Pike Eradication Project

Determination of the Impact on the Water Quality of Lake Davis and Adjoining Wells

May 2007

State of California

Department of Health Services

Summary of Determination

Lake Davis is a reservoir located in the Plumas National Forest. It is primarily used for recreation and serves as a domestic water source for the City of Portola and the Grizzly Lake Resort Improvement District - Crocker Welch (GLRID). In the past water from Lake Davis has been treated in the Plumas County Flood Control District (PCFCD) water treatment plant, but this plant was taken out of service in 1997. A new water treatment plant is being built by PCFCD to comply with state regulations. Upon completion of the treatment plant Lake Davis will be brought back into service as a domestic water supply.

The Department of Fish and Game (DFG) has proposed a project to eliminate Northern Pike from Lake Davis in order to prevent the spread of Northern Pike from the reservoir to additional areas in the state. DFG proposes to use Rotenone, a fish poison, in one or more formulations to eradicate the pike.

Health and Safety (H&S) Code, Section 116751 requires that DFG may not introduce a poison to a drinking water supply for purposes of fisheries management unless the California Department of Health Services (CDHS) determines that the activity will not have a permanent adverse impact on the quality of the drinking water supply or wells connected to the drinking water supply. In making this determination, CDHS shall 1) evaluate the short and long-term health effects of the poison on the drinking water; 2) ensure that an alternative supply of drinking water is provided to the users of the drinking water supply while the activity takes place and; 3) in cooperation with the DFG, develop and implement a monitoring program to ensure that no detectable residuals of the poison, breakdown products, and other components of the poison formulation remain in the drinking water supply or adjoining wells after the activity is completed.

Evaluation of short-term and long-term health effects in drinking water that may result from the proposed project.

DETERMINATION: It is CDHS conclusion that there will be no short-term or long-term health effects in drinking water from the proposed project because no residuals of rotenone, breakdown products, or other components of the rotenone formulations shall be detectable in Lake Davis water before the lake will be returned to service as a source of drinking water. It has been determined that detection levels for these contaminants are below levels known to be safe. Based on the results from previous applications particularly the 1997 treatment of Lake Davis with the rotenone formulation, Nuson-Noxfish, and CDHS evaluation of the rotenone formulation proposed for this project, CFT Legumine and the alternative formulation, Noxfish®, CDHS expects that no detectable residuals of rotenone, breakdown products, and other components of the rotenone formulations will remain in Lake Davis water and sediment. In addition, based on the results of the 1997 treatment and the subsequent monitoring of well water

that has taken place, CDHS does not expect that the water quality of any of the adjoining wells will be adversely affected and, therefore, no short-term and long-term health effects will result from the proposed project.

Alternative supply of drinking water for the City of Portola and the community of GLRID during the treatment and restoration period.

DETERMINATION: It is CDHS conclusion that the City of Portola's existing water supply, which includes the Commercial Street and the Corporation Yard wells and the Willow Springs, will be adequate to meet the City's water demands during the period of time that Lake Davis is expected to be unavailable for use as a drinking water source. GLRID's existing well will be adequate to meet water demands during the period of time that Lake Davis is expected to be unavailable as a drinking water source.

Should Lake Davis, as a result of conditions associated with the proposed treatment project, be unavailable for use as a drinking water source and the City of Portola and/or GLRID are unable to meet water demands, DFG shall provide alternative water supplies to ensure that those water demands are met. DFG shall have in place an approved contingence plan to provide, as necessary, alternative water supplies prior to the implementation of the project. DFG has been working with the City of Portola and GLRID and has developed contingency plans to provide alternative water supplies that will be in place prior to the implementation of the treatment project.

Monitoring Program to ensure that no detectable residuals of Rotenone formulation components or breakdown products remain in Lake Davis water or adjoining wells.

DETERMINATION: CDHS, in cooperation with DFG, will undertake a monitoring program designed to determine that the water in Lake Davis is suitable for use as a source of drinking water when all constituents in the CFT Legumine formulation, including rotentone, breakdown products, and other components of the formulation are below the level of detection based on detection levels set by CDHS. In addition, the dissolved oxygen and biological oxygen demand must be returned to normal levels. A monitoring program has been developed by DFG and approved by CDHS which includes sampling of Lake Davis water and sediment before and after treatment. Sampling will continue until it has been determined that residuals of all constituents of the formulation including rotenone, breakdown products and other components are below the level of detection in three consecutive water and sediment samples. Monitoring of the tributaries that are treated will also be conducted including water and sediment sampling to ensure that no detectable residuals of formulation chemicals remain. In addition, physical parameters such as dissolved oxygen and biological oxygen demand must have returned to normal levels before the lake water can be used in the water treatment plant. Analyses of Lake Davis water and sediment samples will

be carried out by CDHS and DFG laboratories.

The Plumas County Environmental Health Department, in cooperation with the Lawrence Livermore National Laboratory, will complete oxygen isotope analysis of the wells in the current groundwater monitoring network and of additional adjoining wells that have been identified to determine which wells may be directly influenced by surface water from Lake Davis and Big Grizzly Creek. That work is expected to be completed in August. The information from that work along with other factors will be used to establish those wells that will be subject to long-term monitoring for formulation chemicals used in the treatment project.

The impact of dead fish in the lake and mitigation steps.

DETERMINATION: DFG shall have a cleanup plan to ensure that dead fish are removed from the lake before the water is used as a source of drinking water by GLRID and the City of Portola.

Brief History

In August 1994, Northern Pike were reportedly found in Lake Davis. According to DFG, eradication of the pike was necessary to prevent their further spread in the state and to protect the trout fishery at Lake Davis. It was feared that escape of pike into Big Grizzly Creek below the reservoir could be accomplished either by spilling of surface water from the reservoir during a major storm event or by withdrawal from the bottom of the reservoir through the dam outlet. From Big Grizzly Creek, pike could be carried to the Middle Fork Feather River and eventually to Lake Oroville. DFG reported that pike are likely to pose a threat to the anadromous and resident fisheries.

In July 1994, an updated Programmatic Environmental Impact Report (PEIR) was developed which described the use of rotenone formulations, as needed, throughout the State of California. This report described the chemical formulations and the general practices used in their application. A Notice of Preparation for the current project was prepared in response to requirements by the California Environmental Quality Act (CEQA) on February 9, 1995. A draft Environmental Impact Report (EIR) was developed in March 1996. The Final EIR was developed in January 1997.

DFG has historically used rotenone formulations to manage fisheries in California. Prior to Lake Davis, Frenchman Lake was treated to eliminate Northern Pike in 1991. Although rotenone formulations have been used near drinking water supplies, with the exception of Lake Davis, no such formulations had been applied directly into a drinking water supply.

Prior to the implementation of the 1997 project, the Legislature adopted H&S

Code, Section 116751, which requires that DFG may not introduce a poison to a drinking water supply for purposes of fisheries management unless CDHS determines that the activity will not have a permanent adverse impact on the quality of the drinking water supply or wells connected to the drinking water supply. In making this determination, CDHS shall 1) evaluate the short and long-term health effects of the poison on the drinking water; 2) ensure that an alternative supply of drinking water is provided to the users of the drinking water supply while the activity takes place and; 3) in cooperation with DFG, develop and implement a monitoring program to ensure that no detectable residuals of the poison, breakdown products, and other components of the poison formulation remain in the drinking water supply or adjoining wells after the activity is completed.

Although the 1997 project was initially thought to be successful Northern Pike were subsequently detected in Lake Davis in 1999. Because of similar concerns over the escape of Northern Pike into the Feather River and eventually Lake Oroville, DFG has proposed to undertake a second eradication project. A draft EIR was developed and noticed for comment on September 1, 2006. The final EIR was finalized in January, 2007.

Impact of Treatment on the Environment

The law requires that CDHS evaluate several issues regarding the impact of rotenone treatment on the environment. Those issues include the short-term and long-term health effects that may result from the treatment of the lake, taste and odor concerns and the disposal of dead fish. The potential for the contaminants to reach the groundwater around Lake Davis was also reviewed. The law also requires that CDHS and DFG develop a monitoring plan to ensure that no detectable levels of formulation constituents including rotenone, breakdown products, and other components of the formulation are present before Lake Davis can be returned to service as a drinking water source and in adjoining wells affected by the lake.

Chemicals of Concern: Proposed Rotenone Formulations

CFT Legumine®

The formulation labeled CFT Legumine® is the trade product proposed for this treatment. The formulation contains rotenone, rotenolone, and non-rotenoid organic constituents including methyl pyrrolidone and diethylene glycol monoethyl ether and volatile organic chemical (VOCs) such as 1,3,5-trimethylbenzene and 1-butylbenzene and semi-volatile organic chemicals (SOCs) such as naphthalene and methylnaphthalene.

Noxfish®

The formulation labeled Noxfish® is the other trade product that was considered for this treatment. DFG has indicated that Noxfish® will only be used if there is an insufficient amount of CFT Legumine® to complete the treatment. The formulation contains rotenone, rotenolone, and non-rotenoid organic constituents including VOCs such as xylem isomers, toluene and trichloroethylene and SOCs such as naphthalene.

Potassium permanganate will be used to neutralize rotenone residuals if such residuals are discharged into Big Grizzly Creek after treatment

The concentrations of formulation chemicals and potassium permanganate expected to be present in Lake Davis water at the time of treatment as estimated by DFG can be found in Table 1.

Table 1

Chemical Name	Estimated Concentration in Treatment[1] ug/l	Detection Level ug/l	Max. Cont. Level (MCL) or Notification Level (NL) ug/l	
CFT Legumine® Formulation				
Rotenone (active ingredient)	42.1	2	40 (NL)	
Rotenolone	5.2	2		
1-Methyl-2-pyrrolidinone (Methyl pyrrolidone)	87.8	11^^	300 (NL) **	
Diethylene glycol monoethyl ether (Diethylene glycol ethyl ether)	581.1	12^^	400 (NL) **	
1,3,5-Trimethylbenzene (mesitylene)	0.004			
sec-Butylbenzene	0.004			
1-Butylbenzene (n-Butylbenzene)	0.078			
4-Isopropyltoluene (isopropyltoluene)	0.005			
Methylnaphthalene	0.136	0.5		
Naphthalene	0.341	0.5	17 (NL)	
NoxFish® Formulation				
Rotenone	48.81	2	4 (NL)	
Rotenolone	14.641	2		
Trichloroethene (Trichloroethylene)	0.071	0.5	5 (MCL)	
Toluene	1.757	0.5	150 (MCL)	
1,3- and/or 1,4-Xylene (M/p xylene)	0.595	0.5	1750 (MCL)	
1,2-Xylene(o xylene)	0.074	0.5	1750 (MCL)	
Isopropylbenzene	0.050			
1-Propylbenzene(n-Propylbenzene)	0.303			
1,3,5-Trimethylbenzene (mesitylene)	0.839			
1,2,4-Trimethylbenzene	9.761			
1-Butylbenzene (n-Butylbenzene)	8.785			
4-Isopropyltoluene (p-Isopropyltoluene)	0.976			
Naphthalene	68.326 (w/ EPA 8260)	0.5	17 (NL)	

Potassium permanganate	4 mg/L-water			

[1] Based on chemical analysis of commercial formulations and proposed treatment concentration of 1 mg-formulation/L receiving water, concentrations will vary by lot by approximately 10 percent. Data listed from DFG Pesticide Laboratory Reports (CFT Legumine: report date 7/7/04, lab no P-2399; Noxfish: report date 7/9/02, Lab Nos P-2297, 2298, 2300, 2302).
* EPA method 8260
^ EPA method 8270
** Notification Level developed for the implementation of the Lake Davis Treatment Project
^^ Tentative Detection Levels

Impact of Treatment During Past Events

Persistence of Residuals

In order to determine if the project will not have a permanent adverse impact on the quality of the Lake Davis or adjoining wells potentially connected hydraulically to Lake Davis, CDHS reviewed rotenone applications in the Kaweah River and Tulare Lake Basin, as well as the 1991 Lake Frenchman application and the 1997 Lake Davis application. With the exception of Lake Davis, none of the other rotenone applications involved drinking water sources.

Kaweah River and Tulare Lake Basin Applications

Following treatment in 1987 for white bass, the DFG evaluated the persistence of rotenone and its associated compounds, including the VOC's found in the Nusyn/Noxfish® formulation. The Nusyn/Noxfish® formulation is similar to the Noxfish® formulation with the exception that the Noxfish® formulation does not contain piperonyl butoxide. The study attempted to address concerns relating to long term affects of the treatment on both the surface water and the ground water in the vicinity of the treated areas. Immediately after application, rotenone concentrations in the surface water averaged 148 parts per billion (ppb) and ranged from <2 ppb to 370 ppb. The half-life values in surface water averaged 1.8 days. Rotenone degraded from an average of 87 ppb to non-detectable levels within 15 days after application.

Groundwater was evaluated multiple times after these applications. During the testing period of 49 days after the application, no detectable rotenone or rotenolone were found.

Concentrations of inert ingredients in surface water, xylene, benzene, ethyl benzene, trichloroethylene, and naphthalene had dissipated, diluted and degraded to non-detectable levels within 21 days. These compounds were also not found in groundwater at detectable concentrations for 49 days after treatment (1).

In at least one instance, degradation did not occur within the expected 21 day time frame. At Meiss Lake in 1988 and 1990, rotenone and rotenolone concentrations remained above the detection levels for five weeks. At Wolf Creek Lake in 1991, concentrations were detected after six weeks. This was reportedly due to lower water temperatures during this time. Water temperatures below 11 °C (52°F) were recorded during this time. These temperature effects are consistent with findings that rotenone had a half-life of 10.3 days in temperatures from 0-5°C, while its half-life was approximately 0.94 days when the water temperature was above 20°C (2).

Frenchman Lake Application (1991)

Frenchman reservoir was treated at a concentration of 2 parts per million (ppm) Nusyn/Noxfish® during the period of June 11-13, 1991. The treatment was initiated to eliminate Northern Pike from the reservoir. A potassium permanganate detoxification station was installed below the dam's outlet into Little Last Chance Creek. The lake itself was not detoxified with potassium permanganate. Instead, rotenone was eliminated through natural degradation. Water temperatures varied from 10° to 22°C. Residues of both rotenone and rotenolone reached non-detectable levels in the reservoir approximately 21 days after treatment. Rotenone and rotenolone levels reached non-detectable residues in sediment samples 14 days after treatment. Neither rotenone nor rotenolone were detected at any time in samples taken from three campground wells located adjacent to the reservoir.

Other organic compounds present in the Nusyn/Noxfish® formulation were detected in Frenchman Lake and Little Last Chance Creek after the June 11 treatment. With the exception of trichloroethylene, all of these compounds were below detectable levels by June 26, thirteen days after treatment. Trichloroethylene was present on July 2, the final day of scheduled sampling. Unfortunately, resampling was not completed until November 8, 1991. Trichloroethylene was not detected at that time.

In addition to the organic compounds discussed above, several other compounds that are not known constituents of the formulated rotenone product were detected in the reservoir. By July 2, levels of these organic compounds were below detectable levels (0.2 ppb).

Sediment samples indicated the short term presence of naphthalene and methyl naphthalene. The November 8, 1991 final sampling event revealed no residues of these compounds.

Lake Davis Application (1997)

Lake Davis was treated with the Nusyn/Noxfish® liquid formulation and the Pro-Noxfish® powdered formulation on October 15 and 16, 1997. Potassium permanganate was used to detoxify water released from the reservoir into Big Grizzly Creek.

The mean lake water rotenone level was 42 ppb immediately following treatment on October 17, 1997, and rotenone concentrations remained at or above 10 ppb throughout the lake for two weeks. Rotenone and rotenolone residues were reduced to below detection levels (2 ppb) within 48 days after treatment. The half-life of rotenone was 7.7 days in the lake with a water temperature range of 10 to 12 degrees centigrade. Maximum concentrations of VOCs trichloroethylene (0.8 ppb), toluene (3.5 ppb), ethyl benzene (0.5 ppb), total xylene (2.6 ppb) and trimethylbenzene (2.4 ppb) and SOCs naphthalene (210 ppb), 1-methylnaphthalene (210 ppb), and 2-methylnaphthalene (390 pp) were detected immediately after treatment. The VOCS persisted for less than one week and the SOCs persisted for less than two weeks. Piperonyl butoxide (PBO) persisted in lake water for several months after treatment. However, PBO is not part of either the CFT Legumine® or the NoxFish® formulations.

Rotenone and rotenolone levels were detected in lake sediment after treatment. However, both chemicals were below detection levels in sediment within 50 days after treatment. No VOCs were detected in lake sediment while SOCs naphthalene, 1-methylnaphthalene and 2-methylnaphthalene were detected in lake sediment after treatment. All three chemicals were below detectable levels within 50 days after treatment.

Proposed 2007 Treatment Project

Under the proposed project DFG plans to use the CFT Legumine® rotenone formulation. However, if necessary, the NoxFish® formulation may also be used.

The CFT Legumine® formulation contains a mixture of VOCs and SOCs and more water soluble chemicals, methyl pyrrolidone and diethylene glycol monoethyl ether. As with NoxFish® the VOCs and SOCs in the CFT Legumine® formulation are expected to reach non-detectable levels with a week to several weeks. However, methyl pyrrolidone and diethylene glycol monoethyl ether, would be expected to dissipate more slowly. These two chemicals, as indicated in Table 1, will be at much higher initial concentrations in the lake water and, because they are water soluble, will not readily dissipate through volatilization.

However, both chemicals are biodegradable, which is the principle mechanism by which they are expected to dissipate. (3) (4)

The NoxFish® formulation is essentially the same as the Nusyn/Noxfish® formulation used during the 1997 treatment with the exception that the NoxFish® formulation does not contain piperonyl butoxide and the isomers of methylnaphthalene (1-methylnaphthalene and 2-methylnaphthalene). Based on the results of previous treatment projects the VOCs and SOCs in the formulation would be expected to reach non-detectable levels within a week to several weeks after application with the SOCs principally naphthalene remaining at detectable levels longer than the VOCs. The rate of reduction of the VOCs and SOCs in the lake will be most affected by the initial concentration of the chemicals in the lake water after application and the water temperature as these chemicals are volatile and will be released from the lake water into the air more rapidly under warm water temperature conditions. If the lake is treated as planned during late September/early October when the water temperature is still relatively warm, the rate of reduction is expected to be rapid.

Based on the results of previous treatment projects, rotenone and rotenolone are expected to dissipate to below detectable levels within several weeks regardless of which formulation is used. The rate at which both these chemicals dissipate will mainly be dependent on the water temperature. If the application takes place in late September/early October as planned, the rate of dissipation is likely to be faster.

Based on the results the Frenchman Lake application and the 1997 Lake Davis application, certain chemicals such as rotenone, rotenolone, naphthalene and methylnaphthalene are likely to be initially detected in the lake sediment. However, it is expected that these chemicals will dissipate to below detectable levels several weeks after the initial treatment.

Based on the results from the previous treatment projects, particularly the 1997 Lake Davis application where ongoing monitoring of 78 wells has not detected any of the chemicals used in the application, the chemicals contained in either of the two rotenone formulations are not expected to affect adjoining wells that may be hydraulically connected to Lake Davis.

Proposed Monitoring Program

In order to determine that no detectable residuals of rotenone, breakdown products, and other components of the formulations remain in Lake Davis water or sediments or adjoining wells after the project is completed, CDHS, in cooperation with DFG, has developed a monitoring program that will 1) establish the baseline of Lake Davis water quality prior to implementation of the project and; 2) track the levels of residues of rotenone, breakdown products, and other components of the formulations until all residues in water and sediment samples

are below detectable levels. In addition, water and sediment from treated tributaries that flow into Lake Davis will be monitored to ensure that residues of all formulation chemicals are below detectable levels.

In order to determine the natural state of Lake Davis baseline water and sediment sampling will be undertaken. The baseline sampling will establish levels of physical and chemical constituents such as dissolved oxygen, pH, and biochemical oxygen demand as well as the components of the formulations including VOCs and SOCs. Following the application of the formulations to Lake Davis and its tributaries, monitoring of Lake Davis water and sediments and water in selected wells that have the potential to be hydraulically connected to Lake Davis will be undertaken.

Lake Davis Water and Sediment Sampling

The monitoring program that has been developed for sampling Lake Davis water and sediment will be similar to the program undertaken during the 1997 Lake Davis application. Water samples will be collected at ten locations throughout the lake. At least two samples will be collected at five shallow locations, one at the lake surface and one at depth, and three samples will be collected at five deep locations, one at the lake surface, one at mid-depth and one at lower depth to obtain a cross-sectional picture of the levels of any residues of formulation chemicals remaining in the lake water. Water and sediment samples will be collected from all tributaries that have been treated. Sediment samples will also be collected at five locations in the lake to determine if any residues remain in the lake sediments.

All lake water samples will be analyzed by the CDHS laboratory and sediment samples will be analyzed by the DFG laboratory. Lake water and sediment will not be considered free of all residues of formulation chemicals until three consecutive lake water and sediment samples are found to be at non-detectable levels for all formulation chemicals. In addition, a state certified third party laboratory will also analyze the last set of lake water and sediment samples to corroborate that the lake water and sediment are at non-detectable levels for all formulation chemicals. Upon that determination, Lake Davis will be considered acceptable for use as a domestic water supply.

Groundwater Sampling

During the 1997 Lake Davis application five wells that adjoined Lake Davis were monitored. In addition, in 1999 the Plumas County Environmental Health Department (PCEHD) undertook a program of monitoring groundwater in over 80 wells. That program continues into the present and now includes 78 wells, of which 76 wells are monitored annually and two wells are monitored semi-annually. To date there has been no indication from the monitoring results that the 1997 application has affected the groundwater drawn by these wells.

Because of the uncertainty as to the relationship between water in Lake Davis and the groundwater drawn by these wells, PCEHD is working with the Lawrence Livermore National Laboratory to conduct oxygen isotope analysis of the wells in the current groundwater monitoring network and of additional adjoining wells that have been identified to determine those wells that draw groundwater that may be directly influenced by surface water from Lake Davis and Big Grizzly Creek. PCEHD expects to complete that work in August. The information developed from that work along with other factors will be used to select wells for monitoring after the lake is treated. The post treatment well water monitoring program will include sampling and analysis of well water for all formulation chemicals until three consecutive well water samples are found to be at non-detectable levels for all formulation chemicals. Thereafter, these wells will be monitored on an annual frequency.

Alternative Water Supply During Treatment

As part of CDHS responsibility under H&S Code, Section 116751, CDHS must ensure that an alternative supply of drinking water is provided to the users of the affected drinking water supply while the project takes place. DFG is responsible for providing alternative water supplies to both the City of Portola and GLRID should they be needed. The following is an assessment of the existing water supplies of the City of Portola and GLRID and the need for alternative water supplies.

City of Portola

The City of Portola uses two sources of water to meet the City's water demands: wells and a spring. The City has two wells: the Commercial Street well and the Corporation Yard well. The spring source is Willow Springs.

Water demand and water production data for the last full year of record, 2005, indicates that the maximum day demand (MDD) for the City during 2005 was 930 gallons per minute (GPM). This was the highest MDD for the previous five years. The most recent CDHS water production records provided by the City indicate that the two wells and Willow Springs have approximately 1,165 GPM of production capacity, which was sufficient to meet that demand with additional capacity in reserve (5). Data for 2006 up through the month of October indicate that the highest 2006 monthly demand was 35.8 million gallons (MG), which occurred in July. Monthly demand subsequently decreased to 34.8 MG in August, 31.8 MG in September, and 15.6 MG in October (6) (7). Although, as a result of potential new development, the City's water demand may increase by the time Lake Davis is treated, the treatment is scheduled to take place in late September or early October, which, as the City's recent water demand data indicate, will be at a time when water demand will have decreased significantly. Therefore, even with some nominal increase in water demand due to growth, an alternative water supply does not appear to be needed to supplement the City's

existing water supply during the expected duration of the proposed treatment project.

However, as a precaution, DFG shall develop a contingency plan to provide an alternative water supply if the City can not meet water demands and the lake is not available as a drinking water source as a result of conditions associated with the proposed treatment project. The plan shall be submitted to CDHS for review and approval prior to the implementation of the proposed treatment project. In cooperation with the City, DFG has developed a contingency plan to provide the City with alternative water supplies prior to the implementation of the proposed treatment project.

GLRID - Crocker Welch

GLRID has one well that serves as the sole source of water supply. The well is located at the site of the existing Lake Davis water treatment plant. GLRID also has a 200,000 gallon storage tank that can meet about three days of water demand during the summer months, which has helped GLRID get through power outages that are common, especially during the summer. The well produces about 40-45 GPM during the early spring, but tends to slowly taper off throughout the summer, usually down to around 30 GPM by the end of September. GLRID implemented voluntary conservation measures in the summer of 2005, which mainly involved an irrigation schedule for their customers (5). These measures have been adequate to keep the system from running out of water. Assuming that these conditions do not change prior to the implementation of the proposed treatment project and given the expectation that water demand will have begun to decrease at the time that the project is scheduled to begin, GLRID should have sufficient water source capacity to meet water demands for the duration of the treatment project.

However, as a precaution, DFG shall develop a contingency plan to provide an alternative water supply should GLRID be unable to meet water demands and the lake is not available as a drinking water source as a result of conditions associated with the proposed treatment project. The plan shall be submitted to CDHS for review and approval prior to the implementation of the proposed treatment project. In cooperation with GLRID, DFG has developed a contingency plan to provide GLRID with an alternative water supply prior to the implementation of the proposed treatment project.

Conclusions & Requirements

In conclusion, CDHS has determined that the proposed Lake Davis treatment project will not have a permanent adverse impact on the drinking water quality of Lake Davis or the surrounding wells if the following conditions are met:

1) Concentrations of chemicals present in the CFT Legumine® and NoxFish® formulations and of chemicals known or suspected to be breakdown products of chemicals in the formulations dissipate to non-detectable levels in samples of lake water and sediment before the lake is returned to service as a source of drinking water.

2) Levels of Biological Oxygen Demand and Dissolved Oxygen are returned to their pre-treatment levels before the lake is returned to service as a source of drinking water.

3) All submitted and approved plans shall be followed. These plans include treatment plans, monitoring plans, health and safety plans, and contingency plans for alternative water supplies.

4) DFG has developed contingency plans to provide alternative water supplies to the City of Portola and GLRID. The contingency plans shall be submitted to CDHS for review and approval prior to the implementation of the proposed treatment project. DFG shall implement the contingency plans should Lake Davis, as a result of conditions associated with the proposed treatment project, be unavailable for use as a domestic water source and the City of Portola and/or GLRID are unable to meet water demands

References

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3. "Concise International Chemical Assessment Document 35, *N*-METHYL-2-PYRROLIDONE," World Health Organization, Geneva, 2001. http://www.inchem.org/documents/cicads/cicads/cicad35.htm, Accessed November, 13, 2006.

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6. Direct communication, Mike McNamara, CDHS, November 15, 2006

7. Direct communication, Mike McNamara, CDHS, November 16, 2006