Summary of Action Memorandum

For the Lincoln Avenue Water Company (LAWC), Altadena, California Associated with Groundwater Cleanup at the National Aeronautics and Space Administration, Jet Propulsion Laboratory, Pasadena, California

Also available in Spanish

August 23, 2004

PURPOSE

This document summarizes the National Aeronautics and Space Administration's (NASA's) decision to undertake a cleanup action (technically called a "Removal Action") to remove perchlorate from groundwater affecting two Lincoln Avenue Water Company (LAWC) drinking water wells. The wells are located near the NASA Jet Propulsion Laboratory (JPL) site in Pasadena, California.

The Action Memorandum describes the Removal Action (Action) in more detail. This cleanup action is funded as part of the NASA JPL Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Program (commonly referred to as the JPL groundwater cleanup program). The cleanup action is considered a time-critical removal action under CERCLA because it was implemented in less than six months. The Action consists of NASA funding and technical support for the Lincoln Avenue Water Company's construction and operation of an ion exchange water treatment system to remove perchlorate from the water extracted from the two Lincoln Avenue Water Company drinking water wells.

PUBLIC COMMENT IS INVITED

NASA invites public comment on the Action Memorandum. The Action Memorandum is available for review and public comment from **August 23 through October 1, 2004**. Members of the public may acquire or examine a copy of this Summary and the Action Memorandum by visiting any of the public document information repositories listed on page 5 of this document, or by visiting the NASA JPL Groundwater Cleanup Website at http://JPLwater.nasa.gov. The public also may call (818) 393-0754 for more information or to obtain a paper copy of the document. A Spanish language version of the Summary (but not the Action Memorandum itself) is also available. If you would like to ask a question in Spanish, please telephone Gabriel Romero at (818) 354-8709.

Comments on this action may be submitted electronically to mfellows@nasa.gov. Comments also may be submitted by mail to the attention of Merrilee Fellows, NASA Water Cleanup Outreach Manager, Jet Propulsion Laboratory, NASA Management Office, 180-801, 4800 Oak Grove Drive, Pasadena, CA 91109. No specific format for the comments is necessary, although legible comments keyed to specific portions of the Action Memorandum will be helpful. Comments may be submitted in Spanish. All comments must be submitted electronically by midnight, October 1, 2004. If comments are posted by mail, the comments must bear a postmark of no later than October 1, 2004.

BACKGROUND

Liquid wastes generated at JPL in the 1940s and 1950s (such as cleaning solvents, solid and liquid rocket propellants, cooling tower chemicals, and analytical laboratory chemicals) were disposed of in seepage pits, a then common and acceptable practice. Some of these wastes contained chemicals (e.g., perchlorate and chlorinated solvents containing volatile organic compounds [VOCs]) that have been found in groundwater beneath and adjacent to JPL, including groundwater extracted from two wells operated by Lincoln Avenue. The wells are known as Lincoln Avenue Water Company Well #3 and Lincoln Avenue Water Company Well #5. Volatile organic compounds were first detected in Lincoln Avenue Water Company Wells #3 and #5 in 1981. In 1992, the Lincoln Avenue Water Company installed a VOC treatment facility for these drinking water wells. NASA funded the installation of that facility as well as on-going operation of the plant enabling the Lincoln Avenue Water Company to treat its water to remove VOCs and ensure it meets state drinking water standards.

Perchlorate concentrations were first detected in Lincoln Avenue Water Company wells in 1997, when an improved analytical method was developed to detect even low levels of perchlorate. Since 1997, perchlorate concentrations in samples from the Lincoln Avenue Water Company wells have ranged from less than 4 micrograms per liter (µg/L) to 25.0 µg/L. A microgram per liter is equivalent to a part per billion, a term also used frequently to describe an amount of perchlorate in water. The Lincoln Avenue Water Company has always ensured that water provided to its customers meets state standards. The company followed the guidance of the California Department of Health Services regarding perchlorate by, at times, purchasing water from the Foothill Municipal Water District and blending that water with the water from the Lincoln Avenue Water Company's wells.

Groundwater samples collected from Lincoln Avenue Water Company Wells #3 and #5 in 2003 and 2004 show the concentration of perchlorate had increased and the California

Department of Health Services required treatment of the water. Therefore, the Lincoln Avenue Water Company, with funding fromNASA, is now treating its water to remove perchlorate to ensure it meets the newly implemented state drinking water health goal and action level associated with perchlorate.

In March 2004, a State Public Health Goal and Action Level for perchlorate were established at 6 µg/L (or 6 parts per billion). For perchlorate, neither the federal nor California state government has yet set a Maximum Contaminant Level, which is used as a basis for establishing state drinking water standards. Until that final limit is adopted, the State is using the "Action Level" as the level of protection for consumers. Recent sampling of the Lincoln Avenue Water Company's wells revealed perchlorate concentrations in excess of the recently established Action Level. (See boxed text for a discussion of terms.)

The NASA-funded ion exchange plant that the Lincoln Avenue Water Company is using is designed to meet a level below the Public Health Goal and the Action Level (of 6 µg/L and should achieve a level below 4 µg/L). Details of the ion exchange plant are provided in the Action Memorandum.

A Public Health Goal is a recommended level of a chemical in drinking water that does not pose a significant short-term or long-term health risk. A Public Health Goal is not a regulatory requirement. Instead, it is a goal that public water suppliers should try to meet if it is feasible to do so. An Action Level is an interim level derived from the PHG and used by the California Department of Health Services to evaluate chemical concentrations prior to development of a Maximum Contaminant Level, which is the final regulatory level set to ensure safe drinking water. The Action Level – again based on the Public Health Goal – is the concentration of a chemical in drinking water that does not pose any significant risk to health, based on studies of risks to human health.

Figure 1 is a location map showing JPL, the Lincoln Avenue Water Company drinking water wells, and the ion exchange treatment facility. The treatment facility is located on Lincoln Avenue Water Company property at 2700 N. Olive Avenue in the northwest area of Altadena.

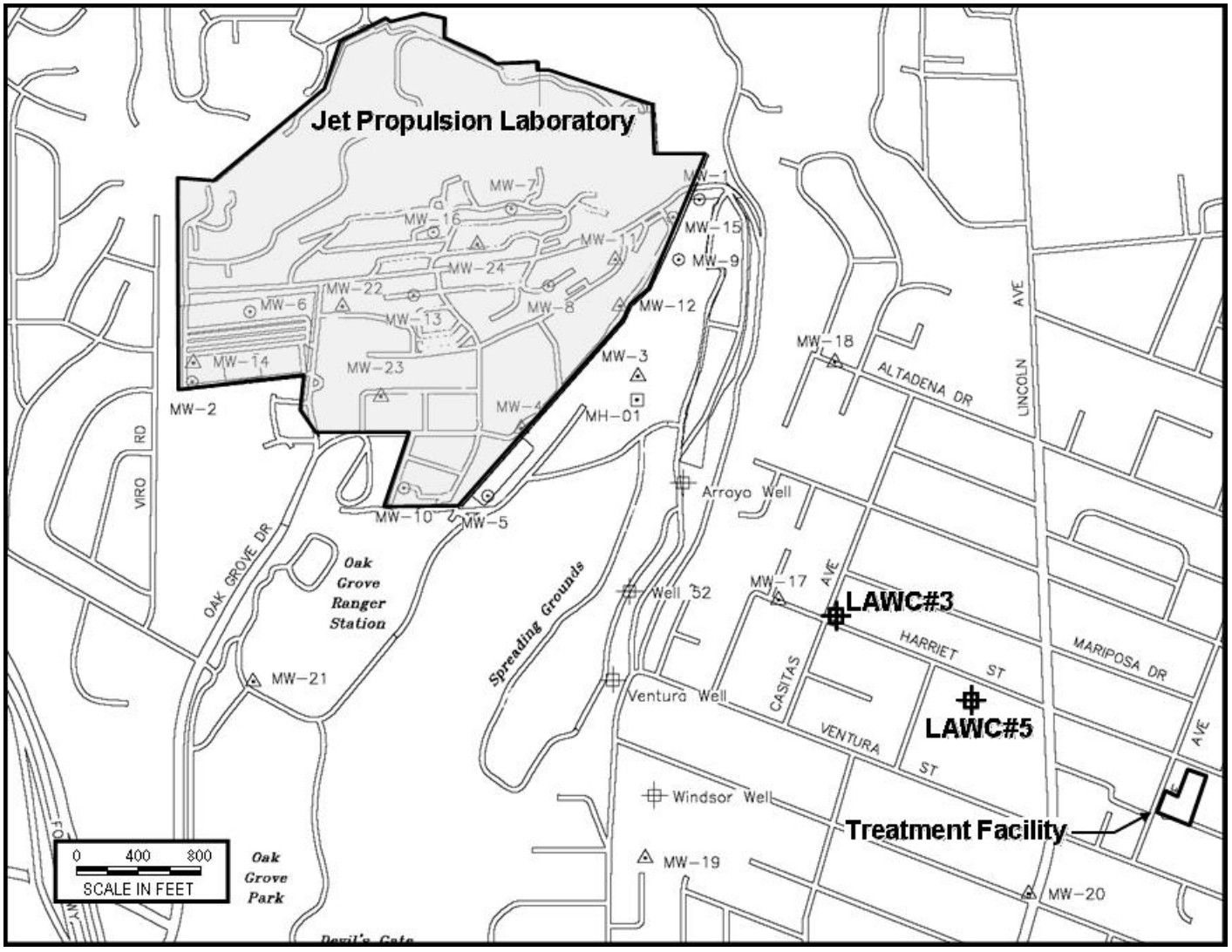

Figure 1. Location Map

DESCRIPTION OF PROPOSED ACTION

An ion exchange system for the removal of perchlorate was added to the existing water treatment system used by the Lincoln Avenue Water Company. NASA funded the construction and installation of the ion exchange system. In addition to the removal of perchlorate, NASA will continue to fund Lincoln Avenue Water Company's treatment of volatile organic compounds. Use of the two treatment systems, followed by chlorination, and blending with Foothill Municipal Water District water in the Olive Sump, all occur before the water is transferred to a reservoir for distribution. The perchlorate treatment must result in cleaning the water to the goal set by the California Department of Health Services and in any case is designed to result in levels of perchlorate in water that are even lower than the Public Health Goal and Action Level. A diagram for this entire treatment system is provided as Figure 2. Additional technical details can be found in the Action Memorandum.

Ion exchange is the only technology that has been approved and successfully used for removal of perchlorate from drinking water in California. Additionally, recent improvements in perchlorate selective resins, the material that acts to absorb or "capture" the perchlorate, specifically the resin identified for use in the Lincoln Avenue Water Company system, have significantly reduced the operational costs associated with ion exchange, making it competitive with alternative treatments.

The ion exchange system plant will be operated and maintained according to the manufacturer's specifications. There are also requirements established by the California Department of Health Services, that govern sampling locations and chemical monitoring, timing for replacement of the ion exchange resin that absorbs the perchlorate, and submission of records about the operation of the plant to the California Department of Health Services.

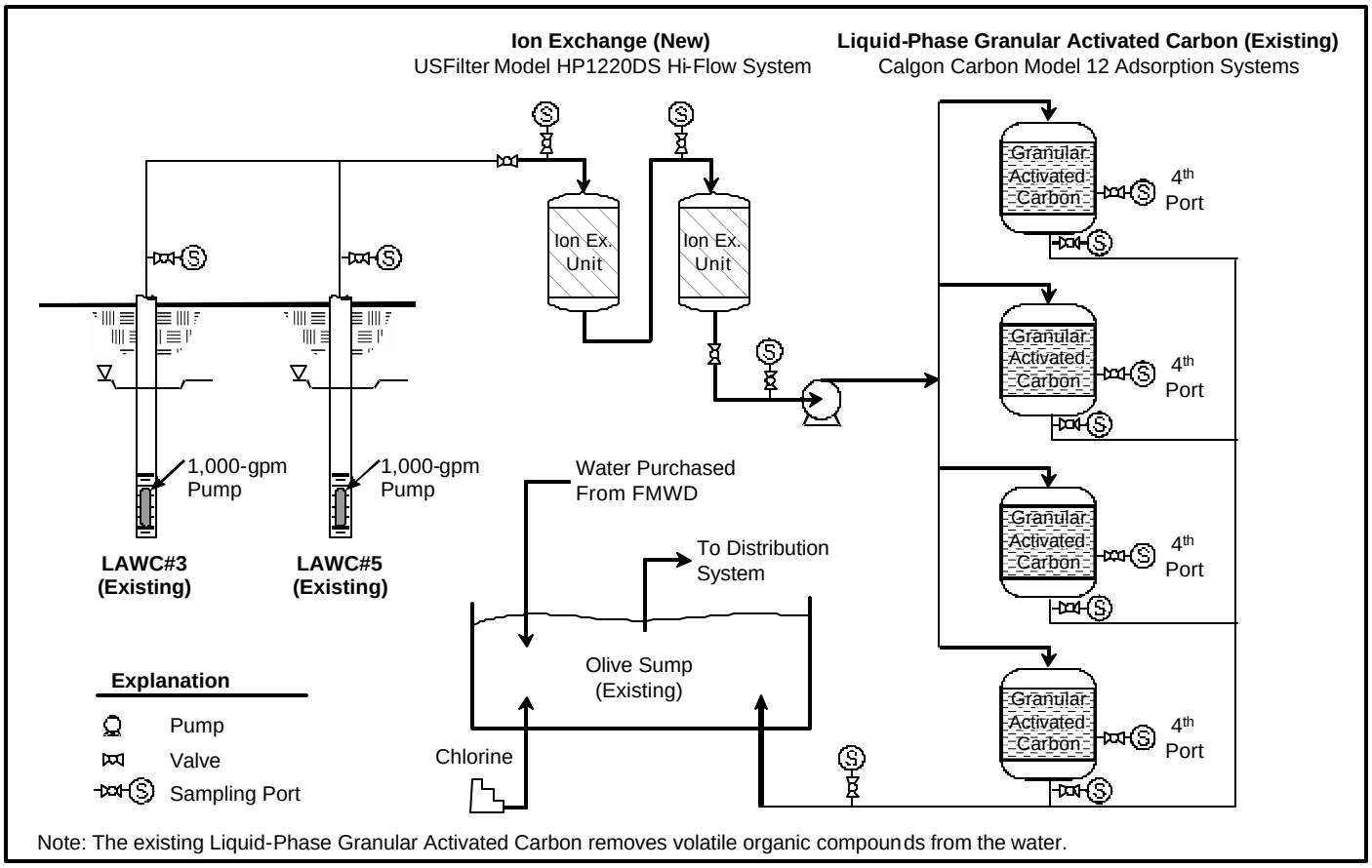

Figure 2. Process Flow Diagram
(Note that the "granular activated carbon" units shown on the right provide removal of volatile organic compounds.)

REGULATORY ANALYSIS

All of NASA JPL's CERCLA program activities are done according to the U.S. Environmental Protection Agency's (EPA's) CERCLA regulations. NASA has identified the specific requirements that this Action must meet, referred to as the "applicable or relevant and appropriate requirements" for this action.

Drinking water requirements. As a purveyor of drinking water in California, Lincoln Avenue Water Company must comply with all applicable State regulations associated with drinking water. Consequently, the treatment plant operators must be certified, and a permit to operate the system must be obtained from the California Department of Health Services.

Treated water intended for drinking must comply with the most stringent provisions of the federal and California "applicable or relevant and appropriate requirements" associated with domestic use of water.

Construction requirements. The ion exchange system is constructed in northwest Altadena on a vacant portion of the same property as the current treatment system for volatile organic compounds and the area where clean water is held prior to distribution. No prehistoric sites, historic sites, historic buildings or landmarks have been identified on this property. No endangered or threatened species or critical habitats are present within the area identified for construction of the Lincoln Avenue Water Company system. Finally, the property is not located in a floodplain or wetland.

NEPA and CEQA. All values of the National Environmental Policy Act (NEPA) were considered to ensure that NEPA concerns were addressed in the decision-making process.

The California Environmental Quality Act (CEQA) is a state environmental protection law that applies to projects undertaken or requiring discretionary approval by state or local government agencies. CEQA imposes requirements on those agencies that are similar to the requirements NEPA imposes on federal agencies. In particular, CEQA requires California public agencies to identify the significant environmental effects of their actions and either avoid and/or mitigate any significant environmental effects where feasible. CEQA applies to this removal action because the Lincoln Avenue Water Company must obtain a drinking water permit from the State Department of Health Services to operate the treatment system. The State Department of Health Services will conduct a separate CEQA proceeding to evaluate the environmental impacts of this project.

Other requirements. During initial testing and evaluation of the treatment plant, extracted water may be discharged to the storm sewer following treatment.

Lincoln Avenue Water Company will continue to comply with extraction, reporting, and monitoring requirements associated with the Raymond Basin Judgment, a 1944 court adjudication of water rights in the Monk Hill Subbasin, from which Lincoln Avenue Water Company draws its water.

A relatively small volume of solid waste (300 to 600 cubic feet per year) will be generated during operation of the ion exchange system. This waste consists of spent (i.e., "used") ion exchange resin beads, the part of the process that absorbs the perchlorate as water flows through the treatment facility. These wastes will be transferred from the site and incinerated, while meeting all legal requirements for the disposal of the used resin.

CONCLUSION

This time-critical removal action is being funded as a part of the NASA JPL CERCLA Program. NASA funded the Lincoln Avenue Water Company's construction and installation of an ion exchange treatment system to remove perchlorate from Lincoln Avenue Water Company Wells #3 and #5 and will continue to fund the treatment system operation. Pumping and treating the water will reduce the movement of chemicals (i.e., volatile organic compounds and perchlorate) in the groundwater underneath and near JPL and ensures that perchlorate is removed to levels that the state considers protective of public health.

This Summary and the Action Memorandum are available on NASA's groundwater cleanup Web site at http://jplwater.nasa.gov and may also be found at the information repositories listed on the following page. Additional technical and environmental information supporting this Action, as well as other documents relating to the cleanup program may also be found on the Web site and at the information repository locations. Public comments are encouraged on the Action summarized in this document and provided in detail in the Action Memorandum.

ACRONYMS AND ABBREVIATIONS

AL	Action Level
ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQA	California Environmental Quality Act
DHS	(California) Department of Health Services
EPA	Environmental Protection Agency
FMWD	Foothill Municipal Water District
JPL	Jet Propulsion Laboratory
LAWC	Lincoln Avenue Water Company
LGAC	Liquid-Phase Granular Activated Carbon
MCL	maximum contaminant level
µg/L	micrograms per liter
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
PHG	Public Health Goal
RWQCB	Regional Water Quality Control Board
VOC	volatile organic compound

NASA CONTACTS

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INFORMATION REPOSITORIES

Altadena Public Library
600 E. Mariposa Ave.
Altadena, CA 91001
(626) 798-0833

Pasadena Central Library
285 E. Walnut St.
Pasadena, CA 91101
(626) 744-4052

La Cañada Flintridge Public Library
4545 Oakwood Ave.
La Cañada Flintridge, CA 91011
(818) 790-3330

JPL Library (JPL Employees Only)
Building 111, Room 104
(818) 354-4200

Web site: http://jplwater.nasa.gov (Note: Do not insert “www” in the Website address.)