988).

MUD: Metropolitan Utilities District

NOPGR: Nebraska Ordnance Plant Groundwater Report

RDX: Hexahydro-1,3,5-trinitro-1,3,5 triazine

ROD: Record of Decision

TCE: Trichloroethylene

USACE: U.S. Army Corp of Engineers

USGS: U.S. Geological Survey

WFCP: Well Field Contingency Plan

1 INTRODUCTION

The Metropolitan Utilities District (MUD) is responsible for providing potable water to the Greater Omaha (Nebraska) Metropolitan area. Based on the continuing population growth of the Greater Omaha area, MUD identified a potential long term deficiency in the water supply. The District (MUD) has recently completed the construction of the Platte West Well Field (Well Field) and associated water treatment facilities as a long-term solution to the potential water supply deficiencies. As a result, MUD has increased its distribution capacity from 234 million gallons per day (mgd) to approximately 334 mgd. The completion of the Well Field provides an alternative source of supply that will enhance system reliability by decreasing the overall system reliance on water supplied from the Florence Water Treatment Plant, which obtains water from a surface water intake located in the Missouri River.

The installation of transmission pipelines for the Well Field necessitated crossing the Platte River, Elkhorn River, and associated wetlands, therefore MUD obtained a Clean Water Act Section 404 Permit (No. 199910085), referred to as Permit in this document. The Permit is administered by the Omaha District Corps of Engineers (CENWO). This document presents the Well Field Contingency Plan (WFCP), which is a requirement specified in Permit condition 62e. The objective of the WFCP is to identify appropriate corrective measures that can be instituted should the Well Field operations cause an impact to the contaminant plumes or remediation efforts at the Former Nebraska Ordnance Plant (FNOP). The remainder of this section provides a general discussion of the project background and describes the overall purpose of work presented within this report. The report is organized as follows:

- **Section 1** – Introduction
- **Section 2** – Hydraulic Data Analysis
- **Section 3** – Chemical Data Analysis
- **Section 4** – Triggers and Potential Response Actions

1.1 PERMIT REPORTING REQUIREMENTS

Section H of the Permit describes specific post-start up conditions that are required for operation of the Well Field. This WFCP was developed to provide a means for monitoring the operation of the Well Field and making adjustments to Well Field operations based on observed aquifer hydraulic and chemical data. The general purpose of the Permit conditions described in Section H are to ensure that the operations of the Well Field do not impact the contaminant plumes or the remediation efforts at the FNOP. The following section presents a summary of Section H Permit Condition 62, as they relate to the development of the WFCP:

- Condition 62a – Permittee will initially monitor and record on a monthly basis for a period of not less than one year after initiation of the well field operations the water table elevations and water level fluctuation as a result of ground water drawdown created by the operation of the Platte West Well field. Following the one-year period and with concurrence by the Corps of Engineers, monitoring may continue on a quarterly basis. In addition, data will be collected using the continuous recording stream gauging station installed adjacent to the well field as required in permit condition E 20.This data shall be incorporated into the existing hydraulic and hydrological model(s) by the Permittee's third party contractor who shall be able to run the updated version of these hydraulic/hydrological model(s) with the updated data. This will be done for the purposes of evaluating well field operations and assessing any potential for the Permittee's groundwater pumping to impact the Mead Site Plume. The potentiometric data will be obtained from monitoring wells located in coordination with the United States Corps of Engineers (USACE).

- Condition 62b – MUD will collect groundwater samples for chemical analysis on a semi-annual basis from monitoring wells located in coordination with the USACE.
- Condition 62c – MUD will update the existing groundwater model on a semi-annual basis using data collected from the monitoring program to evaluate the potential impact of the Well Field on the operations at the FNOP.
- Condition 62e – MUD will develop a Contingency Plan to identify appropriate corrective measures that could be instituted should the Well Field operations cause an impact to the FNOP Site contaminant plumes or remediation efforts.
- Condition 62f – MUD will develop a Nebraska Ordnance Plant Groundwater Report (NOPGR) to summarize the activities described in the above conditions. The NOPGR will be submitted on an annual basis for review by the Corps of Engineers, with the first NOPGR due within one year of Well Field startup.

In addition to the required monitoring and plan development outlined in Condition 62, Condition 66 in Section H of the Permit outlines the required actions to be taken by MUD if the event of an impact to the FNOP site. Permit Condition 66 is presented below:

- Condition 66 – In the event that the Platte West Well Field operations cause, or the data indicates an immediate potential for an impact to the Mead Site groundwater baseline and /or Platte West Well Field operations impact remediation activities at the Site, Permittee shall be solely responsible for taking all steps, including but not limited to: additional monitoring, implementation of corrective measures including additional groundwater wells and treatment, and provision for alternative water supplies. Any such measures shall be coordinated with and subject to the approval of the Corps of Engineers. The Corps of Engineers may require Permittee to develop a Corrective Action Plan to address corrective measures required. Any and all costs associated with these actions shall be the responsibility of the Permittee.

1.2 WFCP CONCEPTS

As part of the NOPGR, hydraulic and chemical data will be collected from the aquifer to evaluate post Well Field startup conditions in the aquifer. Because the FNOP contaminant plumes and hydraulic containment system are located in Saunders County, only hydraulic and chemical data from Saunders County will be incorporated into this analysis. The WFCP does not incorporate the water supply wells located in the Douglas County portion of the Well Field. The following sections present the concepts associated with both the hydraulic and chemical monitoring.

Hydraulic Monitoring

A detailed groundwater flow model (CAI, 2005) was developed by MUD to predict the impact of the Well Field on the potentiometric surface of the Platte River alluvial aquifer. Model predictions showed that if the Well Field is operated within the constraints of the Permit (52 mgd annual flow), the Well Field will not impact the contaminant plumes or remedial efforts at the FNOP site. MUD will monitor the changes in the drawdown induced by operation of the Well Field and will compare the observed field data to model predictions.

Once the Well Field begins pumping, the aquifer will exhibit rapid changes in groundwater elevations and slow changes (if any) in groundwater chemistry. Therefore, MUD will emphasize hydraulic data rather than chemical data to evaluate the impact of the Well Field. MUD has installed a hydraulic monitoring network that consists of 17 monitoring wells including four (4) Lower Platte North Natural Resources District (LPNNRD) wells, on the Saunders County side of the Well Field. Water level measurements will be collected and recorded on a monthly basis at all monitoring wells located within the observation network, as prescribed by Permit condition 62e. These data will be analyzed to ensure that the observed drawdown at each monitoring well is similar to the predictions developed by MUD's groundwater flow

model (CAI, 2004). Monitoring well locations and model predicted drawdown values are shown of Figure 1-1.

Chemical monitoring

CENWK operates a very detailed groundwater monitoring network associated with the FNOP site. CENWK collects groundwater samples from the monitoring network for all Contaminants of Concern (COCs) listed in the Record of Decision (ROD). Water samples from this monitoring network will continue to be collected on a regular basis to ensure that CENWK's hydraulic containment system is operating as designed. In addition to these data, MUD will collect limited groundwater chemistry data from select wells within the hydraulic monitoring network (MW06-18, MW06-30, and MW06-31). Both of these data sets will be used in developing the annual NOPGR which will evaluate the operation of the Well Field and its impact (if any) on the FNOP contaminant plumes and hydraulic containment system.

2 HYDRAULIC DATA ANALYSIS

Hydraulic data will be collected from MUD's monitoring network throughout the operational lifetime of the Well Field. To evaluate the impact of the Well Field, emphasis will be placed on hydraulic rather than chemical data as changes in the potentiometric surface of the alluvial aquifer will be observed much more rapidly than changes (if any) in the distribution of the FNOP contaminant plumes. Evaluating the hydraulic data collected from the monitoring network will allow MUD to make changes to Well Field operations (if warranted). Changes to Well Field operations could be made if the hydraulic data indicate that there is potential to cause an impact to the FNOP contaminant plumes or remedial efforts. The ability to proactively react to hydraulic data will ensure that the Well Field operations do not impact the FNOP hydraulic containment efforts.

2.1 DATA COLLECTION

The hydraulic data that will be collected includes pre and post Well Field startup data and is comprised of water levels collected at observation wells, as well as stream stage and flow data collected at existing stream gauges. The objective of the hydraulic analysis is to evaluate the impact of the operations of the Well Field on the potentiometric surface of the Platte Valley and Todd Valley Aquifers.

As part of the requirements of the NOPGR, water levels will be collected on a monthly basis at all available hydraulic monitoring wells (for at least a period of one year after startup) and will be presented in the NOPGR on an annual basis. The objective of this data collection is to evaluate any potential impacts of Well Field operations on the travel path of the FNOP contaminant plumes or the remediation efforts at FNOP site. Because the FNOP contaminant plumes and hydraulic containment system are located in Saunders County, only hydraulic data from Saunders County will be incorporated into this analysis.

The hydraulic and chemical data collected as part of the NOPGR will be evaluated semi-annually and reported annually, as required by the Permit. These data are a critical component of the WFCP as the newly collected field data will be compared to historical data to determine the impact of the Well Field on the potentiometric surface of the aquifer.

2.1.1 HYDRAULIC MONITORING WELL PRIORITY STRUCTURE

The impact of deviations from model predicted drawdown values is more sensitive in the monitoring wells located on the edge of the hydraulic monitoring network. Significant deviations from model predicted drawdown values in these wells is cause for concern. Conversely, deviations from model predicted drawdown values in the monitoring wells located near or within the Well Field could be caused by many sources (primarily pumping distribution), and should not be as great of a concern.

To identify the most important monitoring wells in the hydraulic monitoring program, MUD has developed the following priority structure:

- Priority One Wells – These are the most important wells in the hydraulic monitoring program and are generally located near the outer contours of the model predicted cone of depression (near the one to three foot drawdown contour intervals). These wells include: MW94-3, MW94-6, MW06-27, MW06-28, and MW-94-5.
- Priority Two Wells – These wells are located near the edge or outside of the model predicted cone of depression. As such, these wells are an important part of the hydraulic monitoring program and will help to determine the extent of the well field impact. These wells include: MW94-7, MW06-18, MW06-19, MW06-20, MW06-21, MW06-30, and MW06-31.
- Priority Three Wells – These wells are located near or within the Well Field. The proximity of these monitoring wells to the well field means the observed drawdown could be impacted by

many factors, including the pumping distribution. These wells include:MW05-22, MW05-23, MW94-4, MW90-10, and MW04-17.

A table which summarizes the hydraulic monitoring well priority structure is presented as Table 2-1.

2.2 HISTORICAL GROUNDWATER DATA

MUD began collecting water levels from monitoring wells located in Douglas, Sarpy, and Saunders Counties in 1990. The monitoring well network was expanded in Douglas and Saunders Counties in 1995, and later expanded again with the addition of monitoring wells in 2004 through 2006. Initially, water levels were collected at regular time intervals using electronic water level indicators, however in 2004 MUD equipped the 12 monitoring wells with pressure transducers/data loggers. Each pressure transducer/data logger collects and records a water level measurement at least once per day. Presently, MUD continues to collect manual water level measurements at least twice yearly to check the accuracy of the pressure transducers/data loggers. The more recent water level data collection program, initiated as part of the Permit operating conditions, supplements the historical data collected by MUD and was evaluated in context with the more than 10 years of historical water level data collected prior to operation of the Well Field.

With this extensive network of historical data, MUD has been able to establish the natural water level fluctuations that have occurred since 1990. MUD has developed 14 hydrographs (presented as Figures 2-1 through 2-14) that illustrate the naturally occurring (pre well field) changes in water levels over time. Based on the hydrographs it can be concluded that there is a repeatable seasonal pattern in which the water table elevation is lowest around October and highest around April. Based on these data, it appears that groundwater elevations fluctuate naturally over a range of approximately four (4) feet. Using the historical hydrograph data, it is possible to extrapolate an "average" water level elevation at each monitoring well location through visual inspection of each hydrograph. The hydrograph review was performed by an experienced hydrologist, allowing for the elimination of obvious flooding and drought periods from the analysis. The selected average water level was checked with the arithmetic average water level for the data set of each monitoring well. In nearly all instances, the average water level determined by the hydrologist through visual inspection was within one standard deviation of the arithmetic average water level. The range of anticipated groundwater levels at each hydraulic monitoring well is shown on Table 2-2. The arithmetic average water level and the standard deviation of each data set are also presented on Table 2-2.

Under natural conditions, it appears that the water levels fluctuate approximately 2 feet up or down from the "average" water surface elevation. Water levels in several of the monitoring wells are significantly impacted by irrigation pumping. The hydrographs presented as Figure 2-11 through 2-14 (wells MW06-18, MW06-19, and MW06-21) all show a large decrease in the water level beginning in late June/early July. Water level data collected from these wells during the summer irrigation period cannot be used to evaluate the impact of the Well Field on the aquifer.

2.3 PREDICTED WELL FIELD IMPACT

Groundwater modeling developed by MUD (CAI, 2005) has shown that Well Field operations under permitted conditions will not impact the FNOP contaminant plumes or the FNOP hydraulic containment system. The model predicted cone of depression, for a steady state simulation of 52 million gallons per day, is shown on Figure 1-1. The model predicted cone of depression was used as a basis to determine the predicted drawdown at each of the available hydraulic monitoring wells.

The predicted well field impact at each hydraulic monitoring well was determined using the following procedure:

1. The drawdown value of the predicted cone of depression was extracted from the groundwater model for each monitoring well.

2. The model predicted drawdown was subtracted from the average baseline historical water level presented in hydrographs 2-1 through 2-14. This value represents the model predicted steady state water level elevation for each specific monitoring well.

To account for the natural groundwater fluctuations in the monitoring wells, the model predicted drawdown was subtracted by 2 feet. The rational for selecting 2 feet as a value which is representative of the largest natural fluctuation in the potentiometric surface was described in Section 2.2. The model predicted drawdown minus 2 feet represents the lowest plausible model predicted water level elevation for each monitoring well.

Using the model predictions and available historic data, MUD has bracketed the likely water level elevations at each monitoring well that should result from Well Field operations. Through the use of MUD's groundwater model (CAI, 2005) it has been shown that operations under these conditions will not impact the FNOP contaminant plumes or hydraulic containment system. The range of anticipated groundwater levels at each hydraulic monitoring well is shown on Table 2-2. These values account for the model predicted drawdown at each observation well and the fact that there is a repeatable seasonal groundwater elevation pattern, in which the water table elevation is lowest around October and highest around April. The terms presented in Table 2-2 are defined below:

- Representative Pre-Startup Groundwater Elevation – An interpreted "average" water level for a specific monitoring well. This value is estimated from individual monitoring well hydrographs. The actual pre-startup groundwater elevation will be collected at each monitoring well within the hydraulic monitoring network prior to well field startup.
- Model Predicted Drawdown – The drawdown predicted by the groundwater model (CAI, 205) at a particular well.
- Natural Groundwater Fluctuation – An interpreted "average" groundwater fluctuation range (plus or minus). This value represents the variations (up or down) in the water level within a well that occur due to natural seasonal variations.
- Anticipated Post Startup Groundwater Elevation – The Representative Pre-Startup Groundwater Elevation minus the Model Predicted Drawdown.
- Tier 1 Trigger Level – The Anticipated Post Startup Groundwater Elevation minus one foot.
- Tier 2 Trigger Level - The Tier 1 Trigger Level minus the Natural Groundwater Fluctuation.

2.4 NEW HYDRAULIC DATA

Water level measurements will be collected and recorded on a monthly basis at all monitoring wells located within the observation network, as prescribed by Permit condition 62e. The depth to water measurement at each hydraulic monitoring well will be converted to a groundwater elevation using survey elevation data previously collected. The measured groundwater elevation will then be compared to the model predicted groundwater elevation (for each well), including the plausible range of seasonal water level variance. Based on the relationship between the measured drawdown and the model predicted drawdown, several response actions are possible. Response actions are presented in Section 4.

3 CHEMICAL DATA ANALYSIS

Groundwater chemical data, in the form of water samples collected from monitoring wells, will be collected from the MUD and FNOP groundwater monitoring networks. Currently MUD collects water samples from the following monitoring wells: MW06-18, MW06-30A, MW06-31A, and MW-039(Corps Well). These samples are collected and tested by ASW Associates, Inc. The collection and evaluation of samples and data is performed in accordance with the Department of Defense (DoD) Quality Systems Manual for Environmental Laboratories (Version 3, January 2006); criteria established for individual method guidelines; and EPA Guidance and Functional Guidelines such as but not limited to: Contract Laboratory Program Guidance for Field Samplers (EPA-540-R-07-06, July 2007); USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (EPA-540-R-07-003 – July 2007); and USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review OSWER 9240.1-45 (EPA-540-R-04-004 – October 2004). MUD may periodically collect samples from other hydraulic monitoring wells and/or production wells. CENWK will collect water samples from its chemical monitoring network. The FNOP groundwater monitoring program is described in the CENWK's 2008 Groundwater Monitoring Program, which is updated annually.

These datasets will include groundwater chemistry data collected pre and post Well Field startup. Chemical data will be evaluated semi-annually (and compiled annually) as part of the requirements of the NOPGR. Because the FNOP contaminant plumes and hydraulic containment system are located in Saunders County, only chemical data from Saunders County were incorporated into the analysis.

3.1 BASELINE NOP PLUME

Prior to Well Field operations, MUD obtained the most recent interpretation of the extent of the FNOP contaminant plumes, as defined by Kansas City District Corps of Engineers (CENWK). This interpretation of the pre-Well Field startup extent of the contaminant plumes is defined as the "plume baseline" as defined by CENWK (August 2008). The distribution of trichloroethylene (TCE) contamination is shown on Figure 3-1a, while the distribution of hexahydro-1,3,5-trinitro-1,3,5 triazine (RDX) is presented on Figure 3-1b.

3.2 NEW CHEMICAL DATA

New groundwater chemistry data collected as part of the NOPGR will be compared to the Baseline NOP Plume to evaluate impact (if any) of the operation of the Well Field onto the FNOP contaminant plumes and remediation system. The FNOP chemical data will be evaluated by CENWK as describe in the *FNOP Containment Evaluation Work Plan* (URS, 2006). Based on the relationship between the measured contaminants and the established FNOP Baseline, several response actions are possible. Response actions are presented in Section 4.

4 TRIGGERS AND POTENTIAL RESPONSE ACTIONS

The objective of this section is to identify triggers and describe potential response actions that may be necessary if hydraulic or chemical data indicate that the Well Field has impacted (or may impact) the natural movement of the FNOP contaminant plumes or the hydraulic containment of the FNOP plumes.

4.1 HYDRAULIC TRIGGERS

Through groundwater modeling and a review of historical water level data (collected prior to well field startup), MUD has developed a model predicted drawdown and water level elevation for each monitoring well within the hydraulic monitoring network. As described in Section 2, a range of plausible drawdown values and water level elevations were developed for each monitoring well within the hydraulic monitoring network. These plausible water level elevations are termed *acceptable operational range* for the purposes of this report. The acceptable operational ranges of each monitoring well are presented in Table 2-2. The triggers and potential response actions presented are based on these data and model predictions.

Tier 1 Action

Tier 1 actions apply to the Priority One and Two wells identified in Section 2, which include MW94-3, MW94-6, MW06-27, MW06-28, MW-94-5 MW94-7, MW06-18, MW06-19, MW06-20, MW06-21, MW06-30, and MW06-31. For the purposes of the WFCP, a Tier 1 Action occurs when the water surface elevation at one Priority One or Two monitoring well (as defined in Section 2) equals or is below the Tier 1 Trigger Level presented on Table 2-2. The Tier 1 Trigger Level is defined as the water surface elevation that is one (1) foot lower than the Anticipated Post Startup Groundwater Elevation. A Tier 1 Action will prompt the following response from MUD:

- Collect a water level from the monitoring well in question to verify the observed drawdown;
- If the verified drawdown results in a water surface elevation that is at least one (1) foot below the Anticipated Post Startup Groundwater Elevation, then evaluate the potential for seasonal impacts on the water surface elevation by checking if the observed water level is below Tier 2 Trigger Level. The Tier 2 Trigger Level is defined as the Tier 1 Trigger Level minus the Natural Groundwater Fluctuation. The Tier 2 Trigger Elevations are shown on Table 2-2.
- If the water surface elevation is above the Tier 2 Trigger Level, no action is required.
- If the water surface elevation is below the Tier 2 Trigger Level:
    - Evaluate the presence or absence of external stresses (i.e. irrigation wells or domestic wells) near the monitoring well.
        - If no other pumping well is located near the monitoring well, proceed to Tier 2.
        - If another pumping well is located near the monitoring well, evaluate the impact of the pumping well on the water level of the monitoring well. If the (non-MUD) pumping well is believed to cause the excess drawdown, no action is required. If the (non-MUD) pumping well is believed not to have cause the excess drawdown, proceed to Tier 2.

Tier 1 Actions are presented as a flow chart at the end of Section 4.

Tier 1 Time Frame/Response

Although the Permit requires that the groundwater model be used to evaluate/predict the potential impact of the Platte West Well Field on a semi-annual basis, MUD will collect groundwater elevation data as necessary to evaluate the drawdown induced by the Well Field, with emphasis placed on the evaluations performed during the peak demand summer pumping season. If a Tier 1 Response is required, the actions listed above will be completed within a period of 30 days. For Tier 1 Action/Response, no change in Saunders County pumping is required.

Tier 2 Action

Escalation to Tier 2 requires that the water surface elevation at a minimum of one (Priority One or Two) monitoring well is less than the Tier 2 Trigger Level (presented on Table 2-2). As such, the Tier 2 Trigger Level includes the plausible impact of natural seasonal changes on the groundwater levels. Upon this finding, the following will occur:

- Evaluate how many monitoring wells have a water surface elevation that is lower than the Tier 2 Trigger Level (Table 2-2): Actions are listed below:
    - Only one (1) Priority One well.
        - Continue to monitor Priority One wells monthly.
    - Two (2) or more Priority One wells.
        - Investigate Priority Two wells.
    - One (1) or more Priority Two wells.
        - Exceedances include more than one (1) Priority Two well, proceed to Tier 3.
        - Only one (1) Priority Two well exceeds model predicted drawdown, no further action required. Continue to monitor Priority One and Two wells, but increase frequency of data collection to weekly.

Tier 2 Actions are presented as a flow chart at the end of Section 4.

Tier 2 Time Frame/Responses

If a Tier 2 response is required, the actions listed above will be completed within a period of 30 days. Additionally, if a Tier 2 response is necessary, the USACE will be notified by MUD staff.

During the evaluation period, pumping from the Saunders County side of the Well Field will be limited. Supply wells 47, 48, and 50 will be shutdown until the completion of the evaluation or until water levels have rebounded in the Priority Two wells.

Tier 3Action

Escalation to Tier 3 requires hydraulic observations at Priority One and Two level monitoring wells that indicate the aquifer is not responding to the system as modeled. Tier 3 actions will include a review of available groundwater chemistry data to evaluate if changes (attributable to the Well Field) have occurred to the distribution of the FNOP plumes. Tier 3 actions will include the following:

- Review hydraulic data collected from monitoring wells within the hydraulic monitoring network.
- MUD will begin a review of operational data to better understand the causes of the increased drawdown (from predicted) in the aquifer.
- Available CENWK and MUD chemical data will be reviewed.
    - If chemical data remains unchanged from FNOP baseline, no further action is required except for an updated groundwater flow model to reflect current conditions.
    - If chemical data has changed from FNOP baseline, CENWO, CENWK and MUD staffs will meet to discuss results.
        - If CENWO, CENWK, and MUD staffs concur that changes in groundwater chemistry are a result of MUD operations, proceed to the Tier 3 Responses.
        - If CENWO, CENWK, and MUD staff agree that the chemical changes are not due to MUD operations, no further action is required by MUD.
        - If the technical staffs cannot establish consensus on either of the two potential outcomes listed above, then CENWO (as the permitting agency) will make the final determination.

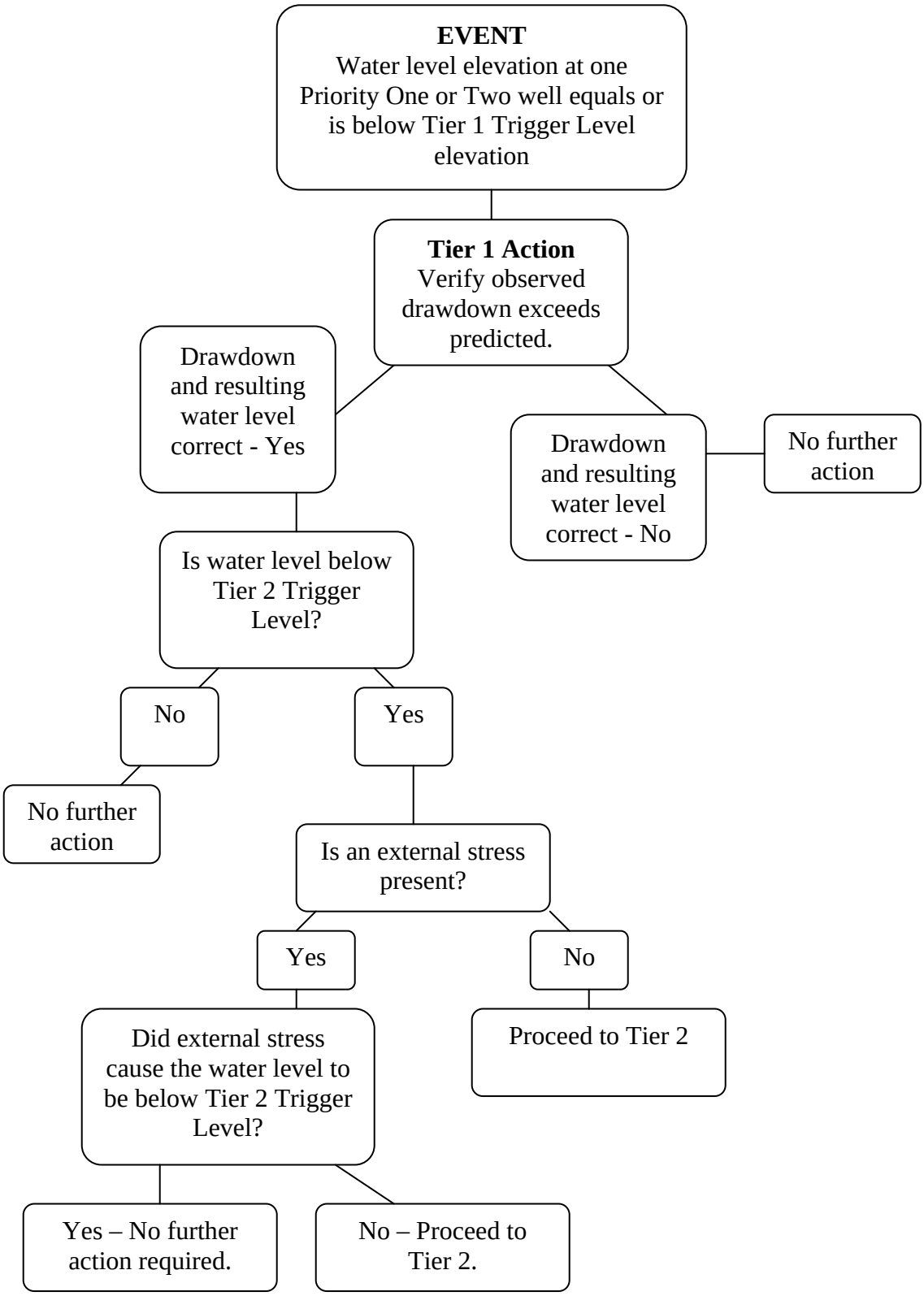
Tier 3 Actions are presented as a flow chart at the end of Section 4.

Tier 3 Time Frame/Responses

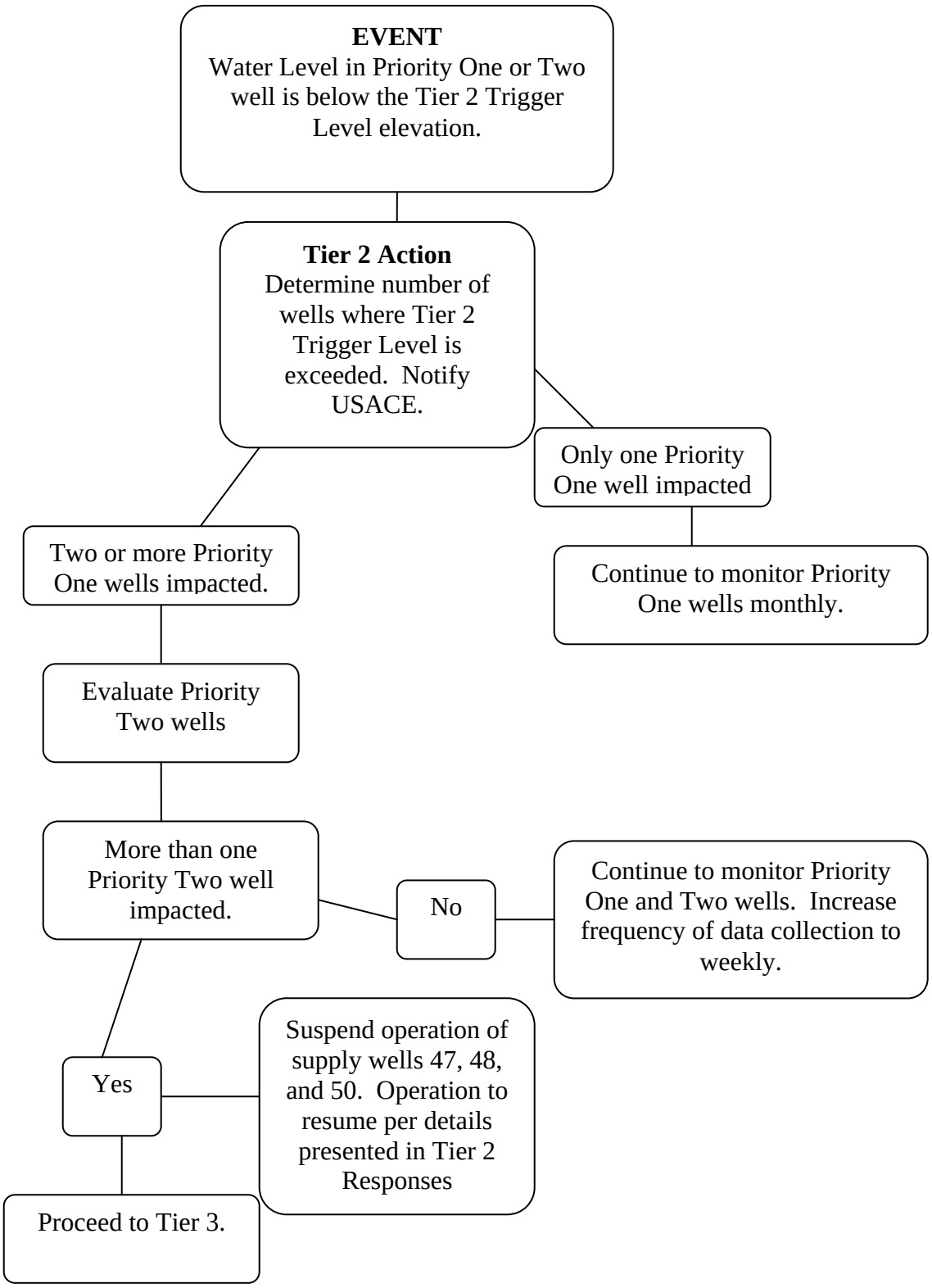
An evaluation of the drawdown induced by the Well Field will be completed every 6 months, as required by the Permit. If a Tier 3 response is required, the actions listed below will be completed within a period of 60 days after completion of Tier 2 activities. Tier 3 responses will include:

- Well Field pumping from the Saunders County side of the Well Field will shift towards the river wells, as defined in the EIS (Burns and McDonnell, 2002). Until MUD's review of operational data is complete, wells 04-47, 04-48, 04-50, 04-51, 04-52, 04-54, and 04-55 will only be used to meet peak water demands during summer months.
    - If the Priority One monitoring wells respond to the shift in pumping, and the water levels in the Priority One wells rebound to a value that is higher than the lowest likely post startup groundwater elevation (Table 2-2), then normal operation of wells 04-47, 04-48, 04-50, 04-51, 04-52, 04-54, and 04-55 will resume.
- MUD will update the groundwater flow model to reflect current conditions.
- MUD will develop and implement a "no impact" pumping scenario using the revised/updated groundwater model. The model will be used to develop alternative transient pumping schedules that will be protective of the FNOP site.

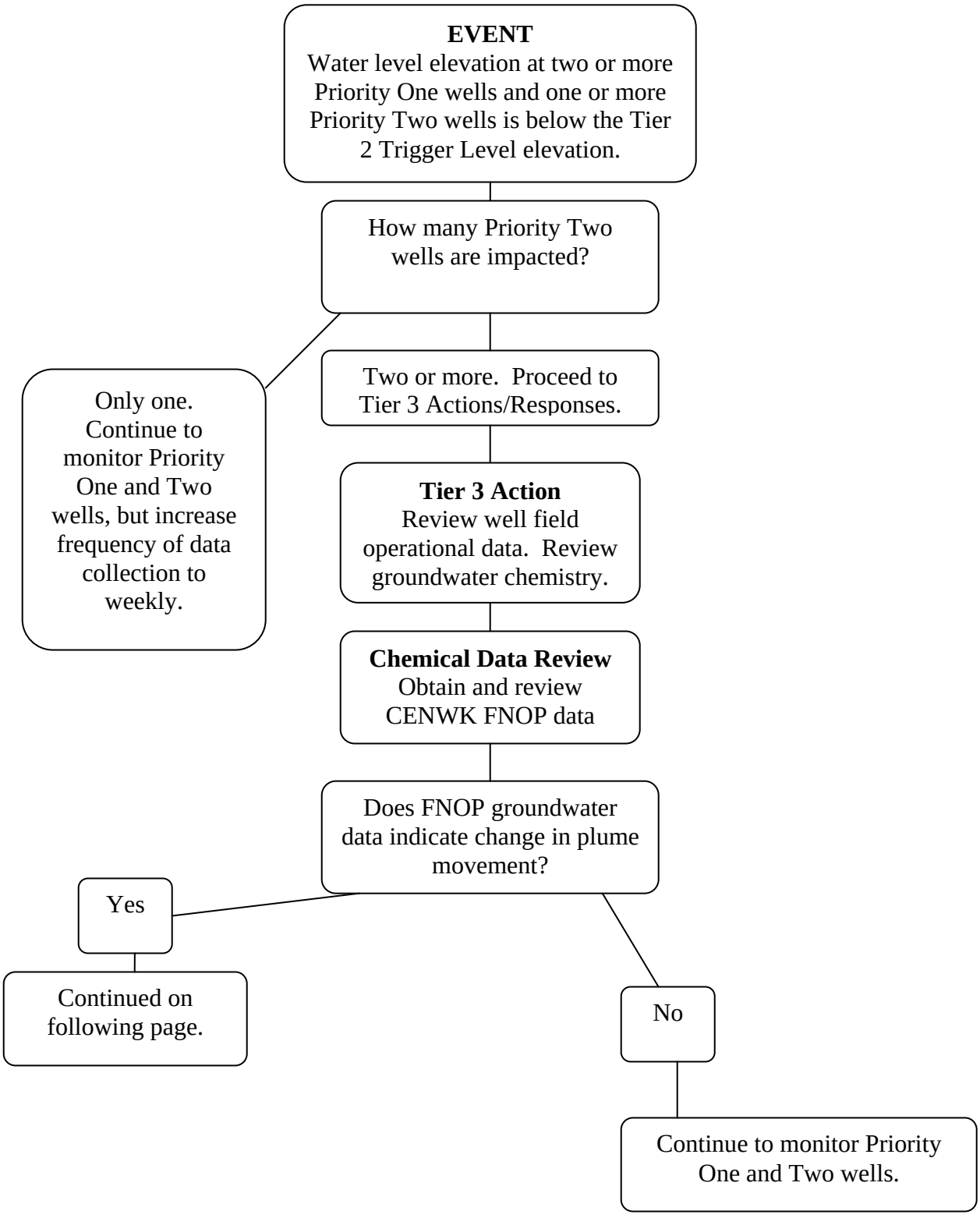
Contingency Plan Flow Chart – Tier 1



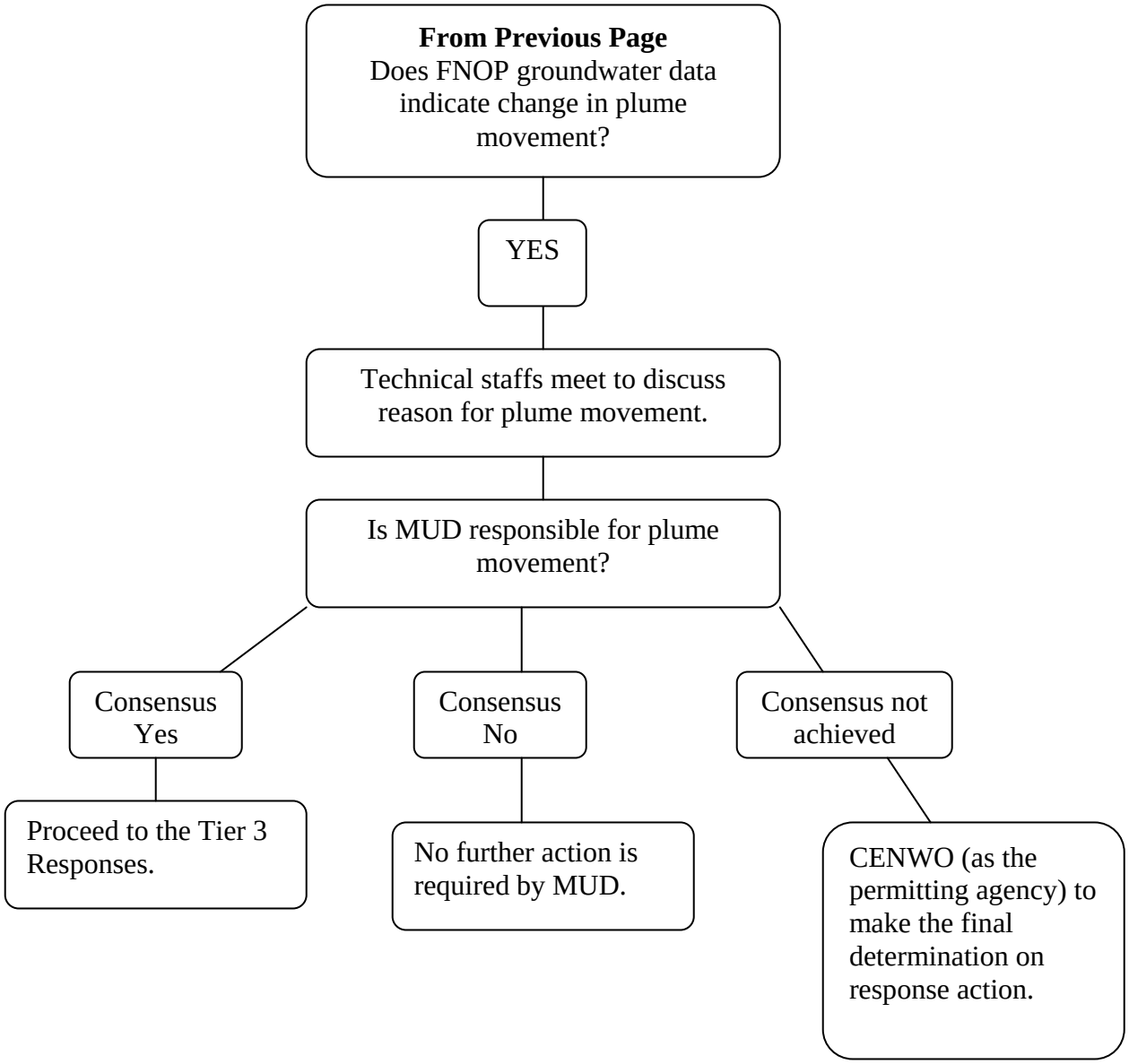
Contingency Plan Flow Chart – Tier 2



Contingency Plan Flow Chart – Tier 3



Contingency Plan Flow Chart – Tier 3 Continued



4.2 CHEMICAL TRIGGERS

MUD will collect groundwater chemistry data from its monitoring network that will supplement the data collected by CENWK. Due to the number of wells and proximity to the contaminant plumes, CENWK's monitoring network is much more capable of detecting changes in the groundwater chemistry near the FNOP site.

CENWK has prepared a detailed list of responses to changes in groundwater chemistry, resulting from loss of hydraulic containment. The list of response actions is presented in the *Final Containment Evaluation Work Plan* (URS, 2006). CENWK has identified the chemical triggers and possible response actions for locations within a one-mile buffer zone of the Baseline NOP Plume distribution.

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