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HEWISEDAWI ILLMAWI ITSATAWI KOSEALEKTE HAMMAWI

VIA ELECTRONIC MAIL and U.S. MAIL

September 8, 2006

Mr. James C. Pedri, Assistant Executive Officer
Attention: Mr. Jim Rohrbach
Central Valley Regional Water Quality Control Board
415 Knollcrest Drive, Suite 100
Redding, California 96002

Re: Revised Tentative Waste Discharge Requirements (WDR) for Calpine Siskiyou Geothermal Partners, L.P., and CPN Telephone Flat, Inc., and the U.S. Department of Agriculture, Forest Service and U.S. Department of Interior, Bureau of Land Management Glass Mountain Exploration and Development Projects, Siskiyou County, for the September 2006 Water Board hearing.

Dear Mr. Pedri, Mr. Rohrbach, and Members of the Board:

The Pit River Tribe, as a Designated Party to these proceedings, submits the following comments in response to your August 8, 2006 Notices of Pulbic Hearing and Revised Tentative Waste Discharge Requirements (WDRs).

As you know, the Tribe's interest in this issue involves its ancient and continuing association with the Sacred Medicine Lake Highlands as an area of highest spiritual and cultural significance. This is recognized in a Memorandum of Agreement (MOA) with the Forest Service, BLM, the State Historic Preservation Officer, and Advisory Council on Historic Preservation, in which the Tribe is a Signatory Party. It is also acknowledged by the National Register of Historic Places, which in 1999 designated the 32 square mile Medicine Lake Caldera as a Traditional Cultural District, based on at least 10,000 years of cultural uses by the Tribe. For more than five years, the Tribes have been working on a Cultural Management Plan with the other MOA signatories, in order to define and safeguard the pristine natural qualities that contribute to the area's cultural significance, so as to assure the continuance of Native American cultural heritage.

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We recall to mind what we have expressed many times before: that the pristine purity of the Medicine Lake Highlands' waters are essential to their beneficial cultural uses because of their spiritual and healing properties. Both the waters above and those beneath the ground, are essential, not only to our continuing cultural heritage, but also to the health of the land and its creatures, as well as the health of human beings who benefit from these pure waters all the way down California's valleys.

The Notice of Public Hearing inexplicably narrows the aspects of the WDRs that are presently open for comment, even though Members of the Water Board expressed far-reaching concerns at the May 2006 hearing. The transcripts of the hearing show the Board's concerns not to be limited to the four changes made to the WDRs, but questioned Calpine's multiple projects and wells and the profound implications that these could have on the pure and pristine waters of the Medicine Lake Highlands aquifer and the Fall River Springs that flow from them into the State's water system.

Limiting comments to these four changes implies that the huge problems that were revealed at the May hearing can be resolved through these changes. But it is unreasonable to think that the use of steel tanks, financial assurances, placement of monitoring wells, and elimination of underground pipes could begin to solve the potentially enormous impacts to this culturally and ecologically fragile, mostly uncharted landscape.

We wish to raise two points in particular that have stood out in the four intervening months since the May hearing.

I. Geothermal Development is now premised on different conditions than those portrayed in the EIS/EIR, and these conditions have not been studied in a Supplemental EIR.

Circumstances have changed since the EIS/EIR for the Fourmile Hill, Telephone Flat projects, and the EA/IS for the exploration projects. There is increased pressure on Calpine to show a commercially viable resource for these geothermal projects, not only because their bankrupt status pushes them to get a financial return from the projects. There are also pressures relating to maintaining or obtaining a power purchase agreement (PPA). Calpine has not met Bonneville Power Administration's standards for their Fourmile Hill agreement, which is currently on hold until at least 2009. And Bonneville has shown no interest in Telephone Flat, for the same reason: Calpine has not proven commercial viability of these projects.

Through the new WDRs, which are designed to replace the obsolete 1995 WDRs that may have expired, Calpine introduces a radically intensified technology designed to prove commercially viable quantities of the resource *at all cost* regardless of environmental consequences, which they are not revealing, as evidenced by their withholding relevant information from Dr. Curry who offered to review the monitoring plan with Calpine.

By introducing *intensive* and sophisticated EGS technology, which the Department of Energy openly admits is highly experimental, Calpine is changing their goal from the originally intended exploitation of the naturally occurring geothermal reservoir, to artificial and intensive stimulation of the reservoir through the potential acidization of dozens of wells within and in the vicinity of the Medicine Lake Caldera. We are learning that EGS can cover a broad range from simple acidization to intensive hydrofracturing and chemically altering the field, and Calpine has taken the direction of intensifying in these WDRs.

The point is that this EGS technology has not been studied for its potential effects on the very specific and unique configuration of the Medicine Lake Highlands, its aquifer, its system of fractures, its permeability….considerations of responsibly and accountability to the Tribe and to the public. Instead Calpine is doing it furtively by making it sound that this is what has been in the plans all along and not a big deal. But the mode of the *intensively* acidizing technology is *not* in the environmental documents, a technology that would potentially need to be applied to deep wells in unmapped regions again and again to maintain the level of production that they and their predecessors have not been able to find thus far in the last fifteen years by standard methods.

This significant change of conditions in how the geothermal resource is now intended to be developed by Calpine poses grave considerations that have to do with the Water Board's strong mandate to prevent degradation of surface and groundwaters. The law is clear: 30 USC Chapter 23, Section 1021 states: "Nothing in this chapter shall constitute an express or implied claim or denial on the part of the Federal Government as to its exemption from State water laws." Equally important is the clear mandate of the Porter-Cologne Act for positive protection.

II. The other large point is to have a broad look at the baseline data and monitoring needed to adequately assess the radical new direction that Calpine's projects are taking.

This second point of the extent of monitoring that is needed is also minimized by limiting comments to the four changes in the Revised WDRs.

The current monitoring plan is based on little or no description of the hydrogeologic systems, and the placement of monitoring devices seems to favor the convenience of the operator rather than the protection of key features, such as Paynes Springs and Creek, Medicine Lake and the other lakes in the Caldera, as well as the Fall River Springs.

The possible scope of a study leading to adequate baseline data is exemplified in the Arbuckle-Simpson Aquifer Study, which was initiated by the Oklahoma Water Resource Board. That Board determined that more information was needed to properly manage and protect the region's water resources. This is a comprehensive multi-year study of surface and groundwater relationships, in order to protect a major drinking water source similar to the situation in the Medicine Lake Highlands. A description is found at:
www.owrb.state.ok.us/studies/groundwater/arbuckle_simpson/arbuckle_study.php

In light of the increased needs for water as the 21st century moves further into global warming and the disappearance of glaciers, growing reliance on water resources if Medicine Lake aquifer and the Fall River Springs are predictable. These water resources must be protected through adequate planning and study, through adequate baseline data and a monitoring plan designed with the knowledge of this specific hydrogeologic system.

We have spoken with Bob Gaddis of Future Resources Engineering, LLC, who has a long experience in geothermal and related fields. We attach his recommendations regarding Hydrology & Hydrogeology as Appendix I to these comments.

III. Conclusion: the four changes in the WDRs cannot be adequately considered without addressing the two basic points that are lacking in the process.

The Pit River Tribe holds the position that these two fundamental points – the radically different conditions that have not been studied in any environmental documents and thus require a supplemental EIR, and the need for a much broader baseline study and monitoring plan than have thus far been presented – these two requirements need to be addressed so that the four changes in the WDRs can be placed in a context that is meaningful for the protection of the sacred high quality waters of the Medicine Lake Highlands.

The four staff changes in the WDRs fall into those two points, but these four changes are not of themselves adequate to address the serious problems with what would be permitted in the WDRs. Two of the four changes—the use of steel tanks for containment of acidified geothermal fluids resulting from EGS, and the elimination of possible use of underground piping to transport geothermal fluid

from wells to sumps—have never been analyzed in an EIS/EIR, or other environmental document in order to evaluate (with regard to use of the tanks) the corrosive influence of the acids, integrity testing, leak detection and similar considerations that could affect water quality. The underground pipeline has been removed from the Revised WDRs, presumably because it has never been analyzed in an environmental document.

In order for the financial assurances to be meaningful, the baseline aquifer study recommended above would need to be correlated with a realistic evaluation of common geothermal risks such as deep leakages, accidental releases, spills and blowouts, which have not been disclosed with regard to the specific land and water formations that comprise the Medicine Lake Highlands. Adequate baseline data is also pertinent to the placement of the monitoring wells, which cannot be limited simply to the project area.

Even though the Tribe has many problems with the impacts on the Medicine Lake Highlands from *any* geothermal development because of its industrializing effect and its profound contradiction with the qualities that make the area a cultural one of the highest significance, it has become clear to us that what is relevant to the WDR process at this stage is the major departure from the original project, the lack of environmental review of this departure, and the abysmal poverty of baseline information about the land and water formations.

In conclusion, the Pit River Tribe urges the Central Valley Water Board to require a responsible and accountable process, as any effects to water in the Medicine Lake Highlands are unacceptable in this highly sacred area. We deeply hope that these comments, as well as those of our attorney, Deborah Sivas, and our consultant, Dr. Robert Curry, will assist the Water Board to fulfill its mandate to protect the waters of California.

Sincerely,

Gene Preston
Pit River Tribal Council

Michelle Berditschevsky
Environmental Coordinator

Cc: Deborah Sivas, Esq.
Dr. Robert Curry
Mount Shasta Bioregional Ecology Center

APPENDIX

HYDROLOGY & HYDROGEOLOGY MONITORING

by Bob Gaddis[1]

Regarding the latest proposed Hydrology Monitoring Plan (GMEC, 2006) the following comments apply.

Distinction should be made between Calpine's project-specific environmental hydrologic monitoring system and the regional resource hydrologic monitor being done by the USGS. The current monitoring plan doesn't distinguish this very well and suggests little responsibility to inform the public of monitoring results other than through an annual means. While benefits accrue from both

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[1] Author Background

Bob Gaddis is currently President of Future Resources Engineering, LLC, Bartlesville, OK. He is former Chief Hydrogeochemical/Civil Engineer, Corporate Engineering, Phillips Petroleum Company (now ConocoPhillips) and a retired Lieutenant Colonel, U.S. Army Corps of Engineers. He holds Bachelor of Science degrees in Geological Engineering and Chemistry, University of Alaska, Fairbanks and a Master's of Science interdisciplinary degree from the Institute of Water Resources, in Civil Engineering from the University of Alaska, Fairbanks, AK. He is a licensed Professional Engineer in Oklahoma and licensed Professional Geologist in Wyoming. He is a Certified HAZWOPER operator and Supervisor and an ASTM-certified Environmental Professional – Phase 1 & II Property Assessments and National Dam Safety Program Inspector. He was hydrologist & reservoir engineer for the former Phillips Roosevelt Hot Springs Geothermal Operation in Utah. He also conducted exploration of the Medicine Lake Highlands area in the early 1980's.

He has more than 32-years of progressive and diversified experience in civil engineering and environmental project management, design & construction, and water resources management in public and private organizations. Specialized knowledge areas span the entire spectrum of water resources engineering from solving supply, quality, contamination / wastewater problems for urban and energy development projects / programs, resolving floodplain & lake development issues to national water resources planning and development. He has extensive experience in environmental assessments & monitoring operations for major energy projects. He has national emergency management operational experience in natural/man-made disasters as well as solving infrastructure security/safety issues. Reputation for reliably innovative results and ethical leadership while maintaining highest standards of quality and productivity for minimal costs. He is a proven expert problem solver in many different geographic, socioeconomic, industrial, and government settings (International, national or federal, state, tribal and local) under varying diplomatic, legal, and policy conditions. Interdisciplinary and diverse team-oriented leadership with proficiency in using computerized modeling, statistical or risk-based evaluations (RBE), project management and GPS/GIS decision tools. Extensive technical advisory experience with legal and planning issues concerning environmental/water resource/ energy project impact & RBE assessments of operating or planned facilities or projects. Superfund sites, orphan, abandoned and closed facilities (CERCLA & FUDS) environmental experience (DOD and private).

He is a member or life member of more than twenty-four technical or professional associations. Partial listing includes: the American Society of Civil Engineers (Environmental & Water Resources Institutes, Structural and Geo Institutes), American Geophysical Union, ASDSO, American Water Work Association, American Water Resources Association, National Society of Professional Engineers, National Ground Water Association, American Chemical Society (Petroleum, Environmental and Geochemistry Divisions), American Statistical Association, National Fire Protection Association, American Society of Photogrammetry & Remote Sensing, American Society of Testing and Materials, International Society of Industrial Ecology, International Association of Hydrogeologists, International GPS Association, International Water Resources Association, WEF, and the New York Academy of Sciences.

activities, it is Calpine's responsibility and accountability requirement to ensure their projects are monitored in such a fashion that results are independent and not reliant on USGS efforts. Further there is little proprietary about such monitoring efforts. The claim made that certain data is proprietary is specious and does not serve public disclosure and right-to-know legal tests.

This having been said, it is necessary to explain the monitoring system design criteria. The current monitoring plan is proposed based on little or no description of the hydrogeologic systems being evaluated as part of the monitoring and no pathway evaluation from key operational features to natural water or other features in need of protection.

The successful implementation of an effective environmental hydrology monitoring system is dependent upon a number of technical factors. For example, monitoring wells must be properly located based on revealed factual hydrogeologic concepts of zones being monitored, constructed of appropriate materials, and properly installed. Similarly, samples must be carefully obtained, properly analyzed, and the data clearly reported and interpreted.

These factors collectively represent the criteria which must be considered in the design of a comprehensive and effective monitoring system which has come to be called proper monitoring practice (*Chapter 8, Ground-Water Monitoring System Design, pp. 517-572 by Martin N. Sara* in Nielsen, 2006). The design criteria identified and utilized in the development of a ground-water monitoring plan are outlined as follows:

(1) Monitoring Network Design Criteria –Recommended locations and specifications for monitoring wells and surface water sampling stations based upon an analysis of potential migration pathways.
(2) Sampling Protocol – Sampling instrumentation and approved methodologies, sampling frequency, sample storage and preservation requirements, and chain-of-custody procedures.
(3) Analytical Protocol – Parameter selection, approved field and laboratory methods, and quality assurance or quality control procedures.
(4) Data Management Criteria –Recommended procedures for data statistical analyses and data reporting.

These elements have only been partially fulfilled by the present hydrology monitoring plan. Noticeably absent is any discussion of the hydrogeologic systems being monitored other than in a "shallow," "intermediate," and "deep" context. The current hydrogeologic monitoring system must take into consideration both horizontal and vertical flow components as well as equal-density and saline density fluids. There is no where specified[2] either in the monitoring plan or support information (EIS/EIR) or USGS publications supporting the plan, the nature of the hydrogeologic units – whether water table or confined conditions, confining units and corresponding boundary conditions defining each system, nor the association of each vertical system to the other, nor the potential pathways contamination could occur from each of the proposed facility or operational features described in Section 1.0 of the plan (production wells, injection wells, steam power plant, cooling tower, and emission control system for each project and I would add – steam-water pipeline conveyance system to and from all wells for each project).

This is a proforma plan with vague and incomplete contents. Any evaluation of this plan based on mere well positioning alone is misinformed. Section 1.1 hydrology controls (GMEC, 2006, items 1-4 in monitoring plan, p. 3; and first paragraph after numbered items) are meaningless since they have not been used to design the monitoring system. No

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[2] Other than water table condition depth at 600-800 ft at Fourmile Hill in Section 3.1, 3rd paragraph.

permeabilities or hydraulic conductivities, storage properties, potentiometry of each system, flow directions keyed to each operational facility feature are discussed anywhere and the resulting monitoring system components reflect a mere minimization of effort and convenience of placement almost totally unrelated to the target features needing monitoring protection.

Section 2.0 of the plan (GMEC, 2006, p. 4) recount potential for hydrologic and water quality impacts during different phases of the operation. In general, how are these items being protected by the monitoring proposed? How is the monitoring protective of the surface lease USFS restrictions imposed on water resources (use and quality impacts) for leases in the SW portion of the Telephone Flat Project area? The following questions relate to the number items in Section 2.0:

1) Re: Drilling of geothermal wells and groundwater use in the Arnica sink area – How are groundwater withdrawal impacts and quality impacts being monitored to detect adverse circumstances? What is considered a negative impact from a quality and quantity perspective?
2) Re: Plant operation impacts – How will adverse water quality impacts from spilled geothermal or poor water quality sources be detected with the positioning of the current array of monitoring wells for the shallow and intermediate groundwater systems? How will local recharge conditions be impacted and diffuse distribution of minor spills over time be detected by the proposed monitoring network for either vertical or horizontal flow components in either the shallow or intermediate ground water zones? What constitutes a negative impact and what proactive steps will be taken to prevent rather than just monitor adverse conditions?
3) Wellbore leaking due to corrosion, weld or connector breaks due to formation stresses and strains over time, or other operational mishaps can occur at any depth. How does the proposed monitoring plan serve to detect these types of source-contaminants contributing to ground water quality and quantity impacts in shallow, intermediate and deep zones adjacent to the adverse well or wells? There are too few monitoring wells, not located correctly which do not meet this purpose in the current plan and as a result most of these types of impacts will go undetected.
4) Injector well leakage – There are too few, if any, proposed monitoring wells related to injectors. How are the proposed monitoring wells in the shallow and intermediate groundwater zones able to detect these types of leaks? A minimum of three wells is needed to properly get some idea as to flow direction and magnitude for a release into any given zone. How does having only one monitoring well in the intermediate zone serve any useful purpose other than to save effort and cost for the project? The one intermediate well proposed at each project site is next to useless without other monitoring wells in the same zone and cannot be honestly appraised as a proper due-diligent effort on the part of the leasee to be taken seriously they can detect leaks into this zone.

Section 3.0 of the plan (GMEC, 2006, p. 4-5) recounts monitoring program concepts for frequency and baseline information. Seasonal data (winter, spring, summer and fall) or quarterly monitoring should be prescribed for all ground water sampling. Continuous monitoring instrumentation should be done for the water supply wells in a separate monitoring observation well dedicated adjacent to the TP Supply well and the Fourmile supply well. Instrumentation in these observation wells should include water level, temperature taken daily at the same time of day, pH and specific conductivity. A weatherproof programmable recorder with interface should be used to safe keep the

information at the well and read directly with portable surface monitoring equipment by personnel prior to operations and SCADA equipment as part of the operational control instrumentation of the plant once operational. Remote data collection instrumentation should be placed in all monitoring wells to simultaneously collect information and preclude individual well visits to collect information. All monitoring wells should be visited monthly (and quarterly if equipment proves reliable over time) by on-site personnel to insure proper operations. Monitoring wells and frequency of observation are not necessarily related to waste discharge requirements and it is recommended that these requirements be coordinated with the waste discharge requirements but decoupled from it for the types of other impacts to groundwater not related to waste discharges. The first paragraph requires rewording of the language in Section 3. The second paragraph of this section should be more specific as to the other springs, wells, lakes and other features to be monitored by Calpine. The promise to do this requires a definite commitment by identifying and specifying which features will be monitored (and what is being measured and why) outside the immediate project locations. Serves to better define the purpose of this monitoring and goals to be achieved by and to the operation under consideration in the plan. There is no defined monitoring strategy developed for the differing components of the plan as currently written.

Section 3.1 (*ibid,* first paragraph, p. 4 & 5) provides a general explanation of the general philosophy of completion of the various proposed monitoring wells How does the current plan account for density flow, spillage or vertical movement of geothermal fluids when lost near or at the surface of the operational area (includes but not limited to the plant site, all well pad areas, and above ground pipeline corridors for each project location)? If no shallow ground water is found, is the leasee willing to monitor the next available ground water zone, be it the intermediate zone? If not, why not? How will the leasee treat contaminated ground which can subsequently lead to soil water zone contamination and deeper ground water contamination?

Section 3.1 (*ibid,* second paragraph, p. 5) – How far in advance will the geology be defined prior to system design and approval by the BLM. This should have already been done in order to define proper placement of monitoring wells. How does the leasee rationalize a well location plan without proper hydrogeologic site definition suitable to allow proper design of the monitoring systems (shallow, intermediate and deep)? It has been stated in the EIS/EIR, Weiss Report and USGS reports that the site hydrogeology is complex, yet oversimplification prevails in most explanations of the monitoring philosophy or plan discussions. How has site complexity been accommodated by the current monitoring plan?

Section 3.1 (*ibid,* third paragraph, p. 5) – How does partially penetrating wells serve the monitoring purpose of the shallow monitoring system? What is considered the bottom boundary layer or feature which defines the shallow system in the Telephone Flat Project area?

Section 3.1 (*ibid,* fourth or last paragraph, p. 5): Vague description of parameters is proposed as if the leasee has little idea what are important parameters. Part of the strategy of a monitoring plan is to express confidence as to the significant quality parameters in need of monitoring. The information expressed in this paragraph indicates leasee is either reluctant or unwilling to describe unique geothermal characteristics which should be included with standard parameter lists for monitoring. This is an opportunity to describe to the regulatory authority unique parameters indicative of operational upsets which would prompt action other than routine monitoring. No suggestions, other than primary drinking water standards, means they should measure everything to find out what is important which will prompt them

to get more specific here and outline a good parameter list. Later in the plan they reference the USGS water quality parameter listing (Appendix 1 t plan, p. 10-11), but this still shows they have put little thought into this plan because of their constant reliance on the USGS. This relationship needs better definition and separate activities should be emphasized. The USGS program and association should not be considered a proxy for these operations. This is a perception issue and potential misuse of government resources (once they are in construction and operation activities) to subsidize private efforts and preclude conflicts of interest.

Section 3.2 (*ibid,* first paragraph, p. 5): Why wasn't the baseline meteorological data included in the EIS/EIR documentation? Will H_2S monitoring also include personnel safety monitoring devices? How is confined space H_2S monitoring being accommodated by the air monitoring plan for off site personnel, private residencies and the visiting public?

Section 3.3 (Geothermal Reservoir Monitoring, p. 6): The environmental portion of the data should not be considered proprietary for health and safety reasons (OSHA compliance and right-to-know law). This is abuse of this privilege by the leasee and should be challenged. Regarding USGS cooperation: coordination is fine, over dependence or reliance on USGS should not be allowed and distinctly called out as not tolerable. This is ripe for conflict of interest issues, particular when the USGS may be called upon for dispute resolution or other issue adjudication fact finding support in the future. Any data provided the USGS should be considered public data and available to the public, no exceptions.

Section 3.4 (*ibid,* Hot Spot monitoring, p. 6): Specific mineralogy and gas geochemistry should be specified in the plan and both vent features monitored, not just one. In addition, mineral geochemistry should be related to temperature conditions of the vents over time and included in the annual monitoring report discussed in Section "Reporting" (editorial comment – all sections should be numbered in the plan, i.e., "Reporting" should be Section 4.0). All sampling and analysis protocols should be specifically listing or referenced and included in the plan.

Section 3.5 (*ibid,* Lakes within Medicine Lake Basin, first paragraph, p. 6-7): Ensure statements made here are also protective of the stipulation (1-4) provisions of the surface leases issued by the USFS for the SW corner of Telephone Flat lease area in vicinity of Payne Springs, the named lakes and other surface- or ground-water features (also includes non-operational areas adjacent to the project area to the west and south). Mud samples mentioned in the last paragraph of this section should be a minimum of four samples seasonally, taken from at least five locations (west and south run-on areas, lateral area on north shore and two at deep end of lake on the east side). Comparison of these data will constitute baseline conditions. All future samples would be compared to this sample set. Locations should be GPS so repeat sapling at close to vicinity of baseline lake locations can be repeated over time. Other lakes can have fewer samples taken but same sampling philosophy for comparability of the future sampling data. All mud samples should have physical (mineralogy and grain-size distribution), and geochemical descriptions made for all samples taken. Liquid portions of samples should be decanted and water quality defined.

Section 3.6 (*ibid,* Springs in the Medicine Lake Area, first paragraph, p. 7): Before the plan is accepted, owner permission and specific springs to be monitored (listed with GPS location) should be identified and included in the plan, not just a generic listing of possible locations. Baseline should include four seasonal samplings as a minimum (four seasons) for one year, minimum). Adjustment from evaluation of the baseline can vary based on this experience.

Discharge and water quality should be measured at established locations at each spring, not just sampled anywhere each time but at established locations personnel can repeat every time. Re: last paragraph (Geothermal Exploration Project) – Why are these provisions included here? There are other wells closer to the spring area then these. There is a USFS surface leasee stipulation on all leases near, around and below Payne Springs and should be so monitored to preclude impacts.

Section 3.7 (*ibid,* Shallow wells, first paragraph, p. 8): Drawdown conditions should be measured in all producing supply wells. See Section 3.0 comments above regarding separate observation wells and suggested instrumentation requirements. All wells listed should be sampled for field and lab water quality. Water level and state of production (frequency and amount, or on idle and period of time between pumping events) should be reported for all shallow producers. This should be done for the baseline period. Re: Second paragraph – water level measurements should be taken during production to assess interference effects and define from pumping the aquifer parameters (storage and hydraulic conductivity, verify water table or confined conditions, likely lateral boundaries etc.) for all production wells. Appropriate well drawdown analysis should be done for all pumping water supply wells. Re: Third paragraph – observation wells should be completed for the specific purpose of monitoring pumping areas for water level and water quality. This will preclude accidental contamination events experienced in pumping supply wells that could compromise from baseline conditions forward in time. Pump problems can compromise later data collection if this is not anticipated. Some of these wells may already be contaminated with pump oil or other organics, iron, or bacteria. This should be assessed for all wells during the baseline period (know as condition of wells) and notes made regarding completion details, screen or perforated zones, geology, etc.

Section 3.8 (*ibid,* Sampling parameters, p. 8) – Sampling frequency and statistical analysis/ evaluation methods should be described for up and down gradient wells, in addition to WQ chemical methods. Anomalous conditions should be described and reported as stipulated by the regulatory authority.

Section on Reporting (*ibid,* unnumbered section, should be Section 4.0, p. 9):

1) Re: Second paragraph – Proprietary information needs to be defined precisely and minimized as most of this information should not be considered proprietary. Mechanical integrity testing should be annual and adjusted based on experience after the first year. Other considerations such as corrosion effects, casing condition, type of production, presence of cathodic protection, weld or connector condition, casing log, and injection (frequency and amount) should be evaluated in setting inspection intervals and thoroughness or rigor for each producer or injector. This is normally adjusted for each well in question based on individual well histories, location in field, etc. and should not be prescriptive for all wells being equal. They usually are not. Trouble wells near key hydrologic features need more attention than those farther away. These needs to be specifically committed to in the plan as well as inspection and testing techniques to be followed, whether industrial standards or those tailored to the site conditions (preferred). Generic procedures or general prescriptions in the plan should be minimal. The plan should be considered a living document and periodic review (say every 5-year period) and adjusted accordingly.
2) Re: Third paragraph – Ground discharges infiltrating to lower zones should also be reportable not just to surface drainage features. The descriptive nature of the area soils suggest lost of any spillage to the subsurface in likely and reportable quantities should be established and made for all spills and a record kept for all well sites.

3) Re: Fourth paragraph – No mention or requirement is made regarding ground water contamination tracing or clean-up requirements for large (must be defined) spills, releases or upset well or mud pit conditions to surface or ground water systems.
4) Re: Fifth paragraph: Again, as mentioned numerous times previously above, cooperation with the USGS is appreciated but must be better defined to preclude conflict of interest requirements of private operations on public lands.