

**Adams County
Community and Economic Development Department
Development Review Comments**

	Case Number: USR2018-00001		Case Name: Duck Club	
	Applicant: Extraction		Date Initiated: 03/07/2018 Comments provided to applicant: 03/29/2018	
Referral Comment No.	Mapped?	Reviewer Initials	County Comment	Applicant Response (date)
1	ADCO	CD	Staff has reviewed comments and is evaluating how Conditionals of Approval (COAs) may be used to mitigate impacts.	
2	ADCO	CD	<p>a. Per the operators MOU with Adams County, baseline testing of all residential water wells located within 1/2 mile of the proposed location will be required upon the owner's request.</p> <p>b. Describe what structural and administrative Best Management Practices will be implemented to mitigate air quality impacts during the different phases of development and production.</p> <p>c. The proposed location is within 1/4 mile of a FEMA flood zone, additional perimeter controls should be implemented to minimize the potential for surface migration of potential pollutants from the location.</p>	

	ADCO	CD	<p>d. The application identifies that nineteen acres (19 ac) will be disturbed for the development of the wellpad. Can that total area be reduced to meet the needs of each phase if all 12 wells are not drilled in a single phase?</p> <p>e. If all the wells are not drilled at the same time then additional information about what Best Management Controls will remain in place, or implemented, to meet Erosion Control/Stormwater Discharge requirements.</p> <p>f. If all the permitted wells are not drilled during the initial phase then how will Extraction provide notification to residence for re-mobilization to drill additional wells?</p> <p>g. Pipelines for transporting product off site has been shown to reduce truck traffic, reduce onsite storage, reduce emissions, and increase the compatibility of oil and gas facilities to current and future land uses. Has Extraction explored the option for connecting to pipeline for the transportation of product off site? If Extraction has explored pipelines and did not find they were a feasible option, what were the restrictions that were identified?</p> <p>h. Provide a summary of any notification Extraction provided to the City of Brighton. Provide a summary of any comments provided by Brighton and any actions taken by Extraction in response to those comments.</p>	
3	ADCO	EC	<p>Landscaping Comments:</p> <ol style="list-style-type: none"> 1. Please include any proposed fence elevations and details on the plan. All fences will require a building permit. 2. More information is required on the proposed irrigation system. Details must be included on the plan. 3. All shrubs must be planted at a minimum 5 gal container. Please update the landscape notes to reflect this requirement. 	

4	ADCO	JR	<p>In accordance with the Resources Review that was completed as a requirement of the Natural Resources Conservation Overlay, the resulting recommendations should be included as Conditions of Approval:</p> <ul style="list-style-type: none"> a. Three Burrowing Owl surveys will be conducted and documented prior to construction at the location if construction occurs between March 15th through October 31st. <ul style="list-style-type: none"> 1. If owls are observed, Extraction will follow the appropriate mitigation options outlined in Colorado Parks and Wildlife’s guidance that include establishing buffers and avoidance of habitat and species. b. Raptor surveys will be conducted prior to construction at the location to determine if the identified nest is still inactive during egg laying and incubation periods for raptors or whether development activities are within a half-mile radius of the nest. <ul style="list-style-type: none"> 2. If an active raptor nest is observed within the recommended buffer zone outlined in CPWs guidance for a particular species, stress monitoring or CPW consultation will be required prior to construction. 	
5	Water District PWSID # CO0103035	ECCV	<ul style="list-style-type: none"> a. This well field supplies over 50,000 people at this time and any contamination of the shallow aquifer or disturbance of operations caused by the Extraction Oil project will essentially curtail water delivery to these water users. As such, ECCV and ACWWA are highly concerned with the specific location of the Extraction project, the facilities to be constructed, and BMP’s to be employed. b. The Application correctly identifies ECCV Well 11 as the closest water well at a 50-foot distance from the Duck Club. The application also proposes compliance with Rule 318-A requiring sampling and monitoring. Should this application move forward, the District will cooperate with Extraction regarding sampling from this well to achieve Rule 318-A compliance, but also believes additional monitoring and routine testing of the shallow groundwater system on and at the boundaries of the Duck Club tract is both appropriate and necessary. 	

5	N/A	ECCV	<p>c. The Beebe Seep Canal and a number of shallow lakes connected to the ground water system lie within ½ mile or less of the proposed facility. These key regional hydrologic features are used for transport of irrigation waters to local farmers. The Mile Hi Lake facility immediately north east of the Duck Pond site is specifically designated as an aquifer recharge site in ECCV’s water rights decrees. More important to ECCV, this seep canal and these lakes interact with its wells. As ECCV’s wells pump, the wells deplete the seep canal. ECCV has a very detailed augmentation plan developed in Water Division 1 Case No. 10CW306 depicting how the seep canal is depleted by ECCV pumping and how such depletions are mitigated to protect senior users. If contamination reaches the canal or the lake beds, through either surface or ground waters, this could incapacitate ECCV’s production wells.</p> <p>d. ECCV operates a reverse osmosis treatment plant in the Beebe Draw. This plant is located approximately 2/3 mile from the Duck Pond Facility as shown on Figure 1. At this plant, salts are removed from the alluvial waters and concentrated in a brine. The brine is being disposed of through 2 deep injection wells, the closest being located at the treatment plant 2/3 mile from the Duck Club. These wells are in excess of 11,000 feet in depth, and are permitted through the EPA’s Class I Injection well program. These wells allow injection of brine into the Lyons, Lower Santanka, Wolfcamp, Amazon, Council Grove, Admire, Virgil, and Missourian geologic units.</p> <p>Construction and operation of these wells is highly regulated and monitored by EPA, and the construction specifications required greatly exceed similar specifications used in most oil and gas production wells. In order to secure the permit for these wells, ECCV had to undertake extensive studies of local seismicity, bedrock faulting, and site specific geology. Furthermore, ECCV is assigned strict limits on operating injection pressures to assure fracturing of the deep formations is avoided. ECCV was not allowed to conduct a petroleum style fracking program on these wells, in large part due to concerns with inducing artificial earthquakes in the area. ECCV has operated in the Beebe Draw for 5 years now without any seismic issues.</p>	
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5	N/A	ECCV	<p>However, any seismic event within 2 miles of ECCV's permit area will because for the EPA to shut down the injection wells and subsequently curtail operations of ECCV's treatment facilities. The construction and operation of the 9 wells on the Duck Club facility could induce seismic activity that could shut down ECCV operations.</p> <p>e. ECCV is sensitive to the potential problems a petroleum release can have on its facilities. One incident occurred several years ago which impacted ECCV's wells. This involved a release from a condensate tank which allowed petroleum products to enter the soils overlying the aquifer. In this particular instance, the operator reportedly removed over 2000 yards of soil from the site, installed a soil vapor extraction system, and sealed up the related production well in order to protect the underlying alluvial aquifer. This spill was not quickly located due to inadequate monitoring. Remediation attempts were generally successful; however, ECCV was forced to shut down wells in the area for more than one year. ECCV's system is larger now with more demand, and a long-term shutdown would be catastrophic.</p> <p>f. ECCV foresees accidental surface and near surface spills from drilling operations, truck spills, pipeline spills, and other sources as one of the greatest risks incurred by our system with the introduction of the Duck Club facility. As such, the BMP's identified in the application are not sufficient to significantly reduce risk of contamination of the alluvial aquifer system lying just a few feet beneath the surface at the site. We strongly encourage COGCC to require upgraded containment, monitoring, and emergency notification procedures should this site move forward. Furthermore, we encourage COGCC to require appropriate bonding and contingency planning should Extraction's operations contaminate the aquifer or curtail ECCV's ability to deliver water to its constituents</p>	
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5	N/A	ECCV	<p>g. ECCV/United operate an aquifer recharge facility just south of the Duck Club property. This facility is operated pursuant to the decree in Water Court Case No. 10CW306. This site takes water rights owned by ECCV, treats the water, and injects it into the aquifer for recapture further north in their production wells. Injection wells operate as an EPA Class 5 injection facility authorized by EPA Rule of Authorization. The Duck Club facility lies directly in the flow path between the points of injection and the points of pumping for this recharge system. The placement of 9 conductor casings in the aquifer at the Duck Club site and the placement of these casings could impact ground water flow regime in this area. If these casings are installed in a manner allowing significant amounts of mud or cement to contaminate the aquifer at distances from the 9 wells, this blockage in the aquifer could defeat much of the recharge effort.</p> <p>h. ECCV also holds rights to surface recharge facilities at the Mile High Lakes sites (identified on Figure 1) These facilities are decreed in Division 1 Water Court Cases 02CW404 and 03CW442. These are surface ponds through which water is recharged into the shallow aquifer system. Operation of these facilities will maintain water levels in the aquifer at near current levels. If any dewatering is anticipated as part of the Duck Club installations, such dewatering will be operating in direct competition to our recharge operations.</p> <p>i. ECCV is highly concerned with the construction and operation of a large petroleum production, processing, storage, and transport complex immediately over the shallow Beebe Draw Aquifer System. Any spill, accidental release, fire, or drilling mishap occurring on the site could, and quite likely would compromise the quality of water in this crucial aquifer. Were the aquifer deeper, or less permeable, remediation of surface releases would be easier to undertake, but it is not. The water table is very shallow, and as ECCV begins to operate its recharge facilities and develops the Mile Hi Lake recharge ponds, the water level beneath the site may become even more shallow.</p>	
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5	N/A	ECCV	j. Finally, we have concerns with the drilling and development operations creating low level seismic activity which, if recorded by EPA or reported by any local land owners, could shut down the deep injection wells key to the District's continued treatment and distribution of water.	
6	N/A	Brighton Fire District	<p>a. Please provide information on the access road condition. The road needs to be capable of supporting of 75,000 pound fire apparatus and maintained at all times.</p> <p>b. Please change the contact number listed on the response resource contact information. The number listed is for our administrative office and is not a 24 hour phone. For 24 hour dispatch, 911 should be utilized.</p> <p>c. Section 3.0 of the TRP states that a copy of the summary card will be provided to the local fire department. Please provide a copy of this.</p> <p>d. Please provide the gps coordinates for the point of site access entry and the public road junction.</p>	

Agency Referral Comments:

- 1) City of Brighton : No Comment
- 2) Tri-County Health: No Comment
- 3) United Power: No Comment
- 4) DNR Parks & Wildlife: No Comment
- 5) School District 27J: No Comment
- 6) Adams County Sheriff's Department: No Comment



March 14, 2018

Christine Dougherty
Case Manager
Adams County
4430 South Adams County Parkway
1st Floor, Suite W2000
Brighton, CO 80601-8204
cdougherty@adcogov.org

RE: Re: Extraction Oil & Gas Duck Club Wellpad, USR2018-00001

Dear Ms. Dougherty,

On March 12, 2018, East Cherry Creek Valley Water and Sanitation District (District) received a request for comments from the Adams County Community & Economic Development Department regarding a Use by Special Review Permit to allow the development of horizontal wellpad facilities for the Extraction Oil & Gas Duck Club project. The District has reviewed the request and does not recommend approval of the project at this time.

The District identified a number of concerns with the proposed project to its municipal water supply interests, as detailed in the attached letter dated January 24, 2018. ECCV met with representatives from Extraction on February 14, 2018 to initiate coordination on the proposed project. The parties verbally agreed to negotiate an agreement addressing operations access, emergency response preparedness, and best management practices to protect water quality within the Beebe Draw aquifer system. At this time, the District has not received any additional information from Extraction Oil, nor seen any indication of a plan to address our concerns. Therefore, ECCV requests that the County deny Extraction's Special Review Permit application because negotiations are yet to be finalized.

Should you have any questions, please feel free to call me at 303-226-9181.

Thank you,

A handwritten signature in black ink that reads "Justin Blair".

Justin Blair
Engineer

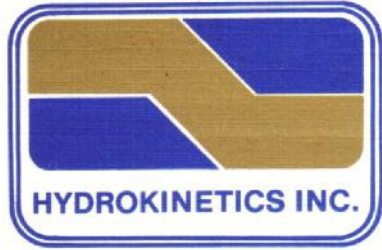
A handwritten signature in black ink that reads "Chris Douglass".

Chris Douglass
Projects Manager

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12975 W. 24th Pl.
Golden, (Applewood) Colorado, 80401
(303) 237-8865
Fax 237-8869

January 24, 2018

Ms. Sheela Stack
Ryley Carlock and Applewhite, P.C.
1700 Lincoln Street, Suite 3500, Denver, CO 80203

RE: Extraction Oil Drilling Application

Dear Ms. Stack:

We understand Extraction Oil has filed an application for the construction of 12 production wells; and siting of 9 oil tanks, 15 separators, 4 vapor recovery units, 4 VOC combustors, and numerous associated facilities on a property in Adams County identified in the application as the "Duck Club". More specifically, the Duck Club application incorporates 40 acres located in the NW ¼ of the SW1/4 of Section 12, T1S, R66W of the 6th PM. East Cherry Creek Valley Water and Sanitation District (ECCV) and Arapahoe County Water and Waste Water Authority (ACWWA) in conjunction with United Water own and operate a large municipal well field which draws water from the shallow alluvial aquifer immediately underlying the Duck Club application. This well field supplies over 50,000 people at this time and any contamination of the shallow aquifer or disturbance of operations caused by the Extraction Oil project will essentially curtail water delivery to these water users. As such, ECCV and ACWWA are highly concerned with the specific location of the Extraction project, the facilities to be constructed, and BMP's to be employed.

ECCV Interests

ECCV is a Special District as described in Title 32 of the Colorado Revised Statutes. It is registered as a public water supply system under PWSID # CO0103035. The District currently serves approximately 50,500 permanent residents through 18,724 individual taps. The District is run by a publically elected Board of Directors composed of residents and property owners within the District. The service area of the District covers approximately 12

square miles. ACWWA, ECCV's partner in the project, supplies water to approximately 20,000 domestic taps, a portion of which rely upon the Beebe Draw well field.

Since 2002, ECCV/ACWWA has been developing renewable water supplies from the Beebe Draw Aquifer System located north of Barr Lake. This is identified as the ECCV Northern Water Supply Project. Figure 1 depicts the ECCV Northern System Facilities in relation to the Duck Club application:



Figure 1

Among the facilities constructed, or under construction, are 18 alluvial wells, a 10 MGD water treatment plant, 2- 11,000-foot-deep brine injection wells, a 3.5 MG water tank, and an aquifer recharge and storage facility. Many of these wells and facilities lie within ½ mile of the Duck Club application. Some facilities, like ECCV Production Well P-11 lie immediately adjacent to the Duck Club site. All of the wells in the ECCV field draw water from a very highly permeable tributary alluvial aquifer which generally ranges from 30 to 60 feet in depth and is highly susceptible to contamination from surface or near surface spills.

Technical Concerns

ECCV has a number of concerns with the construction and operation of the Duck Club facility. Based upon an initial review of the application documents we offer the following comments:

- The Application correctly identifies ECCV Well 11 as the closest water well at a 50-foot distance from the Duck Club. The application also proposes compliance with Rule 318-A requiring sampling and monitoring. Should this application move forward, the District will cooperate with Extraction regarding sampling from this well to achieve Rule 318-A compliance, but also believes additional monitoring and routine testing of the shallow groundwater system on and at the boundaries of the Duck Club tract is both appropriate and necessary.
- The Beebe Seep Canal and a number of shallow lakes connected to the ground water system lie within ½ mile or less of the proposed facility. These key regional hydrologic features are used for transport of irrigation waters to local farmers. The Mile Hi Lake facility immediately north east of the Duck Pond site is specifically designated as an aquifer recharge site in ECCV's water rights decrees. More important to ECCV, this seep canal and these lakes interact with its wells. As ECCV's wells pump, the wells deplete the seep canal. ECCV has a very detailed augmentation plan developed in Water Division 1 Case No. 10CW306 depicting how the seep canal is depleted by ECCV pumping and how such depletions are mitigated to protect senior users. If contamination reaches the canal or the lake beds, through either surface or ground waters, this could incapacitate ECCV's production wells.
- ECCV operates a reverse osmosis treatment plant in the Beebe Draw. This plant is located approximately 2/3 mile from the Duck Pond Facility as shown on Figure 1. At this plant, salts are removed from the alluvial waters and concentrated in a brine. The brine is being disposed of through 2 deep injection wells, the closest being located at the treatment plant 2/3 mile from the Duck Club. These wells are in excess of 11,000 feet in depth, and are permitted through the EPA's Class I Injection well program. These wells allow injection of brine into the Lyons, Lower

Santanka, Wolfcamp, Amazon, Council Grove, Admire, Virgil, and Missourian geologic units.

Construction and operation of these wells is highly regulated and monitored by EPA, and the construction specifications required greatly exceed similar specifications used in most oil and gas production wells. In order to secure the permit for these wells, ECCV had to undertake extensive studies of local seismicity, bedrock faulting, and site specific geology. Furthermore, ECCV is assigned strict limits on operating injection pressures to assure fracturing of the deep formations is avoided. ECCV was not allowed to conduct a petroleum style fracking program on these wells, in large part due to concerns with inducing artificial earthquakes in the area. ECCV has operated in the Beebe Draw for 5 years now without any seismic issues. However, any seismic event within 2 miles of ECCV's permit area will be cause for the EPA to shut down the injection wells and subsequently curtail operations of ECCV's treatment facilities. The construction and operation of the 9 wells on the Duck Club facility could induce seismic activity that could shut down ECCV operations.

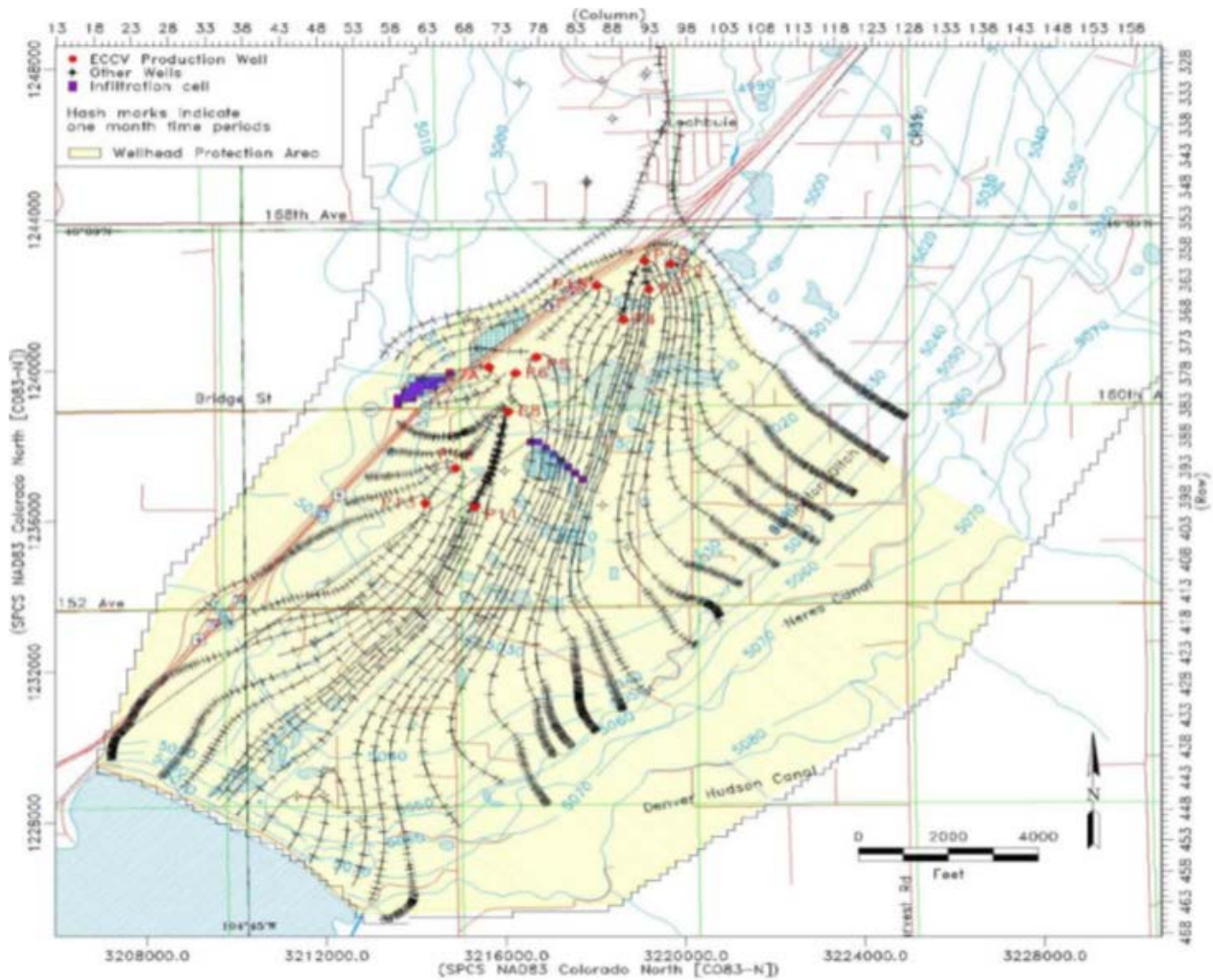
- ECCV is sensitive to the potential problems a petroleum release can have on its facilities. One incident occurred several years ago which impacted ECCV's wells. This involved a release from a condensate tank which allowed petroleum products to enter the soils overlying the aquifer. In this particular instance, the operator reportedly removed over 2000 yards of soil from the site, installed a soil vapor extraction system, and sealed up the related production well in order to protect the underlying alluvial aquifer. This spill was not quickly located due to inadequate monitoring. Remediation attempts were generally successful; however, ECCV was forced to shut down wells in the area for more than one year. ECCV's system is larger now with more demand, and a long-term shutdown would be catastrophic.
- ECCV foresees accidental surface and near surface spills from drilling operations, truck spills, pipeline spills, and other sources as one of the greatest risks incurred by our system with the introduction of the Duck Club facility. As such, the BMP's identified in the application are not sufficient to significantly reduce risk of contamination of the alluvial aquifer system lying just a few feet beneath the surface at the site. We strongly encourage COGCC to require upgraded containment, monitoring, and emergency notification procedures should this site move forward. Furthermore, we encourage COGCC to require appropriate bonding and contingency planning should Extraction's operations contaminate the aquifer or curtail ECCV's ability to deliver water to its constituents.

- ECCV/United operate an aquifer recharge facility just south of the Duck Club property. This facility is operated pursuant to the decree in Water Court Case No. 10CW306. This site takes water rights owned by ECCV, treats the water, and injects it into the aquifer for recapture further north in their production wells. Injection wells operate as an EPA Class 5 injection facility authorized by EPA Rule of Authorization. The Duck Club facility lies directly in the flow path between the points of injection and the points of pumping for this recharge system. The placement of 9 conductor casings in the aquifer at the Duck Club site and the placement of these casings could impact ground water flow regime in this area. If these casings are installed in a manner allowing significant amounts of mud or cement to contaminate the aquifer at distances from the 9 wells, this blockage in the aquifer could defeat much of the recharge effort.
- ECCV also holds rights to surface recharge facilities at the Mile High Lakes sites (identified on Figure 1) These facilities are decreed in Division 1 Water Court Cases 02CW404 and 03CW442. These are surface ponds through which water is recharged into the shallow aquifer system. Operation of these facilities will maintain water levels in the aquifer at near current levels. If any dewatering is anticipated as part of the Duck Club installations, such dewatering will be operating in direct competition to our recharge operations.

ECCV's Efforts to Protect Water Quality in and Up Gradient from their Field.

ECCV has been proactive in protecting the quality of its decreed water in Beebe Draw. Toward this end, ECCV has prepared and implemented a Well Head Protection Plan to identify and control contamination sources in the Beebe Draw aquifer system in and adjacent to their well field. This report was prepared in compliance with Colorado Department of Public Health and Environment guidelines, and has been filed with both the CDPHE and with Adams County. As part of this effort, ECCV developed a numerical model of the Beebe Draw Aquifer System to more accurately define the rate and direction of contaminant particle movement up gradient of their wells. This model demonstrates that ground water from beneath the Duck Club Site (adjacent to well P-11) will move directly toward and into the core of the ECCV/ACWWA well field. As such, contamination of the ECCV well field is not only likely but almost assured if a release were to occur at the Duck Club site. A map of the well head protection area and depiction of particle transport traces within the well field is provided in Figure 2 below:

Figure 2 ECCV Well Head Protection Area and Particle Trace Mapping



Summary

ECCV is highly concerned with the construction and operation of a large petroleum production, processing, storage, and transport complex immediately over the shallow Beebe Draw Aquifer System. Any spill, accidental release, fire, or drilling mishap occurring on the site could, and quite likely would compromise the quality of water in this crucial aquifer. Were the aquifer deeper, or less permeable, remediation of surface releases would be easier to undertake, but it is not. The water table is very shallow, and as ECCV begins to operate its recharge facilities and develops the Mile Hi Lake recharge ponds, the water level beneath the site may become even more shallow.

In addition to water quality issues, ECCV is concerned with maintenance of the current and future flow regime in the shallow aquifer as this is key to the recharge and continued operation of our well field. Finally, we have concerns with the drilling and development operations creating low level seismic activity which, if recorded by EPA or reported by any local land owners, could shut down the deep injection wells key to the District's continued treatment and distribution of water. We ask your help to assure utilization of appropriate BMP's and adequate site monitoring are undertaken, and that you require appropriate bonding and contingency planning should Extraction's operations contaminate the aquifer or curtail ECCV's ability to deliver water to its constituents.

If you have any questions on this material, please feel free to contact our office.

Respectfully Submitted:

A handwritten signature in cursive script, appearing to read "Scott Mefford". The signature is written in black ink and is positioned below the "Respectfully Submitted:" text.

Scott Mefford
CPG 5021