

Memorandum

City of Las Vegas
Office of the City Attorney

To: Undersheriff Douglas Gillespie
Las Vegas Metropolitan Police Department

From: William P. Henry, Senior Litigation Counsel *WPH*

CC: David Roger, Clark County District Attorney
Bradford R. Jerbic, Las Vegas City Attorney

Date: July 22, 2005

Re: **Circumstances Surrounding Editing the Report of Bruce Johnson, P.E., and Jay Witherspoon of CH2MHill Entitled "City of Las Vegas WPCF—Effects of Converting Royal Links Golf Course to Residential Develop [sic] on Odor Complaints"**

Thursday, July 21, 2005, we met with the Clark County District Attorney and the Las Vegas City Attorney. The District Attorney requested that I memorialize interviews I had conducted attempting to ascertain how the above-referenced memorandum came to be edited. This memorandum is penned in obedience to that request.¹

¹ Some background would be helpful in understanding this memorandum. For many years the City of Las Vegas owned approximately 160 acres adjacent to the property where the City's Wastewater Treatment Plant is located. A number of years ago Billy Walters entered into a contract with the City to lease much of this property for purposes of establishing the Royal Links Golf Club. The contract required him to bear all of the costs of building and operating the golf club. In return, the City would lease the property to him and receive lease payments. Initially, the property with improvements would revert to the City after several decades. Subsequently, the contract was amended to sell the property to Mr. Walters. However, a deed restriction was recorded preventing the property from being used for residential purposes. Since the establishment of the Wastewater Treatment Plant the City had viewed this property as being a necessary buffer to protect those residing and working near the plant from foul odors. During the course of the years the City has expended more than \$35 million in installed technology to reduce odors emanating from the plant. In the beginning of 2005 Billy Walters proposed to the City that it remove the deed restriction in return for a sum of money, so that the Royal Links Golf Club could be converted to residential property upon which some 1,200 homes would be built. In early July 2005 the City Manager's Office asked the Director of Public Works, Dick Goecke, and the Manager of the Water Pollution Control Facility, David Mendenhall, to utilize consultants in an established relationship to prepare a report on "the effectiveness of our odor control program" and "an assessment regarding how much we've improved the situation and the likelihood of future complaints compared to the record of complaint when we first acquired the buffer land that is now the golf course." HDR

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Monday, July 18, 2005, the City Attorney requested that I meet with Deputy City Manager Steve Houchens to interview Lori Wohletz, the City of Las Vegas' Environmental Officer, and David Mendenhall, Manager of the City's Water Pollution Control Facility. I met with Steve Houchens in the early afternoon and learned from him that the City Manager's Office had commissioned a report from an outside consultant on the impacts of releasing the deed restriction held by the City on the Royal Links Golf Course so that it might be sold for residential development. Information had come to the City Manager's Office that morning indicating that the report provided by the consultant to the City Manager, and thereafter forwarded to the City Council, might have been edited.

Steve Houchens and I met with Lori Wohletz, the City's Environmental Officer, she provided us with four documents which are attached hereto as Exhibits 1, 2, 3, and 5. Exhibit 1 is a letter from David A. Pivetti, P.E., Senior Vice President, HDR Engineering, to David Mendenhall. It is a cover letter to the attached original report from CH2MHill, a consultant to HDR. Exhibit 2 is the original report from CH2MHill, authored by Bruce Johnson, P.E., and Jay Witherspoon, to David Mendenhall. Exhibit 3 is a redlined version of Exhibit 2. Exhibit 5 is the edited report from CH2MHill from Bruce Johnson, P.E., and Jay Witherspoon, to David Mendenhall. It should be noted that Exhibit 4 is the edited cover letter from David A. Pivetti, P.E., Senior Vice President, HDR Engineering, to David Mendenhall. This was provided to the City Manager's Office contemporaneously with the edited report, Exhibit 5. I did not receive it from Lori Wohletz. Rather, I later got it from Acting City Manager Betsy Fretwell.

Lori Wohletz told me, in the presence of Steve Houchens, that she was attending a seminar with David Mendenhall and John Bettencourt on Wednesday, July 13, 2005, when John Bettencourt received an e-mail on his Blackberry indicating that the report commissioned by the City Manager's Office had been finished by HDR Engineering. Shortly thereafter Mr. Mendenhall had a telephone conversation David A. Pivetti of HDR Engineering. After that telephone conversation he told Lori Wohletz that the original report would not be submitted, rather an edited version would be prepared. Exhibits 1, 2, 3, and 5 were electronically transmitted to David Mendenhall as attachments to e-mail. He printed these documents and gave copies to Lori Wohletz and John Bettencourt. Lori Wohletz provided these copies to me during her interview. An examination of the editing done between Exhibits 1 and 2, the original cover letter and the original report, and Exhibits 4 and 5, the cover letter and report ultimately submitted to the City Manager, reveals that nearly all information tending to indicate it would be hazardous to safety or costly to the City of Las Vegas to see the Royal Links Golf Club converted to residential housing for 1,200 homes was deleted. Lori Wohletz told me that, in addition to the information contained in the original cover letter and original report, Exhibits 1 and 2, she believed that converting the Royal Links Golf Club to residential housing would intrude into an

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Engineering, and its subcontractor on odor control, CH2MHill, were given this commission. The sequence of events described in this memorandum occurred as a result of that commission.

isolation zone required by federal, state, and county laws having to do with exclusion zones around hazardous chemical storage. Because of this, she said, a hazard assessment would need to be done. She also told me that a hazardous consequences analysis would need to be done to determine whether the proposed residential housing intruded into the legally mandated blast zone surrounding methane storage.

Next I interviewed David Mendenhall in the presence of Deputy City Manager Steve Houchens. I showed Mr. Mendenhall Exhibits 1, 2, 3, and 5 and he authenticated them. He told me that he had initially received Exhibits 1 and 2, the original cover letter and report, and then, after a phone conversation with David A. Pivetti, P.E., of HDR Engineering, he received Exhibit 3, the redlined report, and finally Exhibit 5 the edited report was transmitted to him. Exhibit 4, the edited cover letter, was transmitted to him the next day, July 14, 2005. David Mendenhall told me that he had been in the presence of Lori Wohletz and John Bettencourt when he received Exhibits 1 and 2, and had made copies of those exhibits for them. He also told me that he then had a telephone conversation with David A. Pivetti and was told that the original cover letter and reports would not be submitted. **Rather an edited version would be prepared.** David A. Pivetti told him that he had spoken with Dick Goecke, the City of Las Vegas Public Works Director, and been told to focus on the positive accomplishments of the Wastewater Treatment Plant. Mr. Mendenhall stated that he met with Dick Goecke the next day, Thursday, July 14, 2005, and reviewed Exhibits 4 and 5, the edited cover letter and report. He insisted that during this conversation neither he nor Mr. Goecke had mentioned the existence of Exhibits 1, 2, and 3, the original cover letter and report and well as the redlined report. He told me that this meeting occurred because during the previous week he had received an e-mail from Dick Goecke's secretary instructing him not to forward the report commissioned by the City Manager to the City Manager's Office until Dick Goecke had reviewed it.

Next, I interviewed David A. Pivetti, P.E., Senior Vice President, HDR Engineering. Betsy Fretwell, Acting City Manager, placed a telephone call to him. Mr. Pivetti stated that he had prepared an original cover letter and report pursuant to a commission from the City Manager's Office. **He also stated that thereafter he had a telephone conversation with Dick Goecke and was instructed to focus on the positive accomplishments of the wastewater treatment plant.** Mr. Pivetti then edited the original cover letter and report, and transmitted that to David Mendenhall. David A. Pivetti stated that until he spoke with Dick Goecke he was satisfied with the original cover letter and report, and but for his conversation with Dick Goecke he would not have prepared or submitted edited versions.

During the morning hours of Tuesday, July 19, 2005, I interviewed Dick Goecke in the presence of Deputy City Manager Steve Houchens. He stated that he and David Pivetti had spoken the night before regarding my interview of David Pivetti. **He insisted that he had never seen nor heard of Exhibits 1, 2 and 3, the original cover letter, report, and redlined report.** He stated that he had met with David Mendenhall Thursday, July 14, 2005, and reviewed Exhibits 4 and 5, the edited cover letter and report. He stated that during that conversation David

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Mendenhall had mentioned that there might be some issues having to do with conversion of Royal Links Golf Club to residential housing not mentioned in Exhibits 4 and 5. These issues had to do with storage of chemicals. Dick Goecke stated that he told David Mendenhall that if these issues existed they would deal with them. Dick Goecke told me that he had spoken with David A. Pivetti Thursday, July 14, 2005. During this conversation he remembered saying that the report should emphasize the positive accomplishments of the Wastewater Treatment Plant, but did not remember being told that a report already existed, what its contents were, or that any of the contents were negative. Dick Goecke told me that he knew Billy Walters, the owner of Royal Links Golf Club, for 14 or 15 years. He stated that he had eaten at various facilities owned by Mr. Walters but had never been comped. He told me that he had played golf at various golf clubs owned by Mr. Walters, and had been comped half a dozen times over the years. He told me that his daughter's wedding reception was held at a country club owned by Mr. Walters and that he had not paid for it. He stated that the only conversation he remembered having with Mr. Walters concerning the wedding reception occurred after the reception. He told Mr. Walters that the groom's parents should pay him for the reception. He did not remember Mr. Walters responding. Dick Goecke denied receiving anything else of value from Billy Walters for himself, associates, relatives, or any legal entity he was related to. It interested me that when I stopped asking questions concerning the report and began asking questions concerning whether or not Dick Goecke had received things of value from Billy Walters the form of his answered changed. In the first instance his answers were direct, when asked questions having to do with receiving something of value from Billy Walters he prefaced all of his answers with "to the best of my knowledge."

Thursday, July 21, 2005, I reinterviewed David Mendenhall in the presence of Deputy City Manager Steve Houchens. Mr. Mendenhall authenticated Exhibits 1 through 5. He again stated that at the meeting with Dick Goecke Thursday, July 14, 2005, they had only discussed Exhibits 4 and 5, the edited cover letter and report, and had not mentioned the existence of Exhibits 1, 2 and 3. He stated that during the conversation with Lori Wohletz and John Bettencourt Wednesday, July 13, 2005, that occurred after he had gotten the original cover letter and report, Exhibits 1 and 2, and then spoken with David A. Pivetti, P.E., he had shaken his head and expressed disappointment that the original documents would not be submitted to the City Manager's Office.

WPH:ck
Attachments
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EXHIBIT 1

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David Mendehall
City of Las Vegas

Subject: City of Las Vegas Water Pollution Control Facility – Odor Measures
Assessment

Dear Mr. Medenhall,

Please find attached a memo report prepared by CH2MHill with regard to an assessment of the effectiveness of the currently installed odor control measures at the treatment plant. The report indicates that the installed measures have been highly successful in reducing odor complaints related to the Water Pollution Control Facility. In fact, there have been no recorded complaints in the last three years. However, as indicated in the report, this is not likely to be the case in the future as housing encroaches on the plant site. CH2MHill indicates that the City can almost certainly expect complaints in the future as housing is placed closer to the fence line. Further odor control measures would be required to mitigate the potential of future complaints. The capital and operating costs for these future measures could be in the tens of millions of dollars. CH2MHill recommends preparing a more comprehensive study to further quantify the impacts and costs.

As plans are made to residentially develop the area around the plant site, the City needs to keep in mind at least two other issues. The first is that the berm separating the plant site from the Links Golf Course on the West Side of the plant also serves as a continuation of the flood protection around the plant. Any plan to remove this berm and place houses in this location will require the installation of a suitable flood wall to provide continuing protection to the plant.

The second issue involves the existence of hazardous conditions at the plant site that are inherent in the day to day operations of the facility. The treatment plant stores and uses a number of hazardous chemicals required for the operation of the plant. In addition, a byproduct of the natural plant processes is the production of methane gas. The methane gas is then stored onsite and used for heating and energy generation. Both the EPA and OSHA require an analysis of these conditions. Our understanding is that a circle of about one half mile surrounding the methane storage has been defined as a zone of impact for a "worst case scenario incident". Plans for residential development now in progress will encroach upon this zone of impact. Proposed locations for homes will also place them in proximity to storage tanks for hazardous chemicals. These conditions, at a minimum, will require the hazard analysis to be redone. It is expected that mitigation measures would be required for the hazardous conditions and/or possible removal of the hazardous materials from the site. This will have unknown cost and operations implications to the City. It is recommended that prior to approval, by the City or County, of housing placed close to the fence line of the plant, that the hazardous materials implications be reviewed.

Sincerely,

David Pivetti, PE
Senior Vice President
HDR Engineering

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EXHIBIT 2

(13)

City of Las Vegas WPCF - Effects of Converting Royal Links Golf Course to Residential Develop on Odor Complaints

TO: David Mendenhall/
FROM: Bruce Johnson, P.E.
Jay Witherspoon
DATE: July 13, 2005

Introduction

Until recently, the City of Las Vegas Water Pollution Control Facility has been surrounded by a buffer zone of golf courses and undeveloped land. This buffer zone has helped to minimize the impacts of odors from the WPCF to residential areas. The Royal Links Golf course borders the WPCF on the west and north. The owners of the golf course are pursuing the conversion of the golf course to a residential development. As currently proposed, the homes would be constructed adjacent to the boundaries with the WPCF with very little buffer area. The purpose of this memorandum is to discuss the potential impact this could have on the detection of off-site odor, and resulting complaints, and the additional odor controls that would need to be installed to eliminate odors completely at the property line.

Odor Control Improvements

Through the mid to late 1990's, the City received a number of odor complaints from residents living to the west of the WPCF. In 1993 a maximum of 1433 odor complaints were recorded. Over the years the City has completed numerous projects at the WPCF for odor control (a list of projects is attached hereto). In 1997, the City initiated a facilities plan for expansion of the WPCF. The facility plan included a significant odor control program. This program included air sampling, computer modeling of emissions from the WPCF, dispersion modeling to estimate off-site impacts, developing an odor control strategy, and assessment of off-site impacts with improvements. Based on the Facility Plan, nearly \$20 million of odor control improvements were then constructed at the WPCF. These improvements include covering of trickling filters, installing chemical scrubbers on the trickling filters, installing biofilters at the headworks, dewatering building, and Plant 5 and 6 gravity thickeners and primary sedimentation basins, installing an enclosed waste gas flare, lining the digesters and a several process improvements. As a result of these improvements, off-site odor complaints have practically been eliminated. The City has received no odor complaints since 2003.

Likelihood of Future Complains

Although off-site odors have been reduced by 95-99% and odor complaints have virtually been eliminated, it does not mean there will be no off-site odors from the WPCF. When the odor control improvement program was initiated, it was determined that it would be prohibitively expensive to install the controls necessary to prevent every chance of an off-site odor. In addition, the golf course with its high berms and a vegetative barrier separating it from the WPCF, provided an additional barrier to odors reaching residential receptors. If the golf course is converted to a housing development and the vegetated berms are removed, it is likely that residents will, on occasion, detect odors from the WPCF based on the following:

- Computer modeling, using historical records of wind speeds and directions and emission estimates of existing facilities with odor controls, indicates that at the West fenceline of the WPCF there could be between 20 and 50 events per year during which the dilution to threshold ratio could exceed 20. A D/T ratio of 20 is generally considered the odor threshold number at which odors can be detected and identified as coming from a wastewater treatment plant. Without being able to detect the source of odors, the human nose can detect odors down to a D/T ratio of 4.
- A review of the proposed development plans indicates that the existing berms and vegetation will be removed and that houses will be built immediately adjacent to the property line to the northwest and north of the WPCF. Immediately to the west, it appears that there will be some buffer zone with trees, but the berm will be removed. The removal of the berm and the construction so close to the property line will almost certainly increase the reception of odors in the new development.
- The removal of the golf course will probably also have some impact on the residents beyond the new development. The golf course, with all its vegetation and irrigation, creates temperature gradients because of the cooler temperatures than surrounding areas. This helps to dilute trace odors from the WPCF. If the golf course is removed and replaced with streets, tile roofs, concrete structures and desert landscaping there will probably be an impact at DIME 3 and odor complaints from that area could increase.
- There is a correlation with visually being able to see a wastewater treatment plant and the sensing of odors. It is our understanding that there will be a 10-foot wall between the development and the WPCF. If the homes are two story, there will be a view of the WPCF for those home that are just along the edge of the property and this will certainly contribute to the perception of odors.
- There is a sewer junction box on Vegas Valley Drive and Stephanie Street. A computer model has been used to estimate the production of odor causing hydrogen sulfide in the interceptor system. This location has a potential for high odors and would be very close to the homes to be built on both the north and south sides of Vegas Valley Drive,.
- The Las Vegas Valley continues to grow at a rapid rate. At some time in the future, it will be necessary to expand the capacity of the WPCF. It has been planned that the next expansion, which could be up to 25 mgd would be in the northwest corner of the WPDF property. This is the only space left on the site for expansion. Although odor controls

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will be included with this expansion, there would certainly be some detection of odors by the residents immediately west of the WPCF property line. Again the lack of a buffer zone and the close proximity of the homes to the future treatment facilities will make it virtually impossible to eliminate all off-site odors associated with the future expansion.

Elimination of All Odors at the Property Line

Recently, there have been several similar sized wastewater treatment plants (both new and existing) that have set goals of no detectable odors at their property lines. This goal has been set to meet public demand to have an odor-free environment at their homes or recreational facilities near the plants. Plants that we are familiar with are located in California, Washington, Florida, Colorado, Virginia, Singapore, and New Zealand.

These plants have set an odor detection goal that is 20 times lower than the WPCF's goal of 20 D/T at the property line. These plants typically do not have any surrounding "greenbelts" (parks, washes, or golf courses) or significant buffer zones (the distance between the plant odor sources and the first residential or commercial location). These buffer zones and greenbelts allow any trace odors from a WWTP to be further diluted to lower detectable levels before the odor is exposed to the surrounding community.

To meet no detectable odors at the property line, these plants are: installing 5-stage odor abatement trains; covering and venting all wastewater treatment processes to odor abatement trains; enclosing biosolids and other odorous sources in buildings and venting to an odor abatement device; covering all biosolids trucks in and out of the plant; keeping negative ventilation pressure under covered processes and in buildings to keep potential fugitive odors from escaping the processes or buildings; adding maintenance needs odor abatement trains; adding redundant odor abatement equipment; adding temporary odor abatement equipment that can be moved from one location to another to abate short-term odor sources O&M needs, like digester clean-outs or treating ventilation air used to allow staff access to a covered process; converting or purchasing digester waste gas burners; and conducting significant public outreach activities.

The 5-stage odor abatement trains at these plants consist of: Stage 1. liquid phase chemical treatment at the plant's headworks to keep the influent wastewater sulfide loading level below 0.5 ppm; Stages 2. - 4. three-stage chemical scrubber, that uses each stage to target and remove various odorous compounds; Stage 5. carbon bed scrubber to polish off any trace odors downstream of the three stage chemical scrubbers. The cost for this 5-stage odor abatement train runs around \$0.70 to \$1.2/wastewater gallon or \$700,000 to \$1,200,000/MGD.

For the City to match this goal of no detectable odors, the capital costs would be in the \$63,000,000 to \$100,000,000 range for additional odor control to meet no detectable odors at the property line, if the housing development is allowed next to the plant. The O&M annual costs would run between \$2 to \$4 million/year for chemicals, power, water, and O&M staffing needs. The City has invested around \$20,000,000 to date to bring odor complaints down from 100 - 120/per month to 1 or 2 a year. The current odor abatement strategy counts on the plant's odors being reduced by the greenbelt and buffer zone distances before

moving over the surrounding community. If the latter are removed or developed, then the City may be looking at an additional \$43,000,000 to \$80,000,000 in odor abatement needs.

Recommendation for Further Study

It is recommended that if the City is considering the conversion of the golf course to residential development that further studies be done to evaluate potential off-site odor impacts. These studies might include odor emissions sampling (including the plant's odor abatement equipment and current, ambient odor levels at the property line) and additional dispersion modeling to see any potential off-site odor impacts, how the odor is diluted without the surrounding greenbelt or buffer zone, and what would be required to abate the odors to achieve no detectable odors at the plant's property line. Additional study might also include evaluation of potential odor abatement equipment that can be added to the City's existing odor abatement trains to meet no detectable odors at the property line. Finally, a detailed cost estimate to the City for odor abatement needed to meet the no detectable odors at the property line can be provided.

EXHIBIT 3

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City of Las Vegas WPCF - Assessment of Odor Control Improvements ~~Effects of Converting Royal Links Golf Course to Residential Develop-on~~ Odor Complaints

TO: David Mendenhall/
FROM: Bruce Johnson, P.E.
Jay Witherspoon
DATE: July 13, 2005

Introduction

Since as early as 1991 the City of Las Vegas has embarked on an ongoing and successful campaign to reduce odors at the Water Pollution Control Facility. When the plant was first constructed on the fringes of town in 1957, no one could have conceived of the encroaching growth that has now occurred. The first major effort to eliminate odors was the elimination of the sludge drying beds and the construction of a mechanical dewatering facility in 1991. In about 1993 the County Health District established a "hot line" for neighboring residents to register their odor complaints. In 1993 a maximum of 1433 odor complaints were recorded. In response to these complaints the City continued to complete numerous projects at the WPCF for odor control (a list of projects is attached hereto). As a result of these projects the odor complaints have been eliminated (see chart of complaints, attached). There have been no recorded complaints in three years. In all, the City has spent about \$50 million to achieve this level of odor reduction.

1997 ~~Until recently, the City of Las Vegas Water Pollution Control Facility has been surrounded by a buffer zone of golf courses and undeveloped land. This buffer zone has helped to minimize the impacts of odors from the WPCF to residential areas. The Royal Links Golf course borders the WPCF on the west and north. The owners of the golf course are pursuing the conversion of the golf course to a residential development. As currently proposed, the homes would be constructed adjacent to the boundaries with the WPCF with very little buffer area. The purpose of this memorandum is to discuss the potential impact this could have on the detection of off-site odor, and resulting complaints, and the additional odor controls that would need to be installed to eliminate odors completely at the property line.~~

Potential Likelihood of Future Complaints Off-Site Odors

Although off-site odors have been reduced by 95-99% and odor complaints have almost virtually been eliminated, it does not mean there will be no off-site odors from the WPCF. When the odor control improvement program was initiated, it was determined that it would be prohibitively expensive to install the controls necessary to prevent every chance of an off-site odor. In addition, the golf course with its high berms and a vegetative barrier separating it from the WPCF, provided an additional barrier to odors reaching residential receptors. If the golf course is converted to a housing development and the vegetated berms are removed, it is likely that there residents will, on occasion, detect odors from the WPCF based on the following:

- Computer modeling, using historical records of wind speeds and directions and emission estimates of existing facilities with odor controls, indicates that at the Western fence line boundary of the WPCF there could be between 20 and 50 events per year that may produce noticeable odors during which the dilution to threshold ratio could exceed 20. A D/T ratio of 20 is generally considered the odor threshold number at which odors can be detected and identified as coming from a wastewater treatment plant. Without being able to detect the source of odors, the human nose can detect odors down to a D/T ratio of 4. 20 to 50 events is less than 1 percent of all hours.
- If A review of the proposed development plans indicates that the existing berms and vegetation at the West fence line will be removed and that houses will be built immediately adjacent to the property line to the northwest and north of the WPCF. Immediately to the west, it appears that there will some buffer zone with trees, but the berm will be removed. The removal of the berm and the construction so close to the property line there will almost certainly be an increase in the reception of odors in the new development.
- The removal of the golf course will probably could also have some impact on the residents beyond the new development. The golf course, with all its vegetation and irrigation, creates temperature gradients because of the cooler temperatures than surrounding areas. This helps to dilute trace odors from the WPCF. If the golf course is removed and replaced with streets, tile roofs, concrete structures and desert landscaping there may will probably be an impact at DIME 3 and odor complaints from that area could increase.
- There is a correlation with visually being able to see a wastewater treatment plant and the sensing of odors. It is our understanding that there will be a 10 foot wall between the development and the WPCF. If the homes are two story, there will be a view of the WPCF for those home that are just along the edge of the property and this will certainly contribute to the perception of odors.

- ~~There is a sewer junction box on Vegas Valley Drive and Stephanie Street. A computer model has been used to estimate the production of odor causing hydrogen sulfide in the interceptor system. This location has a potential for high odors and would be very close to the homes to be build on both the north and south sides of Vegas Valley Drive.~~
- ~~The Las Vegas Valley continues to grow at a rapid rate. At some time in the future, it will be necessary to expand the capacity of the WPCF. It has been planned that the next expansion, which could be up to 25 mgd would be in the northwest corner of the WPDF property. This is the only space left on the site for expansion. Although odor controls will be included with this expansion, there were certainly be some detection of odors to the residents immediately west of the WPCF property line. Again the lack of a buffer zone and the close proximity of the homes to the future treatment facilities will make it virtually impossible to eliminate all off site odors with the expansion.~~

Eliminating of All Odors at the Property Line

If it should become necessary to provide a higher level of odor control, there are technologies available to do so. There are a number of wastewater treatment plants that are surrounded by residential development that have had to use the highest level of odor control. However, it is very costly. Typical approaches, in addition to what is currently provided at the WPCF, might include:

- Covering all open basins that contain wastewater that is exposed to the atmosphere and treating the air above the liquid.
- Liquid phase chemical treatment to reduce the concentration of hydrogen sulfide coming into the plant
- Using three stage chemical scrubbers to better target and remove odorous compounds
- Adding carbon scrubbers to remove the chemical smells that come from chemical scrubbers
- Using trucks that are completely sealed and/or using odor reducing chemical in trucks that are hauling sludge to the landfill

Recently, there have been several similar sized wastewater treatment plants (both new and existing) that have set goals of no detectable odors encroaching residential growth at their property lines. This goal has been set to meet public demands to have for an odor-free environment at their homes or recreational facilities near the plants. Plants that we are familiar with are located in California, Washington, Florida, Colorado, Virginia, Singapore, and New Zealand.

These plants have set an odor detection goal that is 20 times lower than the WPCF's goal of 20 D/T at the property line. These plants typically do not have any surrounding "greenbelts" (parks, washes, or golf courses) or significant buffer zones (the distance between the plant odor sources and the first residential or commercial location). These

buffer zones and greenbelts allow any trace odors from a WWTP to be further diluted to lower detectable levels before the odor is exposed to the surrounding community.

To meet no detectable odors at the property line, these plants are: installing more intensive 5-stage odor abatement trains; covering and venting all wastewater treatment processes to odor abatement trains; enclosing biosolids and other odorous sources in buildings and venting to an odor abatement device; covering all biosolids trucks in and out of the plant; keeping negative ventilation pressure under covered processes and in buildings to keep potential fugitive odors from escaping the processes or buildings; adding maintenance needs odor abatement trains; adding redundant odor abatement equipment; adding temporary odor abatement equipment that can be moved from one location to another to abate short-term odor sources O&M needs, like digester clean-outs or treating ventilation air used to allow staff access to a covered process; converting or purchasing digester waste gas burners; and conducting significant public outreach activities.

The City has already completed most of these measures through the work that has been done over the years. Because of the closeness of future residences the City may have to increase even further the level of odor treatment to avoid future odor complaints. Possible future projects might include additional odor control stages to the existing chemical scrubbers. Future odor reduction needs could require that more chemicals are consumed in the existing scrubbers.

The 5-stage odor abatement trains at these plants consist of: Stage 1. liquid phase chemical treatment at the plant's headworks to keep the influent wastewater sulfide loading level below 0.5 ppm; Stages 2—4. three-stage chemical scrubber, that uses each stage to target and removal various odorous compounds; Stage 5. carbon bed scrubber to polish off any trace odors downstream of the three-stage chemical scrubbers. The cost for this 5-stage odor abatement train runs around \$0.70 to \$1.2/wastewater gallon or \$700,000 to \$1,200,000/MGD.

For the City to match this goal of no detectable odors, the capital costs would be in the \$63,000,000 to \$100,000,000 range for additional odor control to meet no detectable odors at the property line, if the housing development is allowed next to the plant. The O&M annual costs would run between \$2 to \$4 million/year for chemicals, power, water, and O&M staffing needs. The City has invested around \$20,000,000 to date to bring odor complaints down from 100—120/per month to 1 or 2 a year. The current odor abatement strategy counts on the plant's odors being reduced by the greenbelt and buffer zone distances before moving over the surrounding community. If the latter are removed or developed, then the City may be looking at an additional \$43,000,000 to \$80,000,000 in odor abatement needs.

Recommendation for Further Study

Further studies are recommended to more rigorously evaluate the potential of off-site odors. These studies include the following:

- More extensive odor emission sampling to better define the effectiveness on the plant's existing odor abatement equipment and to characterize ambient odor levels at the property line

- Additional air dispersion modeling at lower odor thresholds to evaluate how odors might be dispersed without the surrounding buffer zones and to determine off site impacts with a higher level of control at the WPCF
- Evaluation of the effectiveness of additional odor control that could be added to the existing odor control treatment trains
- Development of detailed cost for additional odor control

~~It is recommended that if the City is considering the conversion of the golf course to residential development that further studies be done to evaluate potential off site odor impacts. These studies might include odor emissions sampling (including the plant's odor abatement equipment and current, ambient odor levels at the property line) and additional dispersion modeling to see any potential off site odor impacts, how the odor is diluted without the surrounding greenbelt or buffer zone, and what would be required to abate the odors to achieve no detectable odors at the plant's property line. Additional study might also include evaluation of potential odor abatement equipment that can be added to the City's existing odor abatement trains, to meet no detectable odors at the property line. Finally, a detailed cost estimate to the City for odor abatement needed to meet the no detectable odors at the property line can be provided.~~

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EXHIBIT 4

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JUL 15 2005

July 14, 2005

DAP.079

Mr. David Mendenhall
City of Las Vegas
Water Pollution Control Facility
6005 E. Vegas Valley Dr.
Las Vegas, NV 89142

Subject: City of Las Vegas Water Pollution Control Facility – Odor Measures Assessment

Dear Mr. Mendenhall:

Please find attached a memo report prepared by CH2MHill with regard to an assessment of the effectiveness of the currently installed odor control measures at the treatment plant. The report indicates that the installed measures have been highly successful in reducing odor complaints related to the Water Pollution Control Facility (WPCF). In fact, there have been no recorded complaints in the last three years. However, CH2MHill indicates that the City may expect some complaints in the future as housing is placed closer to the plant fence line. As indicated in the report, the technology exists to deal with this situation of encroaching residential development. Upgrades to the existing WPCF odor control measures or additional chemical use may be required to mitigate the potential of future complaints. CH2MHill recommends preparing a more comprehensive study to further quantify the impacts and costs.

Also attached is a detailed account of the history of odor control measures installed at the WPCF, and a copy of the latest Odor Easement document.

Please do not hesitate to contact me with any questions you may have.

Sincerely,



David A. Pivetti, PE
Senior Vice President
HDR Engineering

Enclosures

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EXHIBIT 5

(27)

City of Las Vegas WPCF - Assessment of Odor Control Improvements

TO: David Mendenhall
FROM: Bruce Johnson, P.E.
Jay Witherspoon
DATE: July 13, 2005

Introduction

Since as early as 1991 the City of Las Vegas has embarked on an ongoing and successful campaign to reduce odors at the Water Pollution Control Facility. When the plant was first constructed on the fringes of town in 1957, no one could have conceived of the encroaching growth that has now occurred. The first major effort to eliminate odors was the elimination of the sludge drying beds and the construction of a mechanical dewatering facility in 1991. In about 1993 the County Health District established a "hot line" for neighboring residents to register their odor complaints. In 1993 a maximum of 1433 odor complaints were recorded. In response to these complaints the City continued to complete numerous projects at the WPCF for odor control (a list of projects is attached hereto). As a result of these projects the odor complaints have been eliminated (see chart of complaints, attached). There have been no recorded complaints in three years. In all, the City has spent about \$50 million to achieve this level of odor reduction.

1997 Recent Odor Control Improvements

A major component of the recent WPCF expansion has been the evaluation and construction of odor control improvements. Odor evaluations have included the following:

- Air Sampling
- Computer simulations to estimate emissions from treatment processes
- Air dispersion modeling to determine off-site impacts
- Hydraulic and water/air quality modeling of the interceptor system to calculate hydrogen sulfide loads into the WPCF
- Evaluation of odor control technologies
- Development of an over-all odor control strategy

Based on these evaluations, a number of odor control improvements have been constructed. These include:

- Lining digesters to reduce fugitive emissions from the digesters

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- Enclosing and venting grit bins
- Covering eight trickling filters with low profile aluminum dome covers
- Installing seven multistage packed bed chemical scrubbers
- Installing soil biofilters for the headworks building, dewatering building, and Plant 5 and 6
- Replacing the old open flame waste gas burners with more efficient enclosed waste gas flares.

In addition, operational improvements, such as using ferric chloride at the head of the plant and controlling the number of hours emission units are allowed to operate each year, have made significant improvements in the control of odors.

Potential of Future Off-Site Odors

Although off-site odors have been reduced by 95-99% and odor complaints have virtually been eliminated, it does not mean there will be no off-site odors from the WPCF. When the odor control improvement program was initiated, it was determined that it would be prohibitively expensive to install the controls necessary to prevent every chance of an off-site odor. In addition, the golf course with its high berms and a vegetative barrier separating it from the WPCF, provided an additional barrier to odors reaching residential receptors. If the golf course is converted to a housing development and the vegetated berms are removed, it is likely that residents will, on occasion, detect odors from the WPCF based on the following:

- Computer modeling, using historical records of wind speeds and directions and emission estimates of existing facilities with odor controls, indicates that at the West fence line of the WPCF there could be between 20 and 50 events per year that may produce noticeable odors.
- If the existing berms and vegetation at the West fence line will be removed and houses built immediately adjacent to the property line there will almost certainly be an increase in the reception of odors in the new development.
- The removal of the golf course could also have some impact on the residents beyond the new development. The golf course, with all its vegetation and irrigation, helps to dilute trace odors from the WPCF. If the golf course is removed and replaced with streets, tile roofs, concrete structures and desert landscaping there may be an impact at DIME 3 and odor complaints from that area could increase.

Eliminating All Odors at the Property Line

If it should become necessary to provide a higher level of odor control, there are technologies available to do so. There are a number of wastewater treatment plants that are surrounded by residential development that have had to use the highest level of odor

control. However, it is very costly. Typical approaches, in addition to what is currently provided at the WPCF, might include:

- Covering all open basins that contain wastewater that is exposed to the atmosphere and treating the air above the liquid.
- Liquid phase chemical treatment to reduce the concentration of hydrogen sulfide coming into the plant
- Using three stage chemical scrubbers to better target and remove odorous compounds
- Adding carbon scrubbers to remove the chemical smells that come from chemical scrubbers
- Using trucks that are completely sealed and/or using odor reducing chemical in trucks that are hauling sludge to the landfill

Further Study

Further studies are recommended to more rigorously evaluate the potential of off-site odors. These studies include the following:

- More extensive odor emission sampling to better define the effectiveness on the plant's existing odor abatement equipment and to characterize ambient odor levels at the property line
- Additional air dispersion modeling at lower odor thresholds to evaluate how odors might be dispersed without the surrounding buffer zones and to determine off site impacts with a higher level of control at the WPCF
- Evaluation of the effectiveness of additional odor control that could be added to the existing odor control treatment trains
- Development of detailed cost for additional odor control

City of Las Vegas Odor Control Activities

July 11, 2005

History

1957 - City moves Wastewater Facilities from downtown at Bonanza and Mojave to the remote Vegas Valley location. The original plant had a capacity of 15 MGD.

1985 - The City makes digester gas system improvements that include new roofs for digesters preventing leaking of digester gas. Work done under bid No. 85.7254.2.

1987 - The City installs Chlorination and Sludge Grinders in Plants 1 & 2 for Odor Control in Contract 1, bid No. 87.7112.3.

1988 - The City installs a Ferrous Chloride System in Plants 1 & 2 for Odor Control in Contract 2, bid No. 88.7112.3.

1991 - Contract 3.A, Dewatering Equipment purchase of \$1,598,000. This is in preparation of abandoning the sludge drying beds.

1991 - Contract 4, Chlorine Facilities, are completed for \$1,101,660.44. This allows for bulk Chlorine storage and distribution to: Headworks, clarifiers, etc. for odor control.

1992 - Contract 3.B, Dewatering Facilities are completed for \$4,843,995.33. This allows abandoning of sludge drying beds. Facilities are equipped with odor control systems.

1993 - City of Las Vegas retains John Carollo Engineers to do a comprehensive study entitled "Air Emissions Control Alternatives". This report presents the findings of the plant-wide review of potential odor sources at the Water Pollution Control Facility and outlines a phased approach to further odor mitigation measures.

1993 - Covers and packed tower scrubbers are completed for the gravity thickeners serving all four plants.

1994 - Chemical addition to grit hoppers, trickling filters are tried for odor control. Digester seals are rehabilitated and improved. Concrete covers for open diversion boxes are installed. Temporary covers for the digester scope boxes are installed. Caustic solution addition in the interceptors upstream of the WPCF to reduce the slime layer and resulting sulfides are done.

1995 - Odor control Phase 1 contract is completed for \$ 5,355,617.00 engineering costs is \$ 244,791.00. This contract covered the primary basins, built a building around the bar screens and installed a scrubber system to both.

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July 11, 2005

City of Las Vegas Odor Control Activities

1996 - City contracts with CH2M-Hill for a Wastewater Facilities Analysis that evaluates the impact of expansion on odor generation within the wastewater system the cost is \$ 170,500.00. Trickling filter speed is adjusted to increase flushing action; odors are reduced. Ozone generators are purchased and installed in the grit holding facility and sludge cake tanks; odors are reduced. Ferrous Chloride is plumbed to all digesters for reduction of hydrogen sulfide.

1997 - Digester 2 Rehabilitation Contract is let at \$ 190,523.80 This contract prevents digester gas leaks from the top of the digester. Other digesters are scheduled for this rehabilitation in rotation.

Odor Control phase 2 Contract for \$861,737.00, Engineering costs are \$202,430.00. This contract provides a Barscreen bypass to prevent flooding of the Barscreen facilities, Emergency power for the bar screens and odor scrubbers and tank shielding for the Odor Scrubbers.

1998-2000 The remaining five digesters are rehabilitated to prevent digester gas leaks from the top of the digesters. These rehabilitation projects cost \$300,000 for each digester, for a total of \$1.5 million.

Contract 20B, Trickling filter domes and Scrubbers, \$4,942,053.
Operations shifts from Alum to Ferric Chloride for coagulant, H₂S is drastically reduced.

2000- Construction of Wastewater treatment facility expansion from 66 MGD to 91 MGD. Odor control related activities for the new facilities include: consolidation of grit handling facilities (\$300,000), odor control facilities at headworks (\$250,000), odor control at primary clarifiers (750,000) odor control at thickeners (\$400,000), and odor control at the solids dewatering facility (\$250,000).

2000- Durango Hills Water Resource Center- The facility plan for this satellite wastewater reclamation center included odor control; a separate consultant was hired just to look at odors. This facility has no solids dewatering facilities.

Odor Complaints for the WPCF

