1609-22.1

CONCEPTUAL DRAFT

(For Discussion Purposes Only)

Guidance Manual

For

Preparation of Policy/Process Memo 97-005 Report

I. Introduction

A. Overview of 97-005 process

1. Purpose
2. Desire to use treated water for potable purpose
3. Need to provide public re-assurance for use of an Extremely Impaired source

B. State Water Resource Control Board – Division of Drinking Water (DDW) responsibility to ensure public receives a reliable supply of high quality water

C. Need to establish clarity of 97-005 process

D. Audience for Guidance Manual

1. Applicants
   a. Municipal Water Systems/end distributer of potable water supply
2. PRPs working with Municipal Water Systems
3. DDW staff reviewing 97-005 application submittals

II. History

A. Primary goal of DDW is to provide a reliable supply of safe drinking water.

B. Contaminants (e.g.,Volatile Organic Compounds (VOCs), Perchlorate,N-nitrosodimethylamine (NDMA), Hexavalent Chromium, Arsenic and Selenium) have impacted otherwise reliable groundwater supplies, making them unsuitable for potable use.

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C. Policy Memo 97-005

1. Developed in 1997 to provide guidance to evaluate proposals to use "extremely impaired sources" that have been treated for potable supplies.
2. How to characterize an "Extremely Impaired Source".
   a. An extraction well which is part of an Operable Unit remedy.
   b. Exceeds 10 times aMaximum Contaminant Level (MCL) based on chronic health effects.
   c. Exceeds 10 times aNotification Level (NL) based on chronic health effects.
   d. Exceeds 3 times an MCL based on acute health effects.
   e. Exceeds 3 times an NL based on acute health effects.
   f. Surface water that requires more than 4 log Giardia/or 5 log virus reduction.
   g. Proximity to known contaminating activities.
   h. Contains a mixture of contaminants.
3. Historically applied to extraction wells in the San Gabriel Valley as part of USEPA Operable Unit remedy, but also for other wells (e.g.City of Glendale).

D. Process Memo 97-005

1. Draft dated March 25, 2015; never approved.
2. DDW effort to clarify requirements/components of Policy Memo 97-005.
3. An "Extremely Impaired Source" is still characterized the same

III. Getting Started

A. Determine whether your source may be extremely impaired.

   a. Does it meet any of the criteria in I.C.2 above (also see Process Memo 97-005 Part C). Contact your DDW District Engineer and/or the DDW 97-005 expert

i. Provide a description of the source.

ii. Provide a DWSAP, if available.

iii. Provide water quality data.

iv. Obtain written response from DDW

a) If DDW states 97-005 does not apply, proceed with use of source pursuant to Title 22 guidelines/"DDW water supply permit amendments".

b) If DDW states 97-005 does apply, proceed with 97-005 Report preparation as noted below. Also, obtain written clarification why 97-005 applies.

B. Your source is subject to 97-005, next steps:

1. Conduct a meeting with your DDW Representative.

a. Include your DDW District Engineer.

b. Request DDW staff with prior 97-005 experience participate in meeting to provide guidance.

c. Discuss the provisions of 97-005.(see Section IV below)

d. Discuss DDW expectations.

i. Timeline.

ii. DDW staff review.

iii. Ancillary documents/tasks.

a) CEQA

b) O,M,M Plan

c) Startup Testing

d) NPDES (RWQCB)

e) Permit with County (requires NPDES)

f) Application for Water Supply Permit amendment

g) Preliminary design drawings submitted for DDW review/approval.

2. Considerations when working with DDW staff.
   a. DDW's primary objective is safe, reliable water supply to customers.
      i. Applicant's (PRP's) time and expenses to prepare 97-005 documents is secondary.
      ii. DDW has experienced PRP's which have not been forth coming on past use of chemicals/contaminants at their site; therefore, an exhaustive source water investigation is required.
   b. DDW staff are not technical experts regarding geology, hydrogeology and groundwater modeling.
      i. Provide all assumptions, findings and conclusions clearly in text.
      ii. Make reference to supporting tables, figures, etc. in text.
      iii. Do not obligate DDW staff to search through Appendices to find information.
      iv. Whenever possible, use non-technical terms when describing approach/conclusions.
3. Consider qualifications of the individual/firm preparing the 97-005 Report
   a. Prior 97-005 experience?
   b. Registered Geologist or Professional Engineer? (the report may be required to be stamped by a licensed professional)
   c. Prior experience with computer modelling?
   d. Experience with water quality review?
   e. Experience with treatment technology selection?

C. Following public hearing and DDW evaluation, 97-005 document becomes public document
   1. Remember water system customers may be reviewing the document

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2. Strive to use non-technical terms to describe process followed/conclusions made
3. Acceptance of findings will be enhance through understanding of approach/conclusions

D. Recommended Approach for preparation of 97-005 Report.
1. Submit each section of the 97-005 Report sequentially.
   a. Each section builds on the prior section.
2. Include all assumptions, discussions and conclusions in the text.
   a. Do not obligate DDW staff to generate their own conclusions by reviewing tables, plates, and figures.
3. Refer to relevant tables, plates, tables, and appendices in
4. Use non-technical terms when explaining results/findings in text.
5. Submit 97-005 to DDW.
   a. Request written comments within 4 weeks of submittal to DDW.
      i. Must remember DDW staff must respond to multiple water systems which also may have permitting needs.
      ii. Opportunity for DDW staff review is better during winter than summer.
      iii. While waiting on DDW comments work on ancillary documents to optimize time.
         a) Initiate CEQA
         b) Initiate NPDES application
         c) Initiate DDW water supply permit amendment.

E. Guidance Manual is not intended to be a rigid, prescriptive document;
1. there may be unique circumstance that needs to addressed on a case by case basis

2. Nonetheless, the intent is to follow the process to the extent possible

IV. Components of 97-005 Report

A. Summary of Components

1. Drinking Water Source Assessment and Contaminant Assessment.
2. Full Characterization of Raw Water Quality
3. Drinking Water Source Protection
4. Effective Treatment and Monitoring
5. Human Health Risks Associated with Failure of Proposed Treatment.

B. Drinking Water Source Assessment and Contamination Assessment.

1. Drinking Water Source Assessment.
   a. Need to identify all Potential Contaminating Activities within the capture zone (may be for 5, 10 and 20 years).
   b. Delineate source water capture zone.
      i. Evaluate hydrogeology
         a) Confined/un-confined
         b) Flow direction
            1) Consistent?
            2) Seasonal?
            3) Impacted by groundwater replenishment activity?
            4) Impacted by other production wells?
      ii. Identify extraction rate
         a) Assume consistent production at design capacity.
      iii. Develop/Use Computer model
         a) Model must be documented to be calibrated for groundwater basin.
         b) Provide basin model calibration to DDW.

iv. Use Computer model to create capture zone

a) Hydrology

b) Groundwater flow direction

c) Constant extraction rate

c. Using capture zone, identify all Potential Contamination Activities (PCA) within capture zone.

i. For each PCA, identify associated contaminants

a) Example: Historical dry cleaner; contaminant is PCE.

ii. PCA can be identified by

a) Driving area encompassed by the capture zone.

b) Use of SWRCB's Geo Tracker database.

c) RWQCB site investigations.

d) DTSC investigations.

e) USEPA Operable Unit investigations.

f) Existing monitoring wells.

g) Other.

iii. Identify contaminants

a) Based on identification of PCA's identify associated contaminants.

b) Rely on existing databases to identify contaminants in extraction wells/up-gradient wells.

c) Obtain list of chemicals used at industrial sites (RWQCB often has these lists).

d) Develop map/figure showing location of all contaminant sites in relationship to extraction wells.

2. Contaminant Assessment

a. History of contaminant use at each site

i. Based on travel time has/could contaminants impact the extraction wells.

ii. Identify fate and transport of contaminants.

iii. Ensure all potential contaminants are considered

a) Title 22 (MCLs)

b) Chemicals with NLs

c) Priority pollutants

d) Chemicals included as part of UCMRs

e) Chemicals of Emerging Concern

f) Other

iv. Conduct TIC analysis at existing wells (extraction, production, and monitoring wells) to look for possible unidentified contaminants.

a) 524.2 (VOCs)

b) 8270 (SVOCs)

v. Produce map showing

a) Capture zone for extraction wells

b) Contaminant plumes.

C. Full Characterization of the Raw Water Quality

1. Ultimate goal is to fully characterize groundwater provided to treatment facility.

a. Water quality results must be identical to (or at least consistent with) DDW Title 22 analytical requirements and particularly detection levels

i. Confirm DDW Title 22 analytical methods are used (this may not be the case for water quality results collected pursuant to CERCLA or other regulatory requirements)

a) Detection levels (e.g. typically 0.5 ug/L for VOCs)

b) Analytical methods

c) Important to note – water quality data collected from other data sources may not be valid to use for 97-005 purposes; well groundwater quality may need to be re-analyzed or possibly not included in data set

b. Ensure there will be Best Available Treatment technology to address all contaminants.

   i. Contaminants must be treated to DDW ND levels.

   ii. Possible exception includes Nitrate and TDS.

2. Provide clarification of water quality data collected

   a. Extraction wells – Wells that are located in such a manner as to optimize removal of contaminants from the aquifer

   b. Production wells – Existing wells whose location, depth, and perforated zones makes them suitable for inclusion as pumping wells to remove contaminants from the aquifer without having to construct a new well

   c. Monitoring wells – Existing/new wells which are perforated over discretedepths and are used exclusively to collect water quality (and groundwater level) data to characterize the groundwater aquifer

3. Need to recognize/differentiate between naturally occurring (background) water quality concentrations and concentrations that have been impacted by industrial activities (although they may be below regulatory levels) e.g. hexavalent chromium concentrations

4. Need to clearly identify all contaminants that do or may appear in extraction wells.

5. Need to determine whether there may be variability of contaminants

a. Over time
b. Seasonal.
c. Need to adequately design treatment facility

6. Tabulate contaminants expected to occur in extraction wells and range of concentrations.
   a. Conduct statistical analysis to determine design concentration.
7. Based on full characterization, design appropriate treatment facilities.
   a. Design/selection of treatment facilities needs to consider contaminant concentrations and variety of contaminants that require differing treatment technologies
      i. Order of treatment processes
      ii. Minimize need to re-boost partially treated water; minimize complexity
      iii. Need for pH (or other) adjustment to water chemistry as a result of treatment processes
   b. Provide design drawings to DDW for review and approval.
   c. Design of all on-site improvements.
   d. RWQCB/SWRCB
      i. Request copies of remedial investigations within service area.
      ii. Regularly review GeoTracker

D. Drinking Water Source Protection

1. Drinking Water Systems have no regulatory authority to prevent or order groundwater cleanup, but can become more aware of activities that may impact their sources.
2. Coordination with Regulatory Agencies
   a. USEPA
      i. Participate in Operable Unit meetings/planning.
      ii. Attend public meetings.

iii. Review website for activities.

b. DTSC

i. Attend public meetings

ii. Review website

c. RWQCB/SWRCB

i. Request copies of remedial investigations within service area.

ii. Regularly review GeoTracker.

d. Groundwater Basin Management Agencies

i. Attend Board meeting.

ii. Review agendas for action on water quality treatment, water quality trends, etc.

e. Review NPDES permits for discharges within water system service area.

3. Water System Source Protection Programs

a. Review RWQCB site investigations.

b. Review groundwater basin management agencies activities.

c. Review City Council agendas.

d. Attend RWQCB meetings regarding activities with service area.

e. Training for field Personnel

i. Recognize PCAs.

f. Cross Connection Control Training.

g. Participate in local water associations and workshops.

4. Identify any source water/hot-spot treatment

a. Often treated and discharged by PRPs.

b. Often not included as part of potable water supply.

E. Effective Treatment and Monitoring

1. Detailed Description of Treatment Technology.

a. Rational for selection.

i. Best Available Treatment Technology.

ii. Identification of Contaminant.

iii. Design Concentration.

iv. Demonstrate contaminants will be treated to ND

b. Rational for order of operation if multiple treatment technologies.

c. Need to include process diagram.

i. Show all facilities.

ii. Show water quality sampling points.

d. Demonstrate there are multiple treatment barriers, as a safety factor.

i. Lead/lag configuration for vessels

a) LGAC

b) Resin

ii. Other treatment technologies which provide incidental treatment.

a) UV intended for NDMA but can remove some VOCs.

b) LGAC intended for 1,2,3-TCP but can remove VOCs.

iii. Blending prior to entry point to distribution system.

2. Performance Standards of Treatment

a. Identify design concentrations.

b. Clearly note all contaminants (other than TDS/Nitrate) will be removed to ND.

c. Develop startup water quality test plan (see Section IV.E, below) to demonstrate treatment facilities are operating correctly.

3. Prepare an Operations, Maintenance, and Monitoring Plan for the extraction wells and treatment facility. (see Section V.C. below).

a. Identify all sampling ports.

i. Extraction Wells.

ii. Inflow to each treatment facility component.

iii. Inter-storage (for example).

a) 50% port at LGAC or resin vessels

b) In between lead/lag vessels.

iv. Effluent from each treatment facility component.

v. Inflow to reservoir.

vi. Discharge to distribution system.

b. Reliability Features

i. Dual treatment barriers.

ii. Blending.

iii. Alarms

iv. SCADA/automated controls

v. Nitrate (or other) analyzers; programmed through SCADA.

vi. Up-gradient (early warning) monitoring

a) Wells located up-gradient of extraction wells.

1) Show capture zone

2) Demonstrate travel time from potential monitoring well to extraction well

vii. Prepare response plan in event of failure to be treatment objections.

a) Notification

1) DDW

2) Elected officials.

3) Customers

viii. Compliance Monitoring and Reporting

a) Title 22 Sampling.

b) Monthly Sampling at raw water sources.

c) Weekly monitoring at treated water locations.

1) Partially treated water after each treatment process.

2) Fully treated water to distribution system.

d) Annual TICs (raw/treated).

e) Up-gradient monitoring.

ix. Notification Plan

a) Notification names/contacts in anticipation of potential treatment facility issue/failure.

x. Water Quality Surveillance Plan

a) Up-gradient Monitoring

xi. DDW Evaluation of Monitoring and Treatment

a) DDW is looking to have the treated water to be reduced to an "MCL equivalent" of 1 or less; preferably 0.

b) Historically referred to as Hazard Index.

c) Sum of contaminants in treated water, divided by each contaminants MCL (or NL) needs to equal less than 1.

d) DDW has some subjectivity when evaluating.

1) If Hexavalent Chromium and/or Arsenic can be demonstrated to be naturally occurring (and not from an industrial source) there may be same allowance provided.

e) Contaminants should be treated to below DLRs (i.e., ND)

F. Human Health Risks Associated with Failure of Proposed Treatment

1. Evaluation of Risk of Failure

a. Develop fault tree.

i. Create diagram of each component of the treatment process.

ii. Presume an error/fault has occurred.

iii. Progress forward until a solution is found.

iv. Detailed thought process to diagnose problems.

b. Most conservative approach is to assume all treatment processes fail simultaneously.

2. Health Risk Evaluation

a. Assume failure occurs once every 10-years over 20-year period.

i. 20-years is place holder for life of project.

b. Include all contaminants of concern being treated.

i. Population is exposed to <u>all</u> contaminants simultaneously.

ii. Assume exposure for 24-hours (24-hour turnaround for treated water).

iii. Assume two risk scenarios of contaminants of concern.

a) Current concentrations.

b) Design concentrations.

c. For each scenario address:

i. Cancer risks

ii. Non-cancer risks

d. Provide calculations; discuss findings

V. Ancillary Documents to 97-005 Report

A. Completion of CEQA

B. Submittal of Water Supply Permit Amendment Application

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1. Describe proposed changes to distribution system to accomplish use of an extremely impaired source.
    a. New/modified wells
    b. Treatment facilities.
2. Include supplemental information.
    a. 97-005 Report
    b. Design drawings
    c. Water quality

C. Preparation of Operation, Maintenance and Monitoring (O,M, & M) Plan. (refer to Section III.E.3, above).

1. Description of Treatment Facility
    a. Extraction wells
    b. Treatment systems
    c. Disinfection
    d. Controls.
2. System Operating Procedures and
    a. Details of how each component of treatment system operates.
    b. Design features.
    c. Operating scenarios.
    d. Descriptions of PLC or other sensors.
    e. Pre-startup procedures.
    f. Startup procedures.
    g. Normal/typical operation.
    h. Alarms
    i. Maintenance
    j. Shut-down Procedures
        i. Emergency
        ii. Short-term
        iii. Long-term
    k. Replacement procedures

i. LGAC
ii. Resin
iii. UV lamps
iv. Other

l. List of DDW approved operators.
m. List of technical assistance/vendors.

3. Water Quality Monitoring and Testing
   a. DDW
      i. Early warning wells.
      ii. Extraction wells.
      iii. Treatment Facility.
      iv. Discharge to distribution.
      v. Analytical methods.
      vi. Sampling techniques.
   b. Other (LACSD for example).
   c. Monthly water quality reports to DDW.
4. Safety Plan and Procedures
   a. Describe Safety Procedure for each component of treatment process.
      i. LGAC vessels
      ii. Resin vessels
      iii. UV
      iv. Other
5. Reporting and Records
   a. Operations
      i. Provide standardized form.
   b. Maintenance
      i. Provide standardized forms.
   c. Consider the potential for unintended waste residue (e.g. radioactivity accumulation on media)
      i. Proper waste handling/disposal/documentation

6. Following issuance of a DDW amended water supply permit, **any** modification to the treatment facility and ancillary components must include prior submittal of aa application to DDW and subsequent issuance of a new DDW amended water supply permit

7. The municipal water system may submit a request to DDW at any time to modify the DDW amended water supply permit conditions based on updated water quality results. DDW staff may consider the data and merits of the request before determining whether a permit condition(s) should be modified

D. Treated Water Discharge Permits

1. DDW may not allow treated water to be provided to water system distribution system until after public hearing and permit is issued.
   a. Typically the treatment facility discharge rate is at such a flow that it does not easily lend itself to onsite reuse, discharge to a sewer, discharge to purple pipe, etc. Consequently, there may be a need for adischarge permit from RWQCB (and County or others).
   b. Need to be aware discharge limitations may be more restrictive than DDW Title 22.

2. RWQCB
   a. NPDES
      i. Allow 2 to 3 months to obtain permit following submittal of application.
      ii. Application fees
      iii. Review discharge limitations to confirm ability to comply.

3. County
   a. May require separate permit.
   b. May require application to include an NPDES permit.
   c. Application fee.

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4. City/Local jurisdiction.
    a. May have MS4 requirements.
    b. May have separate fee.
5. All permits must be in place prior to commencing DDW startup/compliance testing of treatment facility.

E. Treatment Facility Compliance/Startup Testing Plan for DDW
1. Describe Treatment facility
2. Identify all sampling points
3. Conduct water quality sampling at each stage of treatment facility to demonstrate full/complete operation.
    a. Well (raw water)
    b. Discharge from each treatment component.
        i. LGAC
        ii. Ion Exchange
        iii. UV
        iv. Nitrate
        v. R.O.
        vi. Other
    c. Discharge of fully treated water.
        i. For DDW
        ii. For RWQCB
    d. Conduct at multiple times per day initially.
    e. Conduct daily.
    f. Conduct weekly if extended startup testing.
4. Report results to DDW.
    a. Tabular summary
    b. Brief text summary
    c. Identify areas of non-compliance, if any.
        i. Corrective actions.

F. NPDES (Discharge) Reports

VI. DDW Review

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A. 97-005 Report

1. DDW staff have already reviewed/approved each section.
2. Final draft report to be placed into 3-ring binder with all appendix, tables, plates, figures.

B. Startup Testing has been completed.

1. All results provided to DDW for review/approval.
2. All results are acceptable.

C. CEQA

1. Has been completed.
2. Approved by lead agency.
3. Notice of Determination filed.

D. Application for Amended Water Supply Permit submitted to DDW.

E. All plans/design drawings submitted/approved by DDW.

F. DDW makes determination on 97-005 process.

1. All acceptable, no public hearing needed.
2. All acceptable, public hearing required.
3. Submittals unacceptable/incomplete.

VII. Public Hearing

A. Based on DDW staff review Public Hearing may be scheduled.

1. All documents need to be in 3-ring binders.
2. Placed at locations for public inspection.
   a. Water company.
   b. Public library.
   c. DDW
3. Notice of Public Hearing Posted
   a. Newspaper
   b. Water Company

B. Public Hearing presentations

1. Coordination
   a. DDW
   b. Regulatory Agencies

c. Water Company

d. Basin Management Agency

2. Rehearsals

C. Public Hearing

1. Opportunity for written oral comments.

2. No need to respond at hearing, but must have record of comments/responses afterwards.

VIII. DDW Evaluation

A. Review of all documents.

B. Public response.

C. Health risks

D. Treatment facility safety features.

E. DDW decision

1. Approval

2. Denial

IX. Case Studies

A. Provide brief summary of 2 to 3 prior 97-005 projects which were permitted

1. Actions that made the process smooth

2. Areas that could be improved upon

3. Areas that caused delay

4. What "went right", what "went wrong"

5. Important to recognize compounds such as TDS/Nitrate may not be Chemicals of Concern regarding remediation, but may need to be to be addressed before water can be served for potable purposes.

a. Municipal water supplier and PRPs will need to address in advance/during 97-005 process; not wait till permit is about to be issued

6. Summary of historical 97-005 permits

X. Reconsideration of 97-005 process

A. 97-005 process is used to
    1. Satisfactorily identify all potential contaminants requiring treatment
    2. Identify treatment facilities
    3. Demonstrate contaminants can be safely and reliably treated for potable use
B. Not aware of 97-005 process being re-opened
C. Potential justification to re-open 97-005
    1. New contaminant that cannot be treated with existing facilities
    2. New highly impair source (but not a new well producing from the same aquifer) is added to treatment facility
    3. New MCL
D. An OM&M plan is often required for treatment facilities, not only treatment facilities subject to 97-005. A revision to an OM&M plan would not be deemed a revision of the 97-005 process

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