



UIC Guidance

Minimum Information Required Operation and Maintenance Manual For Geothermal Projects

The minimum information required in all operation and maintenance manuals for facilities permitted by the Underground Injection Control Program is listed below. The extent of the information will vary for different manuals depending upon the complexity of the water use and treatment process. Larger projects may have separate documents for some of the requirements herein. For those projects it is acceptable to only refer to the separate document/manuals and indicate where it is located.

1. The original copy of this O&M Manual shall be maintained at the project site office. It is recommended a second copy of the O&M Manual be maintained at the central office.
2. All employees at the project site shall be made aware of the manual, and its contents.
3. Each section shall contain safety procedures where necessary.
4. The O&M Manual shall be placed in a binder or similar holder, and organized by the following chapters:
 - A. **Table of Content** – A table of contents with page numbers and lists of all graphs and figures.
 - B. **Introduction** –
 - 1) Describe the purpose of the manual and how to use it.
 - 2) Provide a brief description of the facility, water discharges, and injection wells and summarize emergency procedures.
 - 3) Establish the operator's responsibility, and responsibilities of others.
 - C. **Description of Facility** –
 - 1) Provide a brief, basic description of the facility.
 - 2) Discuss the type of power plant – flash, binary, combined, etc.
If binary, indicate the type of binary product used, capacity of tanks, CAPP permit number, if necessary.
 - 3) Provide a general diagram of the power plant system operations
 - 4) Topographic map showing production, injection and observation well site locations, plant location, all constructed surface basins.
 - 5) Provide details surface basin construction. For each basin, indicate any specific construction details (e.g. lined or unlined, free board dimensions, capacity, etc.)

D. General Project Water Flow Operations –

- 1) Topographic map showing production, injection and observation well locations, all pipelines from production wells to plant, and from plant to injection wells, include injection pump and valve locations.
- 2) Description of production wells and production systems
Include details on separators, in-well pumps, etc. that are used
- 3) Describe injection wells and injection system
Include injection pump info: make, model, size, maximum rate and pressure.
- 4) Discuss metering and monitoring systems for:
 - a. Flow rates from each production well and to each injection well,
 - b. Temperatures at production wells, and injection wells
 - c. Pressures at injection wellhead.
 - d. Indicate location of each gauge.
 - e. Describe how readings are taken, where and by whom.
 - f. Indicate procedure and timing of calibrating all gauges.
 - g. Indicate all record keeping procedures (electronic and manual) for monitoring data.
- 5) Provide an inspection schedule for water control and reporting item.

E. Water Discharges –

- 1) Basic description of other water discharges
 - a. Cooling tower discharge(s)
 - b. Well site basin discharges
 - c. Plant site basin discharges
 - d. Sanitary Septic systems
 - e. Stormwater discharge paths and facilities (retention basin, etc.)
 - f. Maintenance shop floor drains
- 2) Discuss all the discharge permit requirements which must be satisfied along with a program to satisfy all the requirements.
 - a. Table 1 from the UIC permit should be included here.
 - b. Indicate reporting requirements from the permit – those for one-day reporting, five-day reporting.
- 3) A copy of the discharge permit should be included in the appendix.

F. Quality Assurance Monitoring Plan –

- 1) Discuss all monitoring and sampling that is required by the UIC discharge permit, the schedule and where to file the report.
- 2) Indicate what position or consultant is responsible for 1) sampling and 2) reporting.
- 3) Provide the procedure for sampling water discharges, procedure shall include:
 - a. Who will sample
 - b. What materials are needed for sampling
 - c. Explain how to collect samples and to preserve them, if necessary
 - d. What constituents need to be sampled
 - e. Discuss procedure for sampling, including shipping requirements, temperature

requirements, and holding times (Note: samples for metals shall not be filtered in the field)

- f. Where to send the samples – what laboratory is used? (Note: lab must be NV certified for the constituents being sampled)
 - g. Indicate what forms are needed, e.g. chain of custody, field sample forms...
 - h. Provide a sample of a record keeping log sheet with a description of how to complete the record.
- 4) Discuss UIC reporting requirements
 - a. Routing reporting
 - (1) When report is due
 - (2) Report format
 - (3) Where to send report
 - b. Special circumstance reporting
 - (1) Need to report and explain exceedances
 - 5) Discuss the significance of various parameters being monitored.
 - 6) Establish manpower requirements and qualifications

G. Chemicals Onsite Usage –

- 1) List all chemicals on the property, indicate which chemicals come in contact with water from wells and in cooling tower
- 2) List the amounts typically stored on-site, concentrations of stored chemicals,
- 3) List suppliers name with telephone numbers/addresses.
- 4) Include the proper handling procedures, description of use, hazards and how to provide proper controls.

H. Operation and Maintenance –

- 1) Provide routine inspection schedule(s) and a sample of the record keeping log sheet with a description of how to complete the record.
- 2) Discuss maintenance procedures on pipelines, injection pumps and well control devices and valves. Well valves should be worked frequently enough to prevent freeze-up.
- 3) Indicate if maintenance report is generated and where this report is maintained and by whom.
- 4) Indicate any standard plant shutdowns and schedule. For plant shutdown and maintenance, discuss procedure for shutting in and starting up production wells, include info on where and how much water will be discharged
- 5) Discuss common operating problems (water leaks, oil leaks, etc.), how to recognize them, how to avoid them and what to do when they occur.

I. Emergency –

- 1) Discuss how emergencies will be handled and who is responsible.
- 2) Discuss how well leaks or blowouts shall be handled; who will handle each task.
- 3) Provide spill reporting information including local, state and federal agencies that are required to be contacted. NDEP spill hotline is 888-331-6337 or 775-687-9485.
- 4) Provide 24 hour telephone numbers for the notification of all appropriate health,

- safety and/or regulatory agencies.
- 5) List with telephone numbers emergency sources of assistance.

J. **Appendix** –

- 1) Include all appropriate items that have not been included elsewhere. This would be items like:
- a. Signed copy of UIC permit
 - b. Copies of NDEP chemical use approval letters
 - c. Signed copy of all other water discharge permits
 - d. Sample Injection/Discharge Monitoring Report
 - e. Sample operation and maintenance reports
 - f. Copies of MSDS sheets for all chemicals used at site
 - g. List of References
 - h. Superintendents letter of approval of the manual

As a general comment, the manual must be written in easily understandable English. It should be written in a positive manner and emphasis the benefit to the community from well operated and maintained facilities.

For large scale projects, a draft manual must be available prior to facility start-up. The final manual must be available within six months of startup.