







Basalt Aquifer Storage and Recovery Assessment Near Reecer Creek

Kittitas County, Washington

Photo: Kittitas Reclamation District

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Publication Information

Data for this project will be available on Ecology's Environmental Information Management (EIM) website: https://fortress.wa.gov/ecy/eimreporting/default.aspx; at www.data.wa.gov; and from Project Proponent Kittias Reclamation District at 509-925-6158.

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Kittitas Reclamation District

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3/28/2023

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LIST OF ACRONYMS AND ABBREVIATIONS

ASR	Aquifer Storage and Recovery
Ecology	Washington State Department of Ecology
EA	EA Engineering, Science, and Technology, Inc., PBC
ICP	Inductively coupled plasma
KRD	Kittitas Reclamation District
MAR	Managed Aquifer Recharge
ML	Machine learning
Project	Basalt Aquifer Storage and Recovery Project
WDNR	Washington State Department of Natural Resources
WSU	Washington State University
XRF	X-Ray Fluorescence
YBIP	Yakima Basin Integrated Plan

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1. Introduction

The Basalt Aquifer Storage and Recovery (ASR) Project (Project) was conceived by the Kittitas Reclamation District (KRD) to supplement the assessment of Yakima Basin Managed Aquifer Recharge (MAR) projects. MAR projects were identified through previous funding provided by the Yakima Basin Integrated Plan (YBIP) in support of the plan's water storage objective. This Project is funded through Grant Agreement No. WRYBIP-2123-KittRD-00031 between KRD and the Washington State Department of Ecology (Ecology). The project provides the findings of an initial investigation of a basalt occurrence located near Reecer Creek, which is approximately 9 miles north of Ellensburg in Kittitas County, Washington. The Project site is in Sections 22 and 27, Township 19 North, Range 18 East Willamette Meridian (Figure 1). The western portion of Section 22 is located on Washington State Department of Natural Resources (WDNR) managed land (Figure 2). The remainder of the proposed Project area is located on private land.

The purpose of this investigation is to determine, through examination and evaluation of basalt stratigraphy and geologic structures, whether additional investigation is warranted to evaluate ASR at this location.

This assessment provides detailed information of the following:

- Geologic mapping.
- Visual and physical assessment.
- Field description of structural fabrics in outcrop.
- Sample collection for geochemical identification of specific Columbia River Basalt units.
- Determination of location and stratigraphic position of particular outcrops.
- Identification and investigation of springs, wells, or other points of hydrogeologic significance for this site.

This report includes 1) a geologic map showing the location of outcrops, sample locations, and observed physical elements; 2) tabulated and compiled geochemical and physical data gathered at the site; and 3) a conceptual model of the project area.

This assessment provides Project-specific recommendations for implementation of specific ASR project at this site. Information within this report will inform KRD as they coordinate proposed work with YBIP partners including the Yakama Nation, National Marine Fisheries Service, Ecology, Washington Department of Fish and Wildlife, the United States Bureau of Reclamation, Trout Unlimited, local conservation districts, and other partners to make use of regional understanding to realize the benefits of groundwater storage.

2. Project Objectives

The objectives of this Basalt ASR assessment are as follows:

- Characterize a potential ASR/MAR opportunity, which was recently identified by WDNR-published geologic mapping at the project location (Figure 1).
- Acquire surface and groundwater information to inform artificial recharge potential at this site.
- Evaluate the desirability of proceeding with additional hydrogeologic assessment of this project area to establish basalt-hosted ASR/MAR in shallow rocks.
- Present the initial investigation activities and results, along with an assessment of pursuing additional work, to evaluate ASR/MAR potential.

This work supports YBIP goals and objectives for water storage needs within the Upper Yakima Basin, with the goals of supplementing the Total Water Supply Available and providing aquatic habitat improvement(s).

The primary purpose of all local MAR/ASR projects is to implement the goals and objectives of the YBIP by capturing water when it is available and storing or re-timing discharge for later use. An integrated approach to using surface water and groundwater storage to increase Total Water Supply Available providing water for streamflow is central to improving salmonid populations and fish passage in the basin.

3. Background

Recent mapping supported by WDNR and conducted by Sadowski et al. (2020) identified a potential structural zone in the vicinity of Reecer Creek on the north slope of the Kittitas Valley that may be suitable for a shallow basalt-hosted ASR project (Figure 1). The source of water for ASR at the site is assumed to be water that has been conserved by KRD and delivered to the site from KRD's North Branch Canal. The area is mapped as an anticlinal structure in the basalt, which is illustrated in the geologic map (Figure 3) and cross section (Figure 4) modified from Sadowski et al. 2020. This structure, if associated with reverse faults and jointing, may provide the open space connectivity and containment necessary to store significant water within the basalt.

Initial Conceptual Geologic Model

The initial review of the recent WDNR map (Figure 4) suggests the basalt exposure might be desirable for a basalt hosted ASR opportunity. This is predicated on several factors:

• Space for recharge water likely exists within the target location: exposures of Grande Ronde basalt to the north and west of this area are few. It is likely that this location is

near the margin of flows of Grande Ronde age, thus may have textural components that increase the primary porosity of relatively thick portions of the basalt flows. These textures are those most common in flow base and tops: 1) brecciated and fragmented rubbly textures; 2) significant areas of gas vesicles and glassy units; and 3) palagonite and hyaloclastite occurrences. Palagonite and hyaloclastite are volcanic rocks that represent interactions with hot melt or rock with water. They are characterized by broken glassy fragments of the basalt flow in a generally soft, glassy matrix of altered volcanic material. All the textures described above are textures common near the edge of a volcanic flow overriding existing landforms. Increased percentages of platy fractured basalt relative to dense entablature may also indicate relatively rapid cooling near the flow margin.

- It is probable that the aquifer maintains the ability to accept recharge water: the modified WDNR map indicates a set of northwest-trending reverse faults elevating an anticlinal wedge of basalt; likely due to some subsurface structure resulting from stress from the southwest. In these cases, fracturing and faulting associated with brittle deformation of solid basalt may connect and create secondary permeability.
- The aquifer likely maintains the storage capability to hold recharge water: connecting basalt flow textures of relatively high porosity with a likelihood of increased secondary fracturing may form unusual reservoir conditions, perhaps suitable for water storage. In addition, structural bounds on the potential reservoir rock may assist in reducing potential lateral migration of water from any reservoir and minimize leakage and loss of injected water.

This work evaluates the conceptual site model by the following means:

- Assessing Sadowski et al. (2020) including surface mapping and to supplement existing geochemical determinations with additional sampling to expand stratigraphic knowledge and evaluate or refine structural interpretations.
- Examining geologic features at the site to assess likely primary and secondary porosity and permeability of rock units.
- Compiling information and, where desirable, suggesting subsequent steps toward field evaluation of ASR potential of the Project area.

4. Work Performed

4.1 **PROPERTY ACCESS**

Property access was sought for private and publicly owned parcels (Figure 2). Letters (Appendix A) were sent by KRD to select private landholders in the area requesting walk-in access to their property for the purpose of geologic mapping and limited geochemical sampling in the Project area.

The WDNR parcel located in the west half of Section 22, Township 19 North, Range 18 East-Willamette Meridian was the central focus of the field effort. Several adjacent private-property owners also allowed access to their properties. Ultimately, no private land access was necessary in this field effort. Private land in the project area is generally covered by younger unconsolidated sediments, and there are very few basalt outcroppings.

Follow up letters were sent to those property owners who granted access, thanking them for their permission, and notifying them of the conclusion of the field evaluation and that no further access was necessary.

Property access letters and specifics are on file at KRD and not included in this report for privacy reasons. Example text is in Appendix A.

4.2 **GEOLOGIC EVALUATION**

The initial conceptual model was derived from the map (Sadowski et. Al 2020) published by the WDNR Washington Geologic Survey, which is discussed in Section 3. Mr. Sadowski was contacted to evaluate the initial conceptual model, and to assess other opportunities in areas in which he and his team are currently conducting geologic mapping.

Mr. Sadowski was most helpful discussing the geology in the area. In addition to basalt flow margin ASR opportunities at the site, he suggested that the Coleman member, an informally named member of the Ellensburg Formation occurring beneath the surface exposures of Sentinel Bluffs basalt, may be a good target for storing groundwater. The Coleman member is not exposed in the project area, and not known from wells in the immediate area.

The excerpts of the map and cross section of Sadowski et al. (2020) are included in this report (Figures 3 and 4). Geologic age and stratigraphic relationships for geologic units in this report are illustrated on Figure 5.

4.3 FIELD GEOLOGIC MAPPING

Guy Gregory of Gregory Geologic LLC conducted geologic mapping and geochemical sampling of exposures on WDNR property from June 20-24, 2022. Sampling was infrequent because very little actual "outcrop" that was thought to represent bedrock is present. The outcrop map indicates exposures that are most likely actual bedrock (Figure 6).

Actual bedrock outcrop density did not permit traditional evaluation of contact relationships between either stratigraphic or textural units. As the rock units are rubbly and broken everywhere, which is typical of flow margin textures, no reliable planar features associated with volcanic flows or fault/fold axis elements were observed or measured. (Appendix B).

4.4 **GEOCHEMICAL SAMPLING**

Outcrop rock samples were collected to permit stratigraphic discrimination. Nine samples were taken in total including two "Target of Opportunity" samples from prospective areas (Figure 6, Table 1, Section 4.5) and seven samples from exposures in the main Section 22 project area (Figure 7, Table 1). Brief rock descriptions of all basalt samples are provided in Appendix C. All samples were submitted to the Peter Hooper GeoAnalytical Laboratory at Washington State University (WSU). The GeoAnalytical Laboratory performed X-Ray Fluorescence (XRF) determination of 29 major and trace elements and inductively coupled plasma (ICP) mass spectrometer determination of 27 trace elements on each sample permit formation assignment. All sampling was conducted per methodology outlined in Hooper 2000. Geochemical sampling results are provided in Appendix D.

Chemical results were also input into the machine learning (ML) model developed by researchers at the Peter Hooper GeoAnalytical laboratory at WSU. Researchers compiled and gathered a regional compilation of Columbia River Group rocks with whole rock geochemical analyses to construct this model. The ML model compared our Project sample chemical results to those in their regional compilation as described in Section 5.2.

4.5 TARGETS OF OPPORTUNITY

Discussions with Mr. Sadowski indicated two additional areas of potential interest; areas where basalt flows of the Grande Ronde Formation are near or at the surface and initial textural information exhibits potential for basalt hosted ASR. Additionally, stratigraphic information may indicate a potential for ASR hosted in the Coleman member of the Ellensburg formation.

Both sites are within areas identified and assessed for MAR priority in the Ecology-funded Yakima Basin Managed Aquifer Recharge Assessment (KRD 2020). Given results of the assessment, samples were gathered and analyzed to determine stratigraphic position and an initial evaluation of ASR potential in these areas. Locations where samples were gathered are shown on Figure 6and complete chemical analysis is available in Appendix D.

Neither site revealed significant interest in basalt hosted ASR based on textural elements or evidence of structural deformation consistent with increased permeability.

5. Assessment

5.1 GEOLOGIC EVALUATION

Most of the mapped area is covered by unconsolidated Quaternary alluvium or colluvium. Thickness of this material is unknown, but wells and geotechnical borings in Sections 22 and 27 indicate 5 to 200 feet of cemented gravel covers most of the area. The boring logs on file with Ecology are included as Appendix F. This study assumes the thickness of Quaternary sediments on the hill are generally thinner than those lower on the alluvial fan surface, meaning few actual in-place exposures were available to supplement the observations of Sadowski, et al., 2020.

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Actual outcrop exposures, and exposures of basalt in the proposed Project area are typically vesicular and glassy, often brecciated. Generally, they look like an aggregate of vesicular subangular clasts in a matrix of glassy, vesicular lava. Some float appears to have multiple generations of clast/matrix relationships, suggesting these flows were emplaced at or near their margins, where emplacement of the cooling flow over irregular substrates leads to textural fragmentation. Local hyaloclastites suggest rapid lava emplacement in places over standing water, leading to cryptoexplosive textures. Photos in Appendix B and brief rock descriptions in Appendix C provide more information.

No contact relationships were observable between flows or bounding outcrops; thus faults, folds, and other geologic boundaries can only be inferred between relationships of chemically determined basalt flow stratigraphy. Most textural characteristics are only traceable over a distance of a few feet (i.e., flow banding or lineated vesicles).

5.2 GEOCHEMICAL RESULTS AND FORMATION ASSIGNMENT

Discrimination between basalt flows of the Columbia River Basalts is only reliable through chemical assessment. That discrimination is necessary to understand relationships between individual basalt flows, in this case to determine whether and what kind of structural deformation affects the set of rocks. As described in section 4.4, chemical analysis was performed by the laboratory at Washington State University.

Sampling results revealed a very similar stratigraphy to that noted in Sadowski et.al. (2020), though the increased sample density revealed some previously unidentified relationships. These are discussed in Section 6.

Full geochemical results are provided in Appendix D. Appendix E gives a detailed technical discussion of these results. Sample locations are shown on Figure 7 and summarized in Table 1. Table 3 summarizes the formation assignments of each individual sample based on geochemical results in comparison to ML assignment.

5.3 HYDROGEOLOGY

There were no wells, seeps, or springs observed in accessible areas of basalt exposure in Section 22.

There are two well casings containing geotechnical instruments located on the property, which are shown on Table 2. Inquiries made to WDNR staff revealed no permits issued for this construction and there are no identification markings on the casings. Additionally, no logs are available for the project on the Ecology website. Geotechnical serial numbers from the manufacturer are on the instruments inside the casings.

A review of the well logs for the broader area (Appendix F) reveals Kittitas County Public Works drilled several geotechnical borings. Most of these were only advanced to 5 feet deep and seem typical of borings related to assessing the road material reserve. These borings were EA Engineering, Science, and Technology, Inc., PBC Gregory Geologic LLC Jacobs

reported to be in section 22, however boring logs are sometimes mislocated. If the borings were actually located in Section 22, they were likely constructed inside the fence near the center of the west section line in the borrow pit area. Table 2 contains global positioning system locations of the fence corners and a survey monument used by Kittitas County, as well as other points of interest.

Otherwise, static water levels reported as of the date of well construction to the north and east of the area are approximately 180-240 feet below ground surface. Most production comes from sandstone, which may be Coleman member material. South of the section, static water levels are generally less than 100 feet; however, these levels come from water-bearing zones well below this elevation, thus the water table is at least semi-confined below the area. Two wells are included on the cross section (Figure 9), which indicate static water levels at the time of construction at least 200 feet below ground surface.

Based on the above review of available subsurface information, we believe there is approximately 200 feet between ground surface and the area water table. Thus, there is approximately 200 feet of unsaturated zone available for water storage.

6. ASR Assessment and Conceptual Geologic Model Comparison

The stratigraphic assignments of these samples favor a somewhat different conceptual geologic model than that described in Sadowski et al., 2020. That paper suggested an anticline was present in the area, with older rocks flanking a center of younger rocks, as discussed in the initial conceptual geologic model. This model requires dominantly ductile deformation of this section in this area.

This study suggests a brittle, rather than ductile deformation model. The geologic map (Figure 8) and the cross section (Figure 9) shows a series of reverse faults, lifting the stratigraphic package of rocks from the southwest over the northeast. These faults are postulated to be oriented sub parallel to the Dead Coyote Fault of Sadowski, et al., 2020. Central to this interpretation is the assignment of samples G-622-001, G-622-006, and G-622-007 to the Museum member, which essentially repeats the stratigraphic section from the west side of the hill to the east in a manner more akin to fault displacement than folding.

This conceptual model is consistent with brittle deformation effects mapped near important structural features for basalt units found elsewhere in the Columbia Basin. Widely spaced outcroppings with little continuity between them make this model fairly uncertain. However, this interpretation is consistent with the observed chemical data and observations elsewhere in the Columbia Basin.

6.1 CONCLUSIONS AND RECOMMENDATIONS: ASR POTENTIAL

Brittle fracture systems can create areas of enhanced open space and connected fracturing, which are desirable targets for ASR. Brittle fracture systems can also generate no-flow boundary conditions where fractures are poorly connected or otherwise sealed. Those kinds of boundaries are good because they limit reservoir leakage, but they can be undesirable because they may limit the volume of reservoir material. Together with the primary textures observed in outcrop, as

EA Engineering, Science, and Technology, Inc., PBC Gregory Geologic LLC Jacobs well as the relatively thick unsaturated zone, we conclude here is potential for at least small volume ASR hosted by basalts at the project area.

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We recommend, as next steps:

- Identify the best locations to characterize the hydraulic properties of shallow basalts in WDNR property. The major considerations for establishing these locations include practical access constraints like overhead powerlines, cost considerations of access road permitting, construction, reclamation, and any permitting considerations by WDNR.
- Obtain access from WDNR to construct test wells.
- Construct test borings and conduct tests injecting water into dry wells in the shallow basalts, while monitoring hydraulic response in nearby observation wells.

This work is required to determine if the site could be used to store and recover water in the basalt structure present.

6.1.1 Conceptual Testing Plan

If KRD proceeds with further testing to determine the feasibility of Basal ASR at this location, test wells are recommended to be located east of the Dead Covote Fault and north of the Bonneville Power Administration power transmission lines. The objective will be to establish a test boring "nest" consisting of a boring constructed as a water production well and two borings constructed as monitoring wells. Monitoring wells should be situated approximately 120 degrees azimuth from the test well at variable radial distances of up to 75 feet. The production well is anticipated to be 200-feet deep or less, intersecting a zone of fractures and favorable textural characteristics. The monitoring wells will be constructed to monitor the zone identified in the production well.

Based on local ground water conditions, encountering groundwater in these wells is not anticipated. Consequently, once constructed, water will need to be delivered to the well site and injected at a constant rate into the production well. Monitoring wells will be measured to assess the time and volume of water that arrives in the wells. Once a sufficient volume is introduced, injection will cease and monitoring will continue until hydraulic heads stabilize or water dissipates. Conceptually, this will resemble a large-scale constant-head and falling head permeameter test, with the objective of determining hydraulic conductivity of the aquifer material. If repeated along a same structure, a storage volume can be assessed and later tested for injection and recovery of water using pumped water, and boundary conditions evaluated.

As an initial estimate, water sourced from the North Branch Canal at the Reecer Creek Road Bridge delivered to the center of the northwest quarter of Section 22, would need to be piped approximately 9,000 feet and lifted roughly 320 feet.

Disclaimer

This report is prepared describing the geology of a specific location. Standard field methods were used in gathering information presented herein, within the precision and accuracy of instruments and equipment used. Field observations were made by a professional geologist with experience in this terrain and conclusions have been drawn based on that experience and the information gathered. Rock outcroppings on the project area are few, and the ability to establish contacts between or within rocks of similar type is hampered by unconsolidated sediments. Further investigation may reveal rock relationships not considered or in evidence with the current density of information.

References

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- Sadowski, A. J., J.B. McCosby, M.L. Anderson, T.R. Lau, A. Steiner, S.A. DuFrane, T. Rittenour, and B. Housen. 2020. *Geologic map of the Ellensburg North and southern half of the Reecer Canyon 7.5-minute quadrangles, Kittitas County, Washington*: Washington Geological Survey Map Series 2020-01, 1 sheet, scale 1:24,000, 25 p. text. http://www.dnr.wa.gov/publications/ger_ms2020-01_geol_map_ellensburg_north_reecer_canyon_24k.zip

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TABLES

Sample Numbers	Latitude	Longitude
G-622-001	47.12725	-120.577
G-622-002	47.12704	-120.581
G-622-003	47.1278	-120.581
G-622-004	47.05957	-120.426
G-622-005	47.12066	-120.574
G-622-006	47.12033	-120.572
G-622-007	47.12216	-120.573
G-622-008	47.12075	-120.575
KEks002	47.00739	-120.302

Table 1. Sample Numbers and Locations (WGS84)

Note:

WGS84 - Coordinate System

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Latitude	Longitude	Description	Details	
47.12843	-120.579	Fence Corner	NE Fence Corner-Borrow Pit	
47.12752	-120.58	Survey monument	Kittitas County Control Point (Rebar)	
47.12482	-120.579	Fence Corner	SE Fence Corner, Borrow Pit	
47.12482	-120.58	Fence Corner	SE-mid Fence Corner, Borrow Pit	
47.12427	120.5799	Fence Corner	S Fence Corner, Borrow Pit	
47.12428	-120.582	Fence Corner	SW Fence Corner, Borrow Pit	
47.12845	-120.582	Fence Corner	NW Fence Corner, Borrow Pit	
47.13058	-120.577	Outcrop	Subcrop, rock 20-A	
47.13199	-120.577	Fence Corner	Fence Crib at North end of gully on North fence line	
47.13196	-120.571	Fence Corner	NE Corner Fence corner	
47 12012	100 574	Casing	4-inch PVC stickup casing with 1-inch PVC casing inside,	
47.15012	-120.574		contains GeoKon tool	
47 12725	-120.577	Outcrop	Slight outcrop 20-BNE/SW trending no measurable	
47.12723			fractures	
47.12704	-120.581	Outcrop	20-A outcrop,	
47.1278	-120.581	Outcrop	20-B outcrop	
47.05957	-120.426	Outcrop	Rader Rd. west of Fairview RdVesicular float	
47.12075	-120.575	Outcrop	Hyaloclasite outcrop 22-A	
47.12066	-120.574	Outcrop	22-B outcrop	
47.11998	-120.571	Survey monument	Center southernmost power line on N-S section line	
47.12033	-120.572	Outcrop	22-C outcrop	
47.1209	-120.571	Fence Corner	Powerline road gate in N-S fence	
47.12207	-120.573	Outcrop	22-B outcrop	
47.12216	-120.573	Outcrop	22-C subcrop	
47 12294	-120 574	Casing	4-inch PVC stickup casing with 1-inch PVC casing inside,	
+7.12274	120.574	Cashig	contains GeoKon tool serial number 1005934	
47.12075	-120.575	Outcrop	Hyaloclasite 22-A Sample	
47.12115	-120.582	Road junction	BPA Gate on Pheasant Ln	
47.1261	-120.582	Road junction	Borrow Pit Gate on Pheasant Ln	
47.11715	-120.582	Road junction	Pheasant Lane at Reecer Ck. Rd.	
47.10868	-120.582	Road junction	c/l KRD Canal at Reecer Ck. Rd.	

Table 2. Points of Interest and Location

Notes:

Table 3. Machine	Learning and	This Study	Formation	Assignment

	Formation-	Member-Machine	Flow-Machine	
Sample Name	Machine Learning	Learning	Learning	Flow-This Study
G-622-001	Grande Ronde	Meyer Ridge		Museum
G-622-002	Grande Ronde	Sentinel Bluffs	Spokane Falls	Spokane Falls
G-622-003	Grande Ronde	Sentinel Bluffs	Museum	Museum
G-622-004	Grande Ronde	Sentinel Bluffs	Spokane Falls	Spokane Falls
G-622-005	Grande Ronde	Sentinel Bluffs	Museum	Stember Creek
G-622-006	Grande Ronde	Meyer Ridge		Museum
G-622-007	Grande Ronde	Sentinel Bluffs	Museum	Museum
G-622-008	Not a basalt			Hyaloclastite
KEks002	Grande Ronde	Sentinel Bluffs	Museum	Museum

Notes:

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FIGURES



















APPENDICES
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Appendix A. Access Solicitations



Kittitas Reclamation District P.O. Box 276 Ellensburg, WA 98926 Phone: (509) 925-6158 Fax: (509) 925-7425

To: Property owner

RE: KRD surface geology survey

Dear Sir:

The Kittitas Reclamation District is conducting a surface geology survey in your area and has contracted the work out to Guy Gregory of Gregory Geologic LLC. Mr. Gregory works well with us, and we appreciate his knowledge and integrity.

Please see his attached letter.

Thank you,

Urban Eberhart Secretary Manager Kittitas Reclamation District (KRD)



Gregory Geologic LLC 6205 E. Clements Ln Spokane, WA 99217 509.939.1052 gregorygeologic@gmail.com

To: Property Owner

Greetings:

During the last half of June, Kittitas Reclamation District (KRD) will be sending me, as a contractor to KRD, to your property located in Section 27, Township 19N, Range 18E to conduct geologic mapping. I will have KRD photo ID.

During the course of the mapping project, I'll be likely parking during the day on Reecer Ck. Road or Pheasant Lane. I'll be walking in the area, observing the bedrock in the area and, if possible, taking a small (1 lb) sample of the rock for analysis. I will not be digging holes or otherwise disturbing the ground. In addition, I am not going to disturb livestock or otherwise damage crops beyond footprints.

I intend to have the project completed and be out of the area by July 1.

I request your permission to access your property during this time to view the geology of the area and, if available, take a sample for analysis. Of course, following completion of the project and final report, I'll forward you a copy of the report and the location and results of any sampling done on your property.

If you could, please phone me at (509) 939-1052 at your convenience or email me at <u>gregorygeologic@gmail.com</u> and we'll find a convenient time for you to connect with me either by phone or in person to discuss. You may also contact the KRD office by phone at (509)925-6158 or by email at krdoffice@fairpoint.net. I appreciate your consideration.

I look forward to hearing from you.

Regards,

By Sold

Guy J. Gregory, L.G., L. Hg., R.G. Principal Gregory Geologic LLC

Appendix B: Field Photos



Figure B1 Exposure north of quarry, east side of gully



Figure B2 Rubbly outcrop with variable, discontinuous texture



Figure B3 Rubbly subcrop -Black, glassy material with 1 cm weathering rind



Figure B4 Typical low exposure outcrop-location Sample G-622-001



Figure B5 Outcrop of multiple brecciated basalt Sample G-622-005



Figure B6 Hyaloclastite at location G-622-008



Figure B7 Gravel Pit exposure



Figure B8 Rubble in gravel pit, see streched vesicles in glassy matrix

Appendix C: Rock sample Descriptions

Rock Descriptions

Rock Type 20A Sample G-622-002

Glassy basalt +/- magnetite and 1 mm glassy nodules. Vesicular, vesicles lined with quartz, hummocky outcrop pattern. Flow toppy-appearing, vesicles of variable size, fracture set 1/meter, E-W trending, not pervasive

Rock Type 20-C Sample G-622-003 Waypoint 89

Very vesicular overlying interbed or intercalated brecciated horizon. Generally granular/tuffy appearing, some sub horizontal lineation

Rock type 21-A float, Waypoint 83 Blocky, 6" angular framents of tan/brown weathering basalt with ½" weiathering rind-interior material black and glassy

Waypoint 87

Rocktype looks like 20A, call 21-A, slight outcrop of hard, glassy vesicular dark grey basalt, vesicles lined with quartz and zeolites, low rubbly exposure

Sample G-622-004: Target of Opportunity Subcrop vesicular basalt and palagonite in float. Basalt with large vesicles, silica in vug lining, very hard and glassy

Hyaloclastite-Waypoint 91, Sample G-622-008 Outcrop of tuff/ingnimbrite containing angular fragments of glass in a matrix supported breccia. Frags often altered to clay. Glassy bits variable in size.

Waypoint 94, Rock type 22-C Sample G-622-006 Low outcrop under powerline. Very vesicular basalt, vugs lined with silica and occasional olivine, smpall phenocrysts of plagioclase in glassy matrix.

Waypoint 96: Subcrop rock type 22-C Looks like outcrop, or close subcrop. Similar rock to Waypoint 94. Appendix D: Geochemical Results

Trace Element Results

Sample ID	La ppm	Ce ppm	Pr ppm	Nd ppm	Sm ppm	Eu ppm	Gd ppm	Tb ppm
GGL G-622-001	19.83	41.87	5.50	23.54	5.70	1.80	6.10	1.04
GGL G-622-002	21.05	43.97	5.84	24.98	6.08	1.85	6.36	1.07
GGL G-622-003	18.39	37.49	5.18	21.85	5.33	1.67	5.49	0.94
GGL G-622-004	19.31	37.05	5.30	22.89	5.52	1.71	5.83	0.96
GGL G-622-005	23.65	46.46	6.59	27.99	6.89	2.12	7.12	1.21
GGL G-622-006	23.83	41.52	6.48	27.63	6.59	1.99	7.04	1.18
GGL G-622-007	21.69	42.86	5.91	24.91	6.05	1.92	6.38	1.06
GGL G-622-008	20.69	37.91	4.93	19.71	4.14	1.18	4.10	0.68
AGV-2	39.28	70.77	8.29	31.12	5.57	1.52	4.60	0.65
BHVO-2	15.49	37.65	5.37	24.67	5.97	2.10	6.27	0.99
BCR-2	25.72	53.30	6.87	28.81	6.66	1.97	6.71	1.10
Sample ID	La ppm	Ce ppm	Pr ppm	Nd ppm	Sm ppm	Eu ppm	Gd ppm	Tb ppm
GGL KEks002	21.09	43.93	5.79	24.35	5.80	1.83	6.12	1.01
BCR-2	25.77	53.52	6.87	28.79	6.68	2.04	6.88	1.12
BHVO-2	15.48	37.74	5.35	24.63	6.21	2.10	6.37	0.95

Trace Element Results

Dy ppm	Ho ppm	Er ppm	Tm ppm	Yb ppm	Lu ppm	Ba ppm	Th ppm	Nb ppm	Y ppm
6.07	1.24	3.48	0.51	3.11	0.50	853	3.44	10.88	35.64
6.22	1.32	3.59	0.54	3.22	0.51	823	3.79	11.56	35.73
5.43	1.14	3.08	0.46	2.85	0.44	787	3.64	11.10	31.83
5.70	1.17	3.20	0.48	2.92	0.46	487	3.48	10.86	32.27
7.10	1.46	4.02	0.60	3.63	0.55	668	4.09	12.40	39.24
6.77	1.38	3.77	0.55	3.35	0.52	963	3.76	11.47	38.50
6.30	1.31	3.52	0.52	3.15	0.49	518	3.69	11.35	35.66
3.85	0.81	2.18	0.34	2.03	0.33	641	4.87	8.97	22.69
3.56	0.69	1.75	0.26	1.64	0.26	1125	6.43	13.95	19.96
5.33	0.98	2.47	0.34	1.93	0.28	128	1.24	18.07	26.04
6.47	1.32	3.51	0.54	3.29	0.51	668	6.03	12.21	35.64
Dy ppm	Но ррт	Er ppm	Tm ppm	Yb ppm	Lu ppm	Ba ppm	Th ppm	Nb ppm	Y ppm
6.04	1.28	3.46	0.53	3.15	0.51	589	4.06	11.13	34.20
6.36	1.32	3.62	0.55	3.34	0.52	679	5.94	12.40	35.87
5.33	0.99	2.49	0.34	2.01	0.29	130	1.25	18.25	26.10

Hf ppm	Ta ppm	U ppm	Pb ppm	Rb ppm	Cs ppm	Sr ppm	Sc ppm	Zr ppm
4.03	0.66	1.14	10.51	24.1	0.67	349	38.0	155
4.25	0.71	1.15	5.96	25.2	0.72	358	37.8	162
4.19	0.68	0.94	5.51	25.4	0.64	349	38.2	158
4.08	0.68	0.82	5.03	16.9	0.64	326	37.5	156
4.66	0.76	1.19	6.39	29.0	0.78	361	40.5	176
4.31	0.70	1.03	5.68	26.3	0.73	344	37.2	164
4.27	0.70	0.96	6.06	24.8	0.65	334	36.7	160
3.50	0.64	1.12	8.96	54.0	1.59	267	18.3	131
5.29	0.87	1.89	13.47	66.5	1.10	653	12.5	229
4.40	1.15	0.41	1.73	9.2	0.12	390	31.8	167
4.96	0.77	1.64	10.32	46.1	1.20	336	33.6	183
Hf ppm	Ta ppm	U ppm	Pb ppm	Rb ppm	Cs ppm	Sr ppm	Sc ppm	Zr ppm
4.30	0.69	1.05	6.49	26.4	0.74	327	36.4	162
4.89	0.78	1.61	10.46	46.1	1.22	334	33.5	182
4.43	1.19	0.40	1.61	9.2	0.12	392	31.7	168

Trace Element Results

Date	G-622-001 GGL 2516-1 13-Jul-22	G-622-002 GGL 2516-2 13-Jul-22	G-622-003 GGL 2516-3 13-Jul-22	G-622-004 GGL 2516-4 13-Jul-22	G-622-005 GGL 2516-5 13-Jul-22	G-622-006 GGL 2516-6 13-Jul-22	G-622-007 GGL 2516-7 13-Jul-22	G-622-008 GGL 2516-8 13-Jul-22
SO3 >/=	0.03	0.25 Major Flemer	0.02	0.01	0.02	0.04	0.02	0.02
SiO2				j. 51 21	E1 00	52 50	F2 Q1	67 10
5102 TiO2	23.03	1 950	1 021	1 900	54.00 1 007	1 966	1 0 2 2	0 040
A12O2	14 42	14 50	14 00	14 20	15 50	14 50	14 50	10.940
AI203	14.43	14.50	14.80	14.30	15.50	14.52	14.50	10.81
FeO"	10.96	9.52	9.93	11.99	1.91	10.98	10.50	6.73
MnO	0.176	0.174	0.149	0.152	0.142	0.155	0.145	0.088
MgO	4.38	3.85	3.79	3.52	3.93	3.42	3.37	1.82
CaO	8.68	9.16	8.13	7.85	8.66	7.94	7.93	3.47
Na2O	2.71	2.76	2.70	2.56	2.98	2.68	2.76	1.70
K2O	1.04	1.10	1.10	0.72	1.33	1.08	1.02	1.73
P2O5	0.286	0.335	0.313	0.257	0.360	0.327	0.310	0.131
Sum	97.46	96.63	96.09	94.53	97.75	96.46	95.37	94.53
LOI %	2.39	2.85	3.64	5.17	2.00	3.45	4.48	5.24
	Normalized Ma	aior Flements	(Weight %):					
SiO2	54 41	55 17	55 53	54 28	56 15	55 47	55 51	70 98
TiO2	1 82	1 92	1 91	1 90	2 04	1 93	1 92	,0.90
A12O3	1/ 00	15 06		15 19	15 95	15 05	15 27	11 /2
A1203	11 25	13.00	10 22	12.19	13.05	11 20	11 01	TT.43 7 10
MeO	11.25	9.05	10.33	12.09	0.15	11.30	11.01	7.12
MarQ	0.18	0.18	0.16	0.16	0.15	0.16	0.15	0.09
MgO	4.50	3.98	3.94	3.72	4.02	3.55	3.53	1.93
CaO	8.90	9.48	8.46	8.31	8.86	8.23	8.32	3.67
Na2O	2.78	2.86	2.81	2.71	3.05	2.77	2.90	1.80
K2O	1.06	1.14	1.14	0.76	1.36	1.11	1.07	1.83
P2O5	0.29	0.35	0.33	0.27	0.37	0.34	0.33	0.14
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
	Unnormalized	Trace Elemen	nts (ppm):					
Ni	18	15	17	19	14	15	14	11
Cr	51	44	50	50	47	45	48	25
Sc	39	39	38	38	42	39	37	18
V	322	312	298	289	318	292	289	147
Ва	874	840	809	502	690	987	530	650
Rb	23	25	24	16	28	26	24	56
Sr	343	358	348	322	361	342	329	265
7r	152	160	156	154	175	163	160	133
v.	35	36	32	32	29	30	35	22
Nh	11 0	11 4	10 5	11 3	12 0	10 8	10 G	8 4
Ga	20	22	22	20	23	22	21	14
	20	25	20	20	23	22	24	15
Zn	110	100	115	100	125	117	100	
	10	122	113	100	133	117 C	109	04
FU	10	22	10	5	20	22	2	22
La	19	23	19	20	28	23		23
Ce	40	42	37	38	45	41	44	39
In	2	3	3	2	3	2	3	4
Na	24	25	23	24	29	30	27	21
U	1	2	1	2	1	1	1	1
sum tr.	2136	2121	2040	1693	2023	2235	1743	1524
in %	0.21	0.21	0.20	0.17	0.20	0.22	0.17	0.15
sum m+tr	97.67	96.84	96.30	94.69	97.96	96.68	95.54	94.68
I+Toxides	97.72	96.89	96.34	94.74	98.00	96.73	95.59	94.72
w/LOI	100.11	99.74	99.99	99.90	100.00	100.18	100.06	99.96
if Fe3+	101.33	100.79	101.09	101.23	100.89	101.40	101.23	100.71
	Major element	s are normaliz	zed on a vola made from th	tile-free basis, '	with total Fe ex	pressed as Fe	0.	
		1 a 7		2^{10} Same TUCK P	1Q 0	10 0	17 0	1Л Л
Cr3O3	23.5 75 A	±2.1 61 0	41./ 70 0	27.0 72 0		19.U	±1.4	1 1
6-203	15.0	04.0 FO F		13.0			09.9 E7 0	37.1 27 0
30203	59.4	59.5	59.0	5/.9	63.9	59.6	5/.0	2/.0
v203	473.6	458.7	439.l	425.3	467.8	429.4	425.6	216.2
ваО	975.5	938.2	903.0	561.U	769.8	1101.9	591.7	725.2
Rb2O	24.7	27.3	26.2	17.9	31.1	28.4	26.4	60.8
SrO	405.7	423.4	411.0	380.3	426.5	404.3	389.1	313.3
ZrO2	205.1	216.6	210.7	208.3	236.6	220.2	216.0	179.4
Y2O3	44.9	45.2	40.3	41.3	49.3	49.7	44.5	27.9
Nb2O5	15.8	16.4	15.0	16.2	17.2	15.5	15.1	12.0
Pefer9	ooper Gēoa	nalyticall∙Ba	boratory ²	^{27.4} 1	31.0	29.2	²⁸ ·5 A r	alyses by XRF

2633	2615	2516	2124	2515	2734	2181	1845
0.6	1.8	1.1	2.3	1.3	1.1	1.4	1.5
28.2	29.5	27.1	28.3	33.7	34.8	32.0	24.2
2.8	3.0	3.6	2.1	3.4	2.4	3.5	4.3
49.5	51.6	45.8	46.6	55.7	51.0	53.8	48.0
22.7	26.6	22.8	23.5	32.5	27.5	25.2	26.4
10.9	7.2	6.5	5.7	7.0	7.0	5.8	9.7
140.6	151.7	143.5	135.0	167.4	145.8	136.0	79.5
47.2	44.1	37.6	47.5	34.0	41.0	41.9	19.2
	47.2 140.6 10.9 22.7 49.5 2.8 28.2 0.6 2633	47.2 44.1 140.6 151.7 10.9 7.2 22.7 26.6 49.5 51.6 2.8 3.0 28.2 29.5 0.6 1.8 2633 2615	47.2 44.1 37.6 140.6 151.7 143.5 10.9 7.2 6.5 22.7 26.6 22.8 49.5 51.6 45.8 2.8 3.0 3.6 28.2 29.5 27.1 0.6 1.8 1.1 2633 2615 2516	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	47.2 44.1 37.6 47.5 34.0 41.0 140.6 151.7 143.5 135.0 167.4 145.8 10.9 7.2 6.5 5.7 7.0 7.0 22.7 26.6 22.8 23.5 32.5 27.5 49.5 51.6 45.8 46.6 55.7 51.0 2.8 3.0 3.6 2.1 3.4 2.4 28.2 29.5 27.1 28.3 33.7 34.8 0.6 1.8 1.1 2.3 1.3 1.1 2633 2615 2516 2124 2515 2734	47.2 44.1 37.6 47.5 34.0 41.0 41.9 140.6 151.7 143.5 135.0 167.4 145.8 136.0 10.9 7.2 6.5 5.7 7.0 7.0 5.8 22.7 26.6 22.8 23.5 32.5 27.5 25.2 49.5 51.6 45.8 46.6 55.7 51.0 53.8 2.8 3.0 3.6 2.1 3.4 2.4 3.5 28.2 29.5 27.1 28.3 33.7 34.8 32.0 0.6 1.8 1.1 2.3 1.3 1.1 1.4 2633 2615 2516 2124 2515 2734 2181

	USGS	AGV-2	USGS	BCR-2	USGS	GSP-2		
Dete	AGV-2	USGS CRM-1	BCR-2	USGS CRM-2	GSP-2	USGS CRM-3		
Date	PV	14-Jul-22	PV	14-Jui-22	GeoRem	14-JUI-22		
SO3 >/=	0.01	0.00	0.08	0.03		0.04		
0:00	50.14	Unnormalized Major	Elements (We	ight %):				
5102	59.14	59.36	54.00	53.85	66.60	66.54		
1102	17 02	1.047	2.205	2.265	14 00	0.676		
	17.03 6.10	10.99	12.40	10 540	14.90	14.96		
MnO	0.100	0.11	12.39	12.54	4.41	4.45		
MaO	1 90	1 79	3 60	2 60	0.041	0.041		
CaO	5 15	5.26	7 11	7 16	2 10	2 13		
Na2O	4 20	4 17	3 12	3 11	2.10	2.13		
K20	2 90	2 90	1 77	1 77	5 38	5 43		
P205	0 483	0 484	0 359	0 358	0.290	0 294		
Sum	97.96	98 19	98.30	98 32	98.12	98 26		
LOI %	57.50	50.15	50100	50.52	50111	50.20		
				4.04.				
SiO2	60 37		ments (weigi	1 t %): 54 76	67 88	67 73		
TiO2	1 07	1 07	2 30	2 30	0,67	0 69		
AI2O3	17 39	17 30	13 71	13 71	15 19	15 22		
FeO*	6 23	6 22	12 60	12.71	4 4 9	4 53		
MnO	0.10	0.10	0 20	0 20	0.04	0 04		
MaO	1 84	1 81	3 66	3 66	0.98	0.96		
CaO	5 26	5 35	7 24	7 28	2 14	2 17		
Na2O	4.29	4 25	3.17	3 16	2.83	2 84		
K20	2,96	2.95	1.80	1.80	5.48	5.53		
P2O5	0.49	0.49	0.37	0.36	0.30	0.30		
Total	100.00	100.00	100.00	100.00	100.00	100.00		
NI	10			n): 10	17	1.6		
	19	20	15	12	1/	10		
Sc	13	13	34	72	20	19		
V	110	123	418	110	52	54		
v Ba	1134	1136	684	686	1340	1337		
Rh	68	67	46	45	245	247		
Sr	660	662	337	330	240	238		
7r	232	233	187	180	550	569		
Ϋ́.	19	20	36	35	28	28		
Nb	14.1	14.2	12.4	13.2	27.0	26.5		
Ga	20	21	22	22	22	23		
Cu	52	51	20	20	43	45		
Zn	87	90	130	131	120	114		
Pb	13	14	11	11	42	42		
La	38	41	25	24	180	201		
Се	69	72	53	53	410	439		
Th	6	6	6	4	105	106		
Nd	30	32	28	31	200	201		
U	2	2	2	1	2	2		
sum tr.	2611	2631	2078	2055	3650	3714		
IN %	0.26	0.26	0.21	0.21	0.36	0.37		
sum m+tr	98.22	98.45	98.51	98.53	98.49	98.63		
I+IOXIGES	98.27	98.50	98.56	98.58	98.56	98.70		
	90.2/	98.50	90.00	98.58	90.50	98.70		
111631	30.33	Maior elements are n	ormalized on	a volatile-free ba	isis. with total Fe ex	xpressed as FeC		
		® denotes a duplicate	e bead made f	rom the same ro	ock powder.			
NiO	24.0	25.1	16.0	15.2	21.6	20.8		
Cr2O3	23.7	22.8	23.2	19.7	29.2	28.1		
Sc2O3	20.1	20.2	51.4	53.0	9.7	8.7		
V2O3	174.3	180.2	614.3	603.3	76.5	78.9		
BaO	1266.1	1268.3	763.6	765.9	1496.1	1492.5		
Rb2O	_74.1	_73.3	50.3	49.3	267.9	269.7		
SrO	779.9	782.8	399.0	390.2	283.8	281.3		
ZrO2	313.4	314.1	251.9	242.5	742.9	768.4		
Y203	24.3	25.1	45.8	44.5	35.6	35.4		
	20.2	20.3	17.8	18.9 20 0	38.6	3/.9		
retertiooper (∍eoanalyticati	Laboratory ^{2 / . °}	~~~~ /	23.9	29.0	Analyses by XRF		

U2O3 sum tr.	2.1 3109	1.8 3134	1.9 2596	0.7 2566	2.6 4351	2.4 4430
Nd2O3	35.6	37.9	33.0	36.0	233.3	235.0
ThO2	7.0	6.3	6.6	4.3	119.5	121.2
CeO2	85.3	88.4	65.3	64.9	504.0	539.2
La2O3	44.8	48.0	29.4	28.6	211.1	236.0
PbO	14.2	15.0	11.4	11.4	45.2	45.5
ZnO	107.9	111.9	161.2	162.8	149.4	142.4
CuO	64.5	64.4	24.6	25.2	53.8	56.0

Date	Date	KEks002 GGL 2526-1 5-Aug-22	USGS agv-2 PV	AGV-2 USGS CRM-1 4-Aug-22	USGS bcr-2 PV	BCR-2 USGS CRM-2 5-Aug-22	USGS GSP-2 GeoRem	
SO3 >/=								
		Unnormalized Major Elements	(Weight %):					
SiO2	SiO2	53.67	59.14	59.46	54.00	53.90	66.60	
TiO2	TiO2	1.744	1.051	1.049	2.265	2.267	0.660	
AI2O3	Al2O3	14.42	17.03	17.00	13.48	13.47	14.90	
FeO*	FeO*	10.58	6.10	6.12	12.39	12.56	4.41	
MnO	MnO	0.174	0.100	0.099	0.197	0.196	0.041	
MaO	MaO	4.11	1.80	1.78	3.60	3.61	0.96	
CaO	CaO	8.85	5.15	5.26	7.11	7.17	2.10	
Na2O	Na20	2.83	4.20	4.20	3.12	3.13	2.78	
K20	K20	1 11	2 90	2 90	1 77	1 78	5 38	
P205	P205	0 314	0 483	0 479	0 359	0 353	0 290	
Sum	Sum	97 81	97 96	98 34	98 30	98.43	98 12	
	LOT %	1 86	57.50	50.51	20.30	50.15	50.12	
		1.00						
SiO2	SiO2	Normalized Major Elements (W	eight %):	60 46	5/ 93	51 76	67 88	
TiO2	5102 TiO2	1 70	1 07	1 07	24.93	2 20	07.00	
1102	1102		17 20	17 20	2.30	12.50	15 10	
	AIZUS	10.01	17.39	17.20	13.71	13.69	15.19	
FeO MmO	FeO*	10.81	0.23	0.22	12.60	12.76	4.49	
Mai	MnO	0.18	0.10	0.10	0.20	0.20	0.04	
MgO	MgO	4.20	1.84	1.81	3.66	3.67	0.98	
CaU	CaO	9.05	5.26	5.35	7.24	7.28	2.14	
Nazu	Na20	2.90	4.29	4.2/	3.17	3.18	2.83	
N20	K2O	1.13	2.96	2.95	1.80	1.80	5.48	
P205	P205	0.32	0.49	0.49	0.37	0.36	0.30	
Total	Total	100.00	100.00	100.00	100.00	100.00	100.00	
		Unnormalized Trace Elements	(ppm):					
NI	Nı	14	19	20	13	12	17	
Cr	Cr	42	16	16	16	14	20	
SC	Sc	36	13	13	34	34	6	
v	V	315	119	124	418	412	52	
Ва	Ba	591	1134	1130	684	688	1340	
Rb	Rb	25	68	67	46	46	245	
Sr	Sr	324	660	663	337	331	240	
Zr	Zr	160	232	234	187	180	550	
Y	Y	34	19	20	36	35	28	
Nb	Nb	11.7	14.1	14.6	12.4	12.9	27.0	
Ga	Ga	22	20	21	22	21	22	
Cu	Cu	28	52	51	20	19	43	
Zn	Zn	115	87	90	130	132	120	
Pb	Pb	6	13	14	11	11	42	
La	La	21	38	41	25	27	180	
Ce	Ce	40	69	69	53	51	410	
Th	Th	4	6	5	6	4	105	
Nd	Nd	25	30	30	28	30	200	
U	. U	1012	2	1	2	2	2	
sum tr.	sum tr.	1813	2611	2621	2078	2061	3650	
IN %	in *	0.18	0.26	0.26	0.21	0.21	0.36	
sum m+tr	sum m+tr	97.99	98.22	98.61	98.51	98.64	98.49	
1+ I oxides	Toxides	98.04	98.27	98.66	98.56	98.69	98.56	
w/LOI	w/LOI	99.89	98.27	98.66	98.56	98.69	98.56	
If Fe3+	ıİ Fe3+	101.07	98.95	99.34	99.93	100.08	99.04	
		R denotes a duplicate bead ma	on a volatile	-free basis, v same rock po	with total Fe bwder.	expressed as I	-eO.	
ΝίΟ	NiO	17.5	2.4 . 0	25.2	16.0	15.6	21.6	
Cr2O3	Cr203	61 0	22.7	22 A	23.2	20 0	29.2	
Sc203	Sc203	55 9	20.1	20.0	51 4	51 7	97	
V203	V203	464 1	174 2	121 9	614 2	606 0	76 5	
RaO	BaO	 659 8	1266 1	1261 P	762 6	768 1	1496 1	
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Peter Ho	operese	oanalyticarĽaðoratory	× / ۰ ۴	20.0	23.1	20.2	Analyses t	by XRF

Data	GSP-2 USGS CRM-3
	5-Aug-22
SiO3 >/= SiO2 TiO2 Al2O3 FeO* MnO MgO CaO Na2O K2O P2O5 Sum LOI %	$\begin{array}{c} 66.63\\ 0.676\\ 14.94\\ 4.45\\ 0.041\\ 0.95\\ 2.13\\ 2.79\\ 5.45\\ 0.290\\ 98.35 \end{array}$
SiO2 TiO2 Al2O3 FeO* MnO MgO CaO Na2O K2O P2O5 Total	$\begin{array}{c} 67.75\\ 0.69\\ 15.19\\ 4.53\\ 0.04\\ 0.96\\ 2.16\\ 2.84\\ 5.54\\ 0.29\\ 100.00\\ \end{array}$
Ni Cr Sc V Ba Rb Sr Zr Y Nb Ga Cu Zn Pb La Ce Th Nd U sum tr. in % sum m+tr I+Toxides w/LOI if Fe3+	$ \begin{array}{c} 16\\ 21\\ 6\\ 54\\ 1340\\ 247\\ 239\\ 569\\ 27\\ 26.2\\ 23\\ 43\\ 113\\ 42\\ 203\\ 440\\ 106\\ 203\\ 2\\ 3720\\ 0.37\\ 98.72\\ 98.79\\ 98.79\\ 99.29\\ \end{array} $
NiO Cr2O3 Sc2O3 V2O3 BaO Rb2O SrO ZrO2 Y2O3 Nb2O5	20.1 30.3 9.2 80.0 1496.6 269.8 282.5 769.1 34.6 37.4

Peter Hooper Gedanalytical Laboratory

sum tr. in %	sum tr. in %	0.23	0.31 0.31	3123 0.31	2596 0.26	2573 0.26	4351 0.44
U2O3	U203	1.0	2.1	1.1	1.9	1.7	2.6
Nd2O3	Nd203	28.8	35.6	34.7	33.0	34.9	233.3
ThO2	ThO2	4.5	7.0	5.2	6.6	4.9	119.5
CeO2	CeO2	49.6	85.3	84.6	65.3	63.2	504.0
La2O3	La203	24.4	44.8	47.7	29.4	31.1	211.1
PbO	PbO	6.4	14.2	14.8	11.4	11.8	45.2
ZnO	ZnO	143.4	107.9	111.7	161.2	164.2	149.4
CuO	CuO	34.6	64.5	63.6	24.6	23.3	53.8

CuO	53.7
ZnO	140.6
PbO	45.2
La2O3	237.6
CeO2	540.7
ThO2	120.6
Nd2O3	236.7
U2O3	2.7
sum tr.	4438
in %	0.44

Appendix E: Detailed Discussion of Geochemical Results

Appendix E: Detailed discussion of geochemical results

WSU provided formation picks for individual samples from their Machine Learning Algorithm. See Sadowski, et al., 2022 for a detailed discussion of the strengths and limitations of this analysis. Table 3 summarizes formation picks from the machine learning algorithm, and my alternative picks discussed below.

Figure E-1 plots major oxides typically used to discriminate between formations for the 6 site samples. Samples G-622-001 and -005 seem outliers relative to the others. Sample -001 has a generally lower TiO2 content, while -005 is relatively higher in TiO2 than the others.

Figure E-2 compares major oxide values in samples G-622-001, -005, and -006 to typical formation values compiled for Grande Ronde Basalt flows from Reidel and Tolan, 2013, Hammond, 2013, and those for samples taken in Sadowski et al., 2022. Hammond's values are generally accepted as the type values for the formations in this portion of the Columbia Basin region. Samples G-622-001 and -006 were identified by the Machine Learning algorithm as Meyer Ridge; Sample -005 is included as it seems an outlier on Figure 8 plots.

Overall, samples show a general pattern typical of weathering: depletion of iron, magnesium, and phosphorus relative to standards. Significant effort was applied in the field and in the laboratory to select unweathered material, but the range of values suggest weathered material from surface exposures.

Interpreting these results in this light:

1. The Machine Learning algorithm at the WSU Laboratory assigns samples G-622-001 and -006 to the Meyer Ridge Member. The Meyer Ridge Member is older than the Sentinel Bluffs, and generally restricted to southeast Washington (Reidel and Tolan, 2013). It is a small volume flow and sometimes interbedded with the Grouse Creek Member flows. The Meyer Ridge Member is generally understood to have TiO2 analyses <1.8 and MgO analyses >5.1 on a normalized weight percent basis. Neither G-622-001 or -005 meet those criteria. We conclude these samples are not from the Meyer Ridge member.

2. The map shows samples G-622-001 and -006 were taken within an area mapped by Sadowski, et al.,2000 as Stember Creek member of the Sentinel Bluffs Formation. Sample G-622-005 is also within the area mapped as Stember Creek. Plots of normalized major oxides (Figure 6) seem to associate G-622-001 with the Museum member, while -005 and -006 have a signature more closely approximated by the Ortley member, as defined in Reidel and Tolan (2013) and Hammond (2013). As discussed in Sadowski, et al.,, 2000, when discussing lower confidence samples:

"It is unlikely that these lower confidence samples could be classified as the older members, as this would require complicated eruptive histories or complex structural relationships that were not observed. Additionally, the low confidence samples do not reside in the Ortley compositional type-field (Fig. 1). For all of these reasons, the low confidence samples are inferred to be Grouse Creek-type compositions. As of August 2020, geochemical data from Hammond (2013) is not incorporated into the training dataset for WSU's ML model so ML classifications do not well characterize the middle portion of our stratigraphy. In general, samples with Sentinel Bluffs-type compositions have lower SiO₂ content (~53.7–55.7 wt. %), lower TiO₂ content (<2.0 wt. %) and higher MgO content (~3.8–5.1 wt .%), whereas older GRB units have higher SiO₂ (~54.7–57.7 wt. %), higher TiO (~2.0–2.3 wt. %), and lower MgO (<4.2 wt. % MgO). " Sample G-622-001 has a significantly greater chemical similarity to the Museum member than Stember Creek material. Limited outcrop density does not permit assessment of a complex geologic model, however little complexity is required to offset along a speculative fault south of G-622-001 subparallel to Reecer Canyon.

Certainly, assigning G-622-005 and -006 to the Ortley member would similarly require significant eruptive and/or structural complexity not otherwise in evidence. For this reason, we concur with the assignment of G-622-005 to the Stember Creek member. (Table 3). The degree of weathering makes this assignment uncertain.

Sample G-622-006 is similar in major oxide chemistry to -007. This report assigns it similarly to the Museum member and is assigned as such in this study.

Figure E-1: Major Oxide Plots of Rock Chemistry



FeO v. TiO2

MgO v. TiO2



P2O5 v. TiO2



Figure E-2: Formation Discrimination of G-622 Series Samples



FeO v. TiO2

MgO v. TiO2





P2O5 v. TiO2

Key to Formation Designations for Figure E-2

Source	Graph name
Meeks (Hammond, 2013)	Mv(mk)-H
Meyer Ridge (Reidel and Tolan, 2013)	Mv(mr)-RT
Ortley (Reidel and Tolan, 2013)	Mv(o)-RT
Ortley (Hammond, 2013)	Mv(o)-H
Sentinel Bluffs Museum (Reidel and Tolan, 2013)	Mv(m)-RT
Sentinel Bluffs Museum 1 (Hammond, 2013)	Mv(m1)-H
Sentinel Bluffs Museum 2 (Hammond, 2013)	Mv(m2)-H
Sentinel Bluffs Spokane Falls (Reidel and Tolan, 2014	Mv(sf)-RT
Sentinel Bluffs Stember Creek (Hammond, 2013)	Mv(sc)-H
Sentinel Bluffs Stember Creek (Reidel and Tolan, 2013)	Mv(sc)-RT
Upper McCoy Canyon (Hammond, 2013)	Mv(mc)-H
McCoy Canyon (Sadowski, et. Al 2022)	Mv(mc)-S
McCoy Canyon (Sadowski, et. Al 2022)	Mv(mc)-S
Museum (Sadowski, et. Al 2022)	Mv(m)-S
Spokane Falls (Sadowski, et. Al 2022)	Mv(sf)-S
Museum (Sadowski, et. Al 2022)	Mv(m)-S
Museum (Sadowski, et. Al 2022)	Mv(m)-S
	G-622-001

G-622-002
G-622-003
G-622-005
G-622-006
G-622-007

Appendix F: Well Logs in the Vicinity

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E me Kittitas County Rublic Works	County Kittitas	
across 411 North Ruber St	Township (N or S) Range	BE_(E or W) Section 27
Sty CILENSDUCC Same WIJ 200 789 24	<u> </u>	1/4. of above section.
2) TYPE OF WORK	Succer address of well location	lasanthane
	Tax lot number of well location	K Burg WH 48926
	! 	······
3) DRILLING METHOD	(7) STATIC WATER LEVEL	Date
☐ Notary Air ☐ Notary Mild ☐ Calore	Artesian Pressure Ib/sq.	in. Date
	(2) WATER DEADING ZONES	
T) BORE HOLE CONSTRUCTION:	(8) WATER BEARING ZUNES	:
Depth of Completed Well 5 ft	Depth at which water was first found	·
	From To	Est_Flow Rate SWL
E Winter-bght cover		
	······································	
Material	(9) WELL LOG:	
Welded Threaded Graed	Ground Elevation	
	Material	FROM TO SWL
Seal Seal	·····	
Weil Seal		
Material	Cobbles	0 3
	— <u> </u>	
Borchole diameter		
	fl	RECEIVED
		UN 282010
Fifter BD SD Bentonite plug at least 3 ft.	thick	
	DEPAR	IMENT OF ECOLOGY - CENTRAL REGIONAL OFFICE
5 n 30 or 1 10 0 0 Materia		
	.	
A leave and leave stor star	·	
	1/15/10 0	6/15/10
	Date started	_lof la fie
Size	WELL CONSTRUCTION CERTIFI	CATION:
	 constructed and/or accept responsibility/ compliance with all Washington well const 	for construction of this well, and its Incline standards. Materials used
-) WIEDLYEDID: - DPartip D/Bailer DAir Diflowing Artesian	and the information reported above are tru	e to my best knowledge and belief.
PermeabilityYieldGPM	Type or Prim Name and Knibsch	ield License No. 3021
Conductivity PH	Trainee Name	Ucense No.
Temperature of waterOF/C Depth artusian flow found ft	Drilling Company HALMANA	illing The
By whom?		3021
Depth of strata to be manyzed. From ft. to ft.	Internet State	16 CL
Records	Address 10621 71000 KOO	OF FOOLING UT 1851
	Registration No. HOLOCDI)44KH UDone 6/22/10
rease or supervising Goologuer Engineer (71) 1/0-1/4-1, LnC.		

10NITORING WELL REPORT 318148	Well ID# Start Card #	Geote SEO	ch Soil	Boring
1) OWNER/PROJECT ame Gittitgs County Rublic Works dame 411 North Rubly St Gliant County St	(6) LOCATION OF V County Kititas	VELL By Leg	al description Longit BE (E or W) S	nucle section 2.7
2) TYPE OF WORK	Street address of well location	™ Phei Ellen	Santlar Santlar Sburg la	20 48926
New construction Alteration (Repair/Recondition) Conversion Deepening Abandonment	Tax for number of well locat	tion		
DRILLING METHOD Rotary Air Rotary Air Hollow Stein Auger	(7) STATIC WATER	LEVEL: land surface. lb/sq. in.	Date	
BORE HOLE CONSTRUCTION:	(8) WATER BEARIN	IG ZONES:		
	From	Ţo	Est. Flow Ra	te Ś₩Ĺ
Special Standards Water-tight cover				<u>_</u>
TO Surface flush vault Locking cap				
Material	(9) WELL LOG: Ground El	evation	· · · · · · · · · · · · · · · · · · ·	
	Mater	ial	F.rom	To . SWL
ft. pD. pD. pD. pD. pD. pD. pd. Well Seal:	Cobbles		0	3
			3	5
Grout weight				
Borebole diameter Derebole diameter Derebole diameter Derebole diameter Derebole diameter 1 2 in from <u>fl</u> ft to d	R.	DEA		
yO in from fl to fl	£.		EIVED	
iliter (8) are provided at least 3 ft. th back by a sector of the sector	DEP	UN 2	<u>8</u> 2010	
ft 190 yr g 190			GENTHAL REGIONAL OFFICE	
	6/15/	Com	pleted 61	5/10
O O Material C8 C Size	WELL CONSTRUCTIO	N CERTIFIC	ATION:	<u> </u>
WELL TESTS:	 I constructed and/or accept compliance with all Washin and the information reported 	responsibility for glon well constru 1 above are true t	construction of this ction standards. Ma o my best knowledge	well, and its derials used e and belief.
PermeabilityYieldGPM ConductivityPH	Type or Print Name	Knipschi	License No.	3021_
Temperature of waterOF/C Depth artistian flow foundf. Was water analysis done?YesNo By whom?		ene Dri	lling The	3021
Depth of stram to be manyzed. Fromft, toft.	Acoress 10621 100	Id Road	E Edgewi	Nd WA 983
Manne Of Supervising Goologist/Engineer Gn Northern Inc.	Registration No. MOL	UCDI0°	MKH Were	6/22/10

Please print, sign and return to the Department of Ecology

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Water Wall Depart	Current
vv ater vv en Keport Original - Feelow, 1st conv - owner 2nd conv. driller	Notice of Intent No. <u>1-212009</u>
Franking state of the second s	Unique Factory Wall UD Tag No. AIC - BIJ
Construction/Decommission	
$\Box Construction \qquad	Water Right Permit No.
Decommission ORIGINAL INSTALLATION Notice	Property Owner Name Kich Whitteher
of Intent Number	Well Street Address / 7/ Rehamos R
PROPOSED USE: Domestic Industrial Municipal	City Fllenshy County Kith tas
DeWater	Leasting $\frac{1}{1}$ $\frac{1}{$
TYPE OF WORK: Owner's number of well (if more than one)	Locallony 1/4-1/9 He 1/4 See 1 Will V No ence
New well Reconditioned Method . Dug Bored Driven	Lat/Long (s, t, r Lat Deg Lat Min/Sec
DIMENSIONS: Durmeter of well 2 inches drilled 170 ft	etill REQUIRED)
Depth of completed well 1770 ft.	Long Deg Long Min/Sec
CONSTRUCTION DETAILS	Tax Parcel No. 19-18-27000-0018
Casing Welded Diam. from $\cancel{42}$ ft. to $\cancel{3} \cancel{5} \cancel{0}$ ft.	
Installed: There installed 577 Diam. from 79 It. to 100 ft. to ft.	CONSTRUCTION OR DECOMMISSION PROCEDURE
Perforations: Yes No	Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of
Type of perforator used TO R. C. J.4	information indicate all water encountered. (USE ADDITIONAL SHEETS IF NECESSARY.)
SIZE of perfs 4 in. by 6 in. and no. of perfs 6 from 30 ft. to 6 ft.	MATERIAL FROM TO
Screens: Yes Sono K-Pac Location	Dirt 02
Manufacturer's Name	Cemented gravel+baubled 2 12
DiamSlot sizefromft. toft.	emanted grabel - brokenbasel 12 88
DiamSlot sizefromft. toft.	Brokenbasett clay + gravel Do 126
Gravel/Filter packed: Yes K No Size of gravel/sand	Riack Rasalt- Hard 1/10 141
	BIOLENDIACL DASALT-Spiler 191 170
Surface Seal: :: Yes I No To What depth?IL	
Did any strata contain unusable water? Yes Si No	
Type of water? Depth of strata	
Method of sealing strata off	
PUMP: Manufacturer's Name	
Туре: Н.Р	_
WATER LEVELS: Land-surface elevation above mean sea level	
Static levelfl. below top of well Date	OF ECOLO
Artesian pressure lbs. per square inch Date	A Reneived
Artesian water is controlled by	
WELL TESTS: Drawdown is amount water level is lowered below static level	AUG 0 & 2006 - }
Was a pump test made? 🗖 Yes 🔄 No If.yes, by whom?	
Yield:hrshrshrs.	
Yield: gal/min. with tt. drawdown after hrs.	
Recovery data (time taken as zero when pump turned off) (water level measured from well	
top to water level)	
Date of test	
Bailer test gal./min. withft. drawdown afterhrs.	
Airtest 10 gal/min, with stem set at 160 ft, for 1 hrs.	
Artesian flowg.p.m. Date	
Temperature of water Was a chemical analysis made? 📋 Yes 🙇 No	oldt a chile
``	Start Date 8/14/05 Completed Date 8/14/05
WELL CONSTRUCTION CERTIFICATION: 1 constructed and/or accer	pt responsibility for construction of this well, and its compliance with all
Washington well construction standards. Materials used and the information	reported above are true to my best knowledge and belief,
Driller/Engineer/Traince Name (Print)	Drilling Company Hoden Rivers Drilling
Driller/Engineer/Trainee Signature	Address P. D. Box 993
Driller or trainee License No. 242.85	City, State, Zip Selah, WH 48942
(If TRAINEE,	Contractor's
Driller's Licensed No	Registration No. HIDDER DIDDB_Date
Driller's Signature	Ecology is an Equal Opportunity Employer. ECY 050-1-20 (Rev 2/03

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VARIANCE WASHINGTON Notice Right Permit to VARIANCES OF WASHINGTON Notice Right Permit to VARIANCES OF WASHINGTON OF WELL Concept REFERENCE VARIANCES OF WASHINGTON VARIANCE OF WASHINGTON	0 2770	ATER WE	L REPORT	Start Card No Unique Well I D # A	W 1299 FQ721	63
111 Address Particle State Par		STATE OF	VASHINGTON	Water Right Permit N	0 ========	======
19. Deviating of the part of contracts of address ROBSING D. (LLAND BUT 14 Sec 27. T 15. 0.). R. 188 MM 10. RECLEASE OF FLOAT CONTRACTS OF CONTRACTS OF ADDRESS OF ALL CONTRACTORS	(1) UMAEK' NAME MILLER, K / MEICHT, U	Address P.U.	SOX 322 CLE ELUM, WA	98943-		
<pre>[1] FROPOGED DEST DOMESTIC [4] TF2C 0F MORE: [4] TF2C 0F MORE: [4] TF2C 0F MORE: [5] Disconting: [5] Disc</pre>	(2) LOCATION OF WELL COUNTY KITTITAS (2a) STREET ADDRESS OF WELL (or nearest address)	ROBBINS RI	- NE 1/4 NE 1/4), Ellensburg	Sec 27- T 19- N , R 18B	WM	A
(4) TYPE OF WORK: Owner's Number of well If The te than one) If The te te te te te te than one) If The te	(3) PROPOSED USE DOMESTIC		(10) WELL LOG			======
NEW MELL Method: NOTEST 13) DIMENSIONS. Disameter of well 6 incluss 13) DIMENSIONS. Disameter of well 6 incluss 14) DIMENSIONS. Disameter of well 6 incluss 15) DIMENSIONS. Disameter of well 6 incluss 16) DIMENSIONS. Disameter of well 6 incluss 17) DIMENSIONS. Disameter of well 6 incluss 16) DIMENSIONS. Disameter of well 6 incluss 16) DIMENSIONS. Disameter of well 6 incluss 17) DIMENSIONS. Disameter of well 6 incluss 18) DIMENSIONS. Disameter of well 1 bet 6 incluss 18) DIMENSIONS. Disameter of well 1 bet 6 incluss 18) DIMENSIONS. Disameter of well 1 bet 6 incluss 18) DIMENSIONS. Disameter of well 1 bet 6 incluss 18) DIMENSIONS. Disameter of well 1 bet 6 incluss 18) DIMENSIONS. Disameter of well 1 bet 6 incluss 18) DIMENSIONS. Disameter of well 1 bet 6 incluss 18) DIMENSIONS. Disameter	(4) TYPE OF WORK · Owner's Number of wel	1	Formation: Describe 1	by color, character, size	of mater	lal,
<pre>(5) 2008/FRONTION DEFAILS Diameter of vell 6 inches Drilled 131 ft Depth of completed vell 130 ft (5) CONSTRUCTION DEFAILS (5) CONSTRUCTION</pre>	NEW WELL (11 Method. ROTARY		and nature of the main at least one entry for	terial in each stratum per or each chapge in formati	and the l netrated,	with
<pre>16: CONSTRUCTION DESTRUCTION DE /pre>	(5) DIMENSIONS. Diameter of we Drilled 133 ft Depth of completed we	ll 6 inches ll 130 ft	MATERIAL		FROM	TO
Perforations NO Type of perforations Streens, NO Manufacturer's Mame Type Screens, NO Manufacturer's Mame Type Screens, NO Manufacturer's Mame Type Screens, NO Manufacturer's Mame Type Screens, NO Manufacturer's Mame Type Screens, NO Manufacturer's Mame Type State of perforations from fit to fit Diam slot size from fit to fit Screens, NO Manufacturer's Mame Type SUBMERSIBLE H P Material used in seal DESTONTITE Surface neal, MSS Material used in seal DESTONTITE Material used in seal DESTONTICE Material used in seal Seal DEST Material used in seal Seal DEST Material DESTONTICE Material used in seal Seal DESTONTICE Material used in seal Seal DESTONTICE Material used in seal Seal DEST Material used in seal Seal DEST Material used in seal Seal DEST Material used in seal DESTONTICE Material used in Seal DESTONTIC	(6) CONSTRUCTION DETAILS Casing installed. 6 "Dia from +1.5 WELDED W/TUBEX "Dia from エリュ" みつしていたち、 "Dia from	ft to 127 ft ft to ft ft.to ft.	BROWN CLAY BROWN CLAY BROKEN BASALT WITH BROWN CLAY WATER BEAJ BASALT PRACTIPED BACALT WATI	RING	0 51 58 58 93	51 58 93 93 118
Screens NO Manufacturer's Name Type Diam slot size from ft to ft Diam slot size from ft to ft Gravel packed: NO Gravel packed: NO Gravel packed from ft to ft Surface seal. YES To what depth? 85 ft Did any strata contain unusable water? NO Type of water? Depth of strata ft Méthod of sealing strata off SRAL METHOD 1 (7) FUNP Manufacturer's Name Type SUBMERSIBLE H P (9) WALE LEVELS Static level 64 ft Delow top of well? Static level 64 ft Delow top of well? Static level 64 ft Delow top of well? MATER LEVELS Static level 64 ft Delow top of well? Nork started 01/04/01 Completed 01/05/01 (9) WELL TESTS Drawdown is amount water level is lowered below static level Mas a pump the Water Level Time Water Level Time Nater Level Time Water Level Time Water Level Data of test gl/min w/ stem set at 126 ft for 2 25 Drs Artesian How Thenerature of water? Data of test gl/min w/ stem set at 126 ft for 2 25 Drs Artesian How Thenerature of water Was a chemical analysis made? NO	Perforations NO Type of perforator used SIZE of perforations in by perforations from ft to perforations from ft. to perforations from ft to	in ft, ft ft.	HARD BLACK BASALT	SA DEARTING	127	133
Gravel packed: NO Size of gravel Gravel placed from ft to ft Surface seal. YES To what depth? 85 ft Material used in seal BENTONITE Did any strata contain unusable water? NO Type of water? Depth of strata ft Method of sealing strata off SEAL METHOD 1 (7) FUMP Manufacturer's Mame Type SUBMERSIBLE H P Static level 64 ft below top of well pate 01/05/01 Artesian water controlled by CAP Work started 01/04/01 Completed 01/05/01 Static level 64 ft below top of well? Date 01/05/01 Artesian water controlled by CAP Work started 01/04/01 Completed 01/05/01 Static level Was a pump test made? NO If yes, by whom? Tield. gal/min with ft drawdown after hrs Air test g gal/min wistem level Time Water Level Time	Screens. NO Manufacturer's Name Type Model No Diam slot size from ft Diam slot size from ft	to ft to ft	10	FECOLO		
Surface seal. YES To what depth? 85 ft Material used in seal BENTONITE Did any strata contain uousable water? NO Type of water? Method of sealing strata off SBAL METHOD 1 Type SUBMERSIBLE H P Type SUBMERSIBLE H NAME THENDERSIS DESCONTONE CERTIFICATION: SUBMERSIS POBOL P Type SUBMERSIE H P SUBMERSIS POBOL P Type SUBMERSIE H P SUBMERSIS POBOL P Type SUBMERSIE H P SUBMERSIS POBOL P Type SUBMERSIE H P SUBMERSIE	Gravel packed: NO Size of grader of grader states of grader from the size of grader from the size of grader states of of grader sta	avel	Ster Re	celved		
<pre>(7) PUMP Manufacturer's Mame Type SUBMERSIBLE H P (8) WATER LEVELS Land-surface elevation above mean sea level ft Static level 64 ft below top of well Date 01/05/01 Artesian water controlled by CAP (9) WELL TESTS Drawdown is amount water level is lowered below static level Work started 01/04/01 Completed 01/05/01 (9) WELL TESTS Drawdown is amount water level is lowered below static level Work started 01/04/01 Completed 01/05/01 (9) WELL TESTS Drawdown is amount water level is lowered below static level Work started 01/04/01 Completed 01/05/01 (9) WELL TESTS Drawdown is amount water level is lowered below static level Work started 01/04/01 Completed 01/05/01 (9) WELL TESTS Drawdown is amount water level is lowered below Recovery data Time Water Level Time Water Level Time Water Level Date of test // / Bailer test gal/min w/ stem set at 126 ft for 2 25 brs Artesian flow g p m Temperature of water Was a chemical analysis made? NO Hereford Water Static level Was a chemical analysis made? NO Hereford Was a chemical analysi</pre>	Surface seal, YES To what de Material used in seal BENTONITE Did any strata contain unusable water' NO Type of water' Depth of a Method of sealing strata off SEAL METHOD 1	epth'85 ft strata ft	FEB C	EGIONOFS		
(8) WATER LEVELS Land-surface elevation above mean sea level ft static level 64 ft below top of well Date 01/05/01 Artesian Pressure lbs per square inch Date Artesian water controlled by CAP Work started 01/04/01 Completed 01/05/01 (9) WELL TESTS Drawdown is amount water level is lowered below static level Was a pump test made? NO If yes, by whom? Yield. gal /min with ft drawdown after hrs Air test gal/min ft drawdown after firm Water Level Time Time Time Time Time Time Time Time	(7) PUMP Manufacturer's Name Type SUBMERSIBLE	H P				
Artesian water controlled by CAPWork started 01/04/01Completed 01/05/01(9) WELL TESTS Drawdown is amount water level is lowered below static levelWork started 01/04/01Completed 01/05/01(9) WELL TESTS Drawdown is amount water level is lowered below static levelWell CONSTRUCTOR CERTIFICATION: I constructed and/or accept responsibility for con- struction of this well, and its compliance with all Washington well construction standardsWater LevelTimeMater LevelTimeRecovery data TimeTimeWater LevelTimeDate of test//ft drawdown after batehrs DateAir test 9 Artesian flowg g m Was a chemical analysis made? NONAME TUMWATER DELLING, INC (SIGNED)Incense NoContractor's Registration NoTUMWADP 011 LZDate 01/08/01	 (8) WATER LEVELS Static level Artesian Pressure Land-surface elevat above mean sea leve 64 ft below top of well Artesian Pressure Lbs per square inch 	10n 21 ft L Date 01/05/01 Date				
(9) WELL TESTS Drawdown is amount water level is lowered below static level Was a pump test made? NO If yes, by whom? Yield. gal/min with ft drawdown after hrs Time Water Level Time Water Level Time Water Level Date of test // Bailer test gal/min wistem set at 126 ft for 2 25 hrs Artesian flow g p m Temperature of water Was a chemical analysis made? NO WELL CONSTRUCTOR CERTIFICATION: I constructed and/or accept responsibility for con- struction of this well, and its compliance with all Name TUMWATER DRILLING, INC (Person, firm, or corporation) (Type or print) NAME TUMWATER DRILLING, INC (Person, firm, or corporation) (Type or print) ADDRESS P-0 BOX 777 (SIGNED) Date Of water Was a chemical analysis made? NO	Artesian water controlled by CAP		Work started 01/04/01	Completed 01	/05/01	
Date of test / / Name	 (9) WELL TESTS Drawdown is amount water level is static level Was a pump test made? NO If yes, by whom? Yield. gal /min with ft drawdown a 	s lowered below after hrs	WELL CONSTRUCTOR CERT I constructed and/ struction of this Washington well co and the informatio knowledge and beli	IFICATION: or accept responsibility well, and its compliance nstruction standards Ma n reported above are true ef	for con- with all terials u to my be	sed st
Date of test // Bailer test gal/min ft drawdown after hrs Air test 9 gal/min w/ stem set at 126 ft for 2 25 brs Artesian flow g p m Temperature of water Was a chemical analysis made? NO ADDRESS P 6 BOX 707 [SIGNED] Contractor's Registration No TUMWADP 011 LZ Date 01/08/01	Recovery data Time Water Level Time Water Level Tim	ie Water Level	NAME TUMWATER DRILLIN (Person, firm, o	G, INC r corporation) (Type or	print)	
	Date of test // Bailer test gal/min ft drawdown a Air test 9 gal/min w/ stem set at 126 ft Artesian flow g p m Temperature of water Was a chemical ana	fter hrs for 2 25 brs Date lysis made? NO	ADDRESS P BOX 707 [SIGNED] Contractor's Registration No TUMW	ADP 011 LZ Date 01/	1249 08/01	

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File Original and First Copy with Department of Ecology Second Copy Owner's Copy Third Copy Driller's Copy STATE OF	ELL REPORT		Application No.) 	
(1) OWNER: Name ART MANZ_	Address Rt4	Box 2161	< Eli	nstre	NOC.
2) LOCATION OF WELL: County Kittitas	the by conded	SE NW s	ес 22 т 19 + 7	N. R.	8 w.
earing and distance from section or subdivision corner	-unicolaid -	<u> 0~~~~1</u> -	lads	<u>r</u>	
(3) PROPOSED USE: Domestic 🗭 Industrial 🗆 Municipal 🗇	$\frac{(10) \text{ WELL LO}}{(10) \text{ WELL LO}}$	G:		<u> </u>	
	show thickness of aqui	by color, character, uifers and the kind with at least one en	size of muterial and nature of th tru for each cho	and struc e materic mae of f	iure, a il in ea ormatic
(4) TYPE OF WORK: Owner's number of well (if more than one)		MATERIAL	<u> </u>	FROM	TO
New well 📴 Method: Dug 🗌 Bored 🔲 Deepened 🗔 — Cable 🗂 Driven 🗖	Dert			0	5
Reconditioned Rotary B Jetted	CEMENT 9	CAVEL .		5	15
(5) DIMENSIONS: Diameter of well (inches	MEdium	BASALT		155	175
Drilled 3.00 ft. Depth of completed well. 300 ft.	Saudetau	E WATE	6 6500	125	2.7
(6) CONSTRUCTION DETAILS:	24443 16/	<u>e (w-1/c</u>	- ency	<u>r70</u>	3e
Cosing installed: /					
Threaded []					
Welded 🗌					
Perforations: Yes 🔲 No 🖻			+		
Type of perforator used					
SIZE of perforations	· · · · · · · · · · · · · · · · · · ·				
perforations from		<u></u>			
perforations from					
Screens: Yes 🗆 No 🕞	·				
Manufacturer's Name					
Diam. Slot size from ft, to ft.					
Diam. Slot size from ft, to ft.					
Gravel packed: Yes D No D Size of gravel:					· ·
Gravel placed from ft. to ft.				j	
Surface seal: Yes Ng D To what depth? 25 t.				İ	
Material used in seal BEATONITS				·	
Type of water?				ł	
Method of sealing strata off		IEGEN	77	· ;	
(7) PUMP: Manufacturer's Name			·		
Туре: Н.Р		100 3 1 10	~~ ++		
(8) WATER LEVELS: Land-surface elevation above mean sea level.	\\\				
Static level 180 ft. below top of well Date					· · ·
Artesian pressure		an transit	SPHCE		
(Cap, valve, etc.)				·· ·	
(9) WELL TESTS: Drawdown is amount water level is lowered below static level	Week and 8- 2	0 8	x -	<u></u>	
Was a pump test made? Yes 📋 No 📋 If yes, by whom?	WORK Started. C.LR.			<u> </u>	, 190
Yield: gal./min. with ft. drawdown after hrs.	WELL DRILLE	R'S STATEME	NT:		
u D U U H	This well was of true to the best of	irilled under my my knowledge	jurisdiction an and belief.	id this r	eport
Recovery data (time taken as zero when pump turned off) (water level			/		
measured from well top to water level) Time Water Level Time Water Level Time Water Level	NAME BACH	Drilling	1 (0	ma '	
		A corpo	- میر مسر	pe or pri	INT)
	Address AT. 5	. Box 1010	, ELLE	~544	u r .g.
Z Date of test	1 miles	Burl.			/
Bailer test 25 gal/min. with	[Signed]	(Wei	I Driller)		
Artesian flow				-	

string WA

ESOURCE PROTECTION WELL SUBMIT ONE WELL REPORT PER WELL D	L REPORT NSTALLED)	T CURRENT Motion of Intent No. 51.6.68			
Construction/Decommission ("x" in box) Construction 375980 Decommission ORIGINAL INSTALLATION Notice of Intent Number:			Resource Protection		
		Property Owner	Ceotech Soll Boring		
		Site Address			
ousulting Firm Barr Engineer	ing	City Ellens	birg county IT. ++i+AS		
nique Ecology Well IDTag No.		Location $NF1/4$ -	1/4 21/4 Sec 22 Twn 19 R 18		
ELL, CONSTRUCTION CERTIFICATION: 1 con sept responsibility for construction of this well, and his compli	structed and/or hance with all	EWM			
ashington well construction standards. Materials used and the ported above are true to my best knowledge and helief.	e information	Lat/Long (s, t, r still REOLURGIN	Lat Deg MinSec		
Briller C Engineer C Traincon 1	11.411	Tax Parcet No	Long Deg Min Sev		
mo (Print Last, First Name) 150 d Ney (7)	Iself &	Cased or Uncased F	Diameter () Static Land 110 d		
iller or Traince License No1U173	· · · · · · · · · · · · · · · · · · ·	Work/Decommissio	in Stari Date $\mathcal{U} - 2 - 10$		
traince, licensed driller's Signature and Licens	e Number:	Work/Decommissio	n Completed Date <u>4 - 2 - 10</u>		
Construction Design	Well I	Data	Formation Description		
			5:11		
			1 a. A. 8111		
			Saley Silly		
			6-1-0-015		
			cobble		
			Silty sand.		
			cobb 189		
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			NEUEIVED		
			MAY 1 9 2010		
			DEPARTMENT OF ECOLOGY - CENTRAL REGIONAL OFFICE		
1					

Ecology is an Equal-Opportunity Employer

Please p RESOURCE PROTECTION (SUBMIT ONE WELL REPORT PER W Construction/Decommission ("x" in box) Construction 37598 Construction 37598 Decommission ORIGINAL INSTALLATION Notice of Intern SEOW Consulting Firm <u>BACN</u> Eugin Unique Ecology Well IDTag No. WELL CONSTRUCTION CERTIFICATION accept responsibility for construction of this well, and Washington well construction standards. Materials us reported above no tracto my best knowledge and bells Differ CI Engineer CI Traince Man eye Driller or Trainee License No. <u>14</u> If traince, licensed driller's Signature and	rint, sign and return WELL REPORT VELL INSTALLED) A Number: SUS Meeting N: Acconstructed and/or its compliance with all ed and the information of. GilSeTH GilSeTH Market SS SS License Number:	Property Owner Site Address City <u>EllPrisb</u> Location <u>JE</u> 1/4- EWM <u>Elor</u> WWM Lat/Long (s, t, r still REQUIRED) Tax Parcet No Cased or Uncased E Work/Decommissio Work/Decommissio	nt of Ecology Notice of Intent No. $\underline{A E o 88 99}$ Tope of Well ("x in box) Resource Protection Geotech Soil Boring \underline{CAG} County $\underline{Kc} + \underline{Fi} + \underline{A5}$ \underline{K} Geotech Soil Boring \underline{CAG} County $\underline{Kc} + \underline{Fi} + \underline{A5}$ \underline{K} Geotech Soil Boring \underline{CAG} County $\underline{Kc} + \underline{Fi} + \underline{A5}$ \underline{K} Geotech Soil Boring \underline{CAG} County $\underline{Kc} + \underline{Fi} + \underline{A5}$ \underline{K} Geotech Soil Boring \underline{CAG} County $\underline{Kc} + \underline{Fi} + \underline{A5}$ \underline{K} Geotech Soil Boring \underline{K} Geo
Construction Design	Well	Data	Formation Description
		3 Bentovie Slorg Trimanie 66 +0 301	RECEIVED
			MAY 192010 Department of ecology - central regional office

Ecology is an Equal Opportunity Employer

Please print, RESOURCE PROTECTION WE (SUBMIT ONE WELL REPORT PER WELL Construction/Decommission ("x" in box) Construction 3759.8-Z. Decommission 3759.8-Z. ORIGINAL INSTALLATION Notice of Intent Num Consulting Firm Barr Engineer Unique Ecology Well IDTag No. WELL CONSTRUCTION CERTIFICATION: 10 accept responsibility for construction of this yetl, and its com Weshington well construction standards. Materials used and	sign and return LL REPORT INSTALLED) aber:	to the Departme CURRENT Property Owner Site Address City Ellen S Location <u>All</u> /4 EWM Or WWM Lat/Long (s, t, r	nt of Ecology Notion of Intant No Tope of Well ("x in b Resource Protect Cleatech Soil Bor <u>borg</u> County <u>F</u> . -1/4 <u>54</u> 1/4 Sec <u>22</u> 4 Lat Deg <u>Min</u>	. <u>SE06836</u> (ox) (on ling <u>++(++++++++++++++++++++++++++++++++++</u>
Teported above are true to my best knowledge and helter. Differ [] Engineer [] Traince Name (Print Last, First Name) Driller/Engineer /Trainee Signature Driller or Traince License No If traince, licensed driller's Signature and Lice	nse Number:	still REQUIRED) Tax Parcet No Cased or Uncased I Work/Decommissie Work/Decommissie	Long Deg Mir Diametor Sta on Stari Date on Completed Date	$\frac{Sec}{1 - 16}$
Construction Design	Well L	Data	Formation	Description
			Sard Wita Roc	y Silly del K
			RECEIVE MAY 1920 DEPARTMENT OF ECOLOGY - CENTRAL M	ED 10 Negional office

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ta and/or the Information on this Well Report.	Please pri RESOURCE PROTECTION & (SUBMIT ONE WELL REPORT PER WE Construction/Decommission ("x" in box) Construction 37 5983 ORIGINAL INSTALLATION Notice of Intent SEO683 Consulting Firm <u>Backs</u> Eugine Unique Ecology Well IDTag No. WELL CONSTRUCTION CERTIFICATION accept responsibility for construction of this well, and its Well CONSTRUCTION CERTIFICATION accept responsibility for construction of this well, and its Well CONSTRUCTION CERTIFICATION accept responsibility for construction of this well, and its Well CONSTRUCTION CERTIFICATION accept responsibility for construction of this well, and its Well CONSTRUCTION CERTIFICATION accept responsibility for construction standards. Materials used reported above are tone to my bast knowledge and baller SL Dritter CI Engineer [] Trainee Name (Print Last, First Name)	nt, sign and return i NELL REPORT (LL INSTALLED) Number: (1996 : 19 (1996 : 19) (1996 : 1996 : 19) (1996 : 19) (to the Department CURRENT N Property Owner Site Address City <u>EllErtSba</u> Location <u>Aur</u> _1/4-1 EWM & or WWM [Lat/Long (s, t, r still REQUIRID) Tax Parcel No: Cased or Uncased Di Work/Decommission Work/Decommission	t of Ecology Jotice of Intent No. $\underline{AEO8986}$ Tripe of Well ("x in box) Tripe of Well ("x in box)
The Department of Ecology does NOT Warranty the Da	Construction Design	Well E	Data 3/8 Aule plug 3 Bentanite Glula, Trimule 60 to 3 UD	Formation Description

File Dep Sec Thin	Original with artment of Ecology ond Copy - Owner's Cop d Copy - Driller's Copy	y STATE OF WASHINGTON	OR	Notice of Intent <u>W113427</u> UNIQUE WELL I.D. # <u>AFE 217</u> Water Right Permit No	
(1)		avialee	Add	1000 20th/ QVE East Tacoma W	a
(2) (2a)	LOCATION OF WELL: STREET ADDRESS O TAX PARCEL NO.:	County KiHitas	ק	U 1/4 <u>5</u> 21/4 Sec 22 T 19 N.R. 18 WM 98 SUNEOST	;44
(3)	PROPOSED USE: Domestic Industrial Municipal Irrigation Test Well Other DeWater			(10) WELL LOG or DECOMMISSIONING PROCEDURE DESCRIPTION Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least	
(4)	TYPE OF WORK:	Owner's number of well (if more than one) New Well Deepened Depend Reconditioned Cable Decommission	-	one entry for each change of information. Indicate all water encountered. MATERIAL FROM TO TOPSOIL Bir, M O Claustary of the state of the s	
(5)	DIMENSIONS: Drilled 285	Diameter of well 10." g." 6 "	ches ft.	cement dor. Cab BIB mill 17 28 Cem gravellob BL Brmit 28 57	
(6)	CONSTRUCTION DET Casing installed: Weided Liner installed Threaded	AILS Diam. from <u>+ 2</u> ft. to <u>2.57</u> Oiam. fromft. to	ft. ft. ft.	Cem. gr. Cob BI. Br. H 73 103 Cem. gr. Cob Clay BI Br.H. 103 197 Sandstore wich Ven Br.H. 103 197 Sandstore wich Ven Br. 115 197 248 Sandstore maity color m248 285	
	Perforations: Type of perforator used SIZE of perforations	Yes FiNo perforations fromft. to	in. it.		
	Screens: Manufacturer's Name _ Type DiamSio DiamSio Gravel/Filter packed:	Yes K-Pac Location	ft. ft.		
	Material placed from	tt. to	ft.		
(7)	PUMP: Manufacturer's Type:	NameH.P			
(8)	WATER LEVELS; Lan Static level Artesian pressure	t. below top of well	ft.	Work Started 9/6/00. Completed 9/8/00	
	Artesian water is contro	(Cap, valve, etc.)		WELL CONSTRUCTION CERTIFICATION:	
(9)	WELL TESTS: Drawdo Was a pump test made Yield:gal./min. Yield:gal./min. Recovery data (time tak well top to water level) Time Water Level) Time Water Level Date of test Bailer test	win is amount water level is lowered below static level 7	_hrs. _hrs. _hrs. _ hrs. hrs.	I constructed and/or accept responsibility for construction of this well, and compliance with all Washington well construction standards. Materials us and the information reported above are true to my best knowledge and bell Type or Print Name <u>Heve Mills</u> Cense No. <u>1335</u> (Licensed Driller/Engineer) Trainee Name <u>License No.</u> Drillod dampart of MAT, UEII <u>Drilling In</u> (Signed) <u>Licensed Driller/Engineer</u>) (Licensed Driller/Engineer) (Licensed Driller/Engineer) Contractor's <u>UNTE PMINDDR9/A/M</u>	まます。
	Airtest Artesian flow Temperature of water	_gal/min. withft. drawdown after g.p.m. Date Was a chemical analysis made?	hrs.	(USE ADDITIONAL SHEETS IF NECESSARY)	-

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Ecology is an Equal Opportunity and Affirmative Action employer. For special accommodation needs, contact the Water Resources Program at (360) 407-6600. The TDD number is (360) 407-6006.

l'hird	Goppy — Driller's Copy STATE OF W	ASHINGTON	17 211	Permit No.		<u>.</u>
<u>(1)</u>	OWNER: Name Sorian Franceson	Address MI 7	<u>BM 216</u>	B PD	2ndb	ura:
(2)	ng and distance from section or subdivision corner.		NW 12 NW	A Sec. A A TA	N. R.	w.м.
$\widetilde{(3)}^{\prime\prime}$	PROPOSED USE: Domestic 🕞 Industrial 🗋 . Municipal 🗋	(10) WELL LO	DG:			7
	Irrigation 🗌 Test Well 🗍 Other 🗌	Formation: Describ show thickness of a	e by color, charac quifers and the k	ter, size of materia ind and nature of	il and stri the mater	icture, and ial in each
(4)	TYPE OF, WORK Owner's number of well		MATERIALS.	e entry for each c	FROM	TO
	New well 🖳 Method: Dug Bored Cable Driven 🗌	Soil, Broy	wn	· · · · · · · · · · · · · · · · · · ·	F. a.	201.9
	Reconditioned 🗌 👘 Rotary 🗐 Jetted 🔲	Sand. Gra	vel. Boul	ders.		002
(5)	DIMENSIONS: Diameter of well	Clay. Broy	<u>UBIUS</u> NII		203	330
	Drilled	Sandstone	Brown.	WB	330	370
(6)	CONSTRUCTION DETAILS:					
	Casing installed: <u>6</u> " Diam. from <u>0</u> ft. to <u>200</u> ft.		· · · · · · · · · · · · · · · · · · ·	<u> </u>		
	Threaded					
,	Doufonctions.			<u>.</u>		
	Type of perforator used CWTTING torch					
	SIZE of perforations <u>1/8</u> in. by <u>5</u> in.	· · · · · · · · · · · · · · · · · · ·				
	perforations fromft. toft.					
	perforations from ft. to ft.	·		<u> </u>		
· .	Screens: Yes D No D	s				
	Manufacturer's Name	a the second of the	d melling and makes are to			
હર્સ્ટ્ર-* સંસ્કૃ	Diam Slot size from tt. to ft.					
4		·		4	1.4	
~~~~~	Gravel placed from ft. to ft.				**	
	Surface sealt		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		
	Material used in seal composite bontonite	· · · · · · · · · · · · · · · · · · ·		• • •	100	1.
	Did any strata contain unusable water? Yes D No	*	<u> </u>			E CE
	Method of sealing strata off	* <u></u>				
(7)	PUMP: Manufacturer's Name					
	Туре: Н.Р					
(8)	WATER LEVELS: Land-surface elevation above mean sea level.			in the second second second second second second second second second second second second second second second Second second br>Second second	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	
Static	level 3.9.0 ft. below top of well Date	· · · · ·				
artes.	Artesian water is controlled by					
	TATTER TO THE AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS AND THE ADDRESS					
(9) Nos (	WELL TESTS: Indexed below static level	Work started	50 51924	Completed .		19.
vas a Zield	gal/min. with ft. drawdown after hrs.	WELL DRILL	ER'S STATE	MENT:		
,,	· · · · · · · · · · · · · · · · · · ·	This well was	drilled under i	my jurisdiction;	and this	report is
Recov	very data (time taken as zero when pump turned off) (water level	title to the best		ge and bener.		
m Tin	easured from well top to water level) ne Water Level   Time Water Level   Time Water Level /	NAME	Vell, Dri	rula <u>c</u>		
		(1 1) 1) 1) 1)	erson, nrm, or "co	л poration)(	1.ype or p	
		Address	1. 1947 104763 			
	te of test	[Signed]	tor Bil	a la color		
Baile: Artes:	r test		A.7	Well Driller) 4 🤮		
Temp	erature of water Was a chemical analysis made? Yes 🗌 No 🔃	License No.s.		Date		
	I LICE ADDITIONAL OIL	FFTS IF NFCESSAD	<b>v</b> )			
	No. 7356-08-(Rev. 4.71)	ALICEGOAN	-/		1	-

hirt	I Copy - Driller's Copy /23 264 STATE OF V	ASHINGTON Water Right Permit No.
`` <u>`</u>	OWNER: NUTTO ERRY SALISBURY AND	KT4 BORDISC EIICUSBURE WA 9
2)	LOCATION OF WELL: carry Kittitas	E/2 14 E/2 14 See 22 T 19 N. R 18
22)	STREET ADDRESS OF WELL (or nearest address)	
3)	PROPOSED USE: Domestic Industrial C Municipal C	(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION
DeWatter Test Well Other D		Formation. Describe by color, character, size of material and structure, and show thickness of a and the kind and nature of the material in each stratum penetrated, with at least one entry to
4)	TYPE OF WORK: Owner's number of well (If more than one)	Change of Information,
	Abandoned D New well K Method. Dug D Bored D Descened D Cable C Priven	SAIL COBBLES MOS
	Reconditioned 🗆 Rotary 🗹 Jettad 🗆	COBBLES BOULDERS CLAY H 5 10
5)	DIMENSIONS: Diameter of well inches.	Corres Boulders Sindstone M 100 18
	Drilled 200 feet. Depth of completed well 300 ft.	CIAY COBBLES BOULDERS M 188 17
5)	CONSTRUCTION DETAILS: 4.2	SAMOSTONE LOBOLES H 218 2
	Casing installed: Diam. from t. to t.	C/4 m 235 2
	Uner installed 2. Diam. rom R. to t. to t.	Sandstone GRAVEL m 245 2-
		CAY GRAVEL m 27/ 2
	Type of performance SAW	$A = \frac{17}{2}$
	SIZE of performations in. by in.	Sanstone m 212 3
	<u>140</u> perforations from <u>340</u> ft. to <u>390</u> ft.	CLAY - TRIKE WATER M 325 3.
	perforations from T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. to T. toT. to	Sano STONE-WATER M 329 3
		C/AY M 376 3
	Manufacturer s Name	
	Type Model No	
	Diam. Skot sizeft. toft. toft.	
		R D R D V P C
	Gravel placed fromfL (afL	
	Surface analy You K No To what death? 390 + .	
	Material used in seal	
	Did any strata contain ununable water? Yes 🗌 No 🔲	
	Type of water? Depth of strate	CENTER ST
0	PUMP: Manufacturer's Name	
	HP	
I)	WATER LEVELS: Land-Lumice sevention	Work Started 19 Completed 19
	Artesuan pressure Ibé. pér equare inch. Date	WELL CONSTRUCTOR CERTIFICATION:
	Antesian water is controlled by(Cap. valve, etc.)	I constructed and/or accept responsibility for construction of this well, and
))	WELL TESTS: Drawdown is amount water lavel is lowered below static level	the information reported above are true to my best knowledge and belief
·	Was a pump test made? Yes No I If yes, by whom?	NAME REBE WELL DRILLING
	Vield gai /min, with ft crawdown after hrs.	IPERADON, FIRM, OR CORPORATION
_	H / H II N	Address TOBOFIO864 UAKIMMO
	Recovery data (time taken as zero when owno turned off) (water level mantured from wall	(Signed) WENT-2 License No. 1728
ħ	top to writter level) me Water Level Time Water Level Time Water Level	(WELL CHULLEN)
		Registration 2 7 V
-		No. 130-14, 19_
ىر	Date of test	(USE ADDITIONAL SHEETS IF NECESSARY)
	Bailor teet gal./min. with ft, drawdown after hre.	Ecology is an Equal Opportunity and Attempture Action completions
	ren were t t t t t t t t t t t t t t t t Artesian flow t g.p.m. Date t	cial accommodation needs, contact the Water Resources Program at (21
	Temperature of water Wee & chemical analysis made? Yes No	407-6600. The TDD number is (208) 407-6006.

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## WELL LOG CHANGE FORM

**Instructions:** Record any change made to the well log record on this form. Append this form to the well log image. File with the original.

WCL Log ID (Required)	Well Log ID
Regional Office: CRO ERO NWR	D SWRO
Type of Well: 🗌 Water 🔲 Resource	
Notice of Intent: Ecology We	ell ID Tag No.
Property (Well) Owner's Name Well Street Address	··· ·
City County _	Zip Code
Location:1/4-1/41/4 Sec 7	Wn R E or W (Circle One)
Lat./Long: (Required) Lat. Deg I Long. Deg I Horizontal Collection	Lat. Min/Sec Long. Min/Sec Method Code
Tax Parcel No	<u>.</u>
Type of Work: New Well Recondition Well Log Received Date /// Well Diameter (in inches) Well Depth	ned  Deepened (in feet) Well Completed Date _/_/
Driller's Ecology License No Trainee's Ecology License No	
Reason/Source of Change (Required)	VAL CORRECTION - IMAGE UNCHANGED
Signature of Well Log Tracker (Required)	EG Date 3/05

Imaging Well Log Phase 11 – Change Form ECY-WR-WLCF Rev. 10/02/02

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4.4. Boy 20 EDD	malu	NA 11
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	Lin, H	
NENE Sec. 2	<u>1 7/9/</u>	017/8
L LOG:		
entite by color obstrater size of materi	al and striv	ature and
e of aquifers and the kind and nature of	the mater	ial ta eaci
recea, with at loast one entry for each	criange of	Jormetion
MATERIAL	FROM	70
gravel - copples	0	120
BrokEN BASAIT	120	32-0
DEALING		
M BASAIT	320	779
rock	440	445
BASA IT	445	53
shale	535	600
Basa Ht	600	650
BASAttwater	650	660
Basatt	460	200
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ILLER'S STATEMENT:		
was drilled under my jurisdiction	and this	report is
oost of my knowledge and belief.		
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ICA UTILITY	- 0 ,	
	TANK OL D	F2074.)
OR 1010, KTE S	)	
nute (Bach		
(Well Driller)		
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Date Date	<u> </u>	19.8.
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File Dep Sec	Original and First Copy with artment of Ecology ond Copy — Owner's Copy STATE OF V		090: 90 K	348 843
	OWNER: Name MiKail Tarasenko Ad	tress 13115 SIF 258 th St. Ke	- + (	Jan
(2)	LOCATION OF WELL: COUNTY K: H; +a S	SE WNEWS ZZ . 1	9	8E
( <b>2</b> a)	STREET ADDRESS OF WELL (or nearest address)	is Rd	<u>N.,H</u> _	H
(3)	PROPOSED USE: O Domestic Industrial Municipal	(10) WELL LOG or ABANDONMENT PROCEDURE D	ESCRIPT	
	Irrigation     DeWater Test Well     Other	Formation: Describe by color, character, size of material and structure, and	show thickne	ss of aquifers
(4)	TYPE OF WORK: Owner's number of well	and the kind and nature of the material in each stratum penetrated, with a change of information.	at least one e	entry for each
	Abandoned  New well	MATERIAL	FROM	то
	Deepened  Cable  Deepened  Cable  Deepened  Reconditioned  Recondi	TOOSOCI	·	- <u>y</u> -
(5)	DIMENSIONS: Diameter of well 6 inches.	10P 3877		· / · / ·
-, -	Drilled 305 feet. Depth of completed well 300 ft.	Brown Clay 9 gravel	4	81
(6)	CONSTRUCTION DETAILS:		à	1=1
	Casing installed: Diam. from <u>+2</u> ft. to <u>178</u> ft.	Sticky Brown Clay	81	156
	Welded <u>4</u> Diam. from <u>-/C</u> ft. to <u>300</u> ft. Diam. from <u>t</u> to <u>t</u>	Brown Clay & gravet	136	157
	Type of perforator used	Basalt Black	157	178
·	SIZE of perforations in. byin.	a th tractures	<u>.</u>	
	perforations from ft. to ft.	Sticky Brown	198	260
	perforations from ft. to ft.	Clay )		
		Crambly Brown	260	27/
	Manufacturer's Name	Sand Hone 4.0 GFM		
	Type Model No	Brown Clay	2.71	292
- /	DiamSlot sizefromft. toft.			
		Grown Sand Stone	292	792
	Gravel placed from ft. to ft.	(PO.CF) y Water		<u>-</u>
<u></u>	Surface seal: Yes X No C To what depth? 47 ft.	III E US E I W		
	Material used in sealBentonite			
	Did any strata contain unusable water? Yes No.			
	Method of sealing strata off	I COMO (10)		<u> </u>
		ULIARTIMEAT		
(7)	PUMP: Manufacturer's Name H.P.	RECION COULDER		
(8)	WATER LEVELS: Land-surface elevation	Work Started 9-11 19 Completed 9-1	2	
•••	Static levelft. below top of well Dateft.			<u> </u>
	Artesian pressure lbs. per square inch Date Artesian water is controlled by		-	
	(Cap, valve, etc.)	compliance with all Washington well construction standards	of this well Materials	used and
(9)	WELL TESTS: Drawdown is amount water level is lowered below static level	the information reported above are true to my best knowledge	e and belief	• •
	Vield:gal./min. withft. drawdown after hrs.	NAME /// // / / / // // ////	9 ·	· .
	¹⁾ ¹⁾ ¹⁾ ¹⁾	Address 9455 Stans ( wast	D.	$M_{\rm I}$
	" " " " " " " " " " " " " " " " " " "	(Signed) M. H. M. M.	12	( 7)
_	Hecovery data (time taken as zero when pump turned off) (water level measured from well top to water level)	(WELL DRILLER) LICENSE	⊎ №0. <u>/ C</u>	
	Time water Level IIme Water Level Time Water Level	Contractor's Registration - 1 - 0 - 1 - Pr Or	19	~~
2		No. MATAEDC/bate		19 <u>-9</u> 8
·	Date of test	(USE ADDITIONAL SHEETS IF NECESSA	RY)	
	Bailer test gal./min. with ft. drawdown after hrs.			_
	Airtest gal./min. with stem set at ft. for hrs. Artesian flow o:o.m. Date	cial accommodation needs, contact the Water Resources	mployer. F Program	⁼ or spe- at (206) ·
	Temperature of water Was a chemical analysis made? Yes No	407-6600. The TDD number is (206) 407-6006.		()

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File Original and First Copy with	h
Department of Ecology	
Second Copy — Owner's Copy	

## WATER WELL REPORT

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Pepartm ⁻ st of Ecology econd Copy — Owner's Copy	WATER WELL	KEPORT	Application N	<b>o</b>	
aira Copy — Driner's Copy	STATE OF WASH	NGTON	Permit No	<u> </u>	
(1) OWNER: Name Mr. & Mrs.	Donald McLaughlin	ress Rt 4, Box	216 Ellenst	ourg	
i LOCATION OF WELL: County	Yakima	E // E	12-4 Sec.22 т. 1	1.9N. R.	
Bearing and distance from section or subdivision	corner Sun East Deve	elopment /2-	/		
3) PROPOSED USE: Domestic M. In	dustrial 🗆 Municipal 🔂 (10)	WELL LOG:			
Irrigation 📋 To	est Weil 🗌 Other 🔲 Form	ation: Describe by color, cl	laracter, size of material	and struct	ure,
A TUBE OF WORK. Owner's number	of well f	thickness of aquifers and t im penetrated, with at leas	the kind and nature of the to one entry for each ch	ie material ange of fo	i in Tma
4) IIFE OF WORK: (if more than on New well D Metho	e)Bored O	MATERIA	.L	FROM	T
Deepened 7	Cable Driven DI	Soil	brnS		1
Reconditioned	Rotary Jetted [] Har	d pan boulder	s_brn_H	1	-11
5) DIMENSIONS: Diameter of	weil 6 inches. Par	LOW CLAY	<u>\$</u>	11 +-	-14
Drilled 160 ft. Depth of comple	eted well 160 ft Sor	udstone wh		$\frac{14}{12}$	42
(6) CONSTRUCTION DETAILS:	Jan	<u>clav Streaks</u>	of Sandstone	4 <del>6</del> 0	- <del>0</del> 0 97
Casing installed: 6 " Dias too	4+ 154 Bro	ken rock and	clay brn H	97	$\frac{7}{11}$
Threaded []	tt. to ft. Bro	<u>ken rock br</u>	n VH	144	15
Welded 🕵		<u> </u>		<u>-</u> +	
Perforations: yes No 🗆		<u>e is caving, r</u> forsted from 1	180. to run ca	sing	
Type of perforator used 70rc	h cut Tor	ch perforated	6" casing wi	t.h	
SIZE of perforations	in by 6 in 50	1/8" x 6" slot	3		
perforations from	ft. toft. 6x8	<u>packer set at</u>	<u>94 ft.</u>		
perforations from					
Screens: Yes D No N	Bro	<u>ken rock &amp; sha</u>	le brn H	154	_1
Manufacturer's Name		gpm at 160 ft			
Type	Model No.	96.6 ft.			
Diam. Slot size from	ft. to ft.				
Gravel packed was a static	Cas	ed 154 ft. wit	h 6 inch ste	el ca:	si
Gravel placed from	ft. to ft.	al depth of we	<u>11 is 160 ft</u>	•	
Surface sealt u M	18t	·			<u> </u>
Material used in seal Bente	N/Te				
Did any strata contain unusable wa	iter? Yes 🗆 No Ҟ '			İ-	
Type of water? Dept Method of scaling strata of	h of strate	······		Į_	
(F) DUTRED.		·····			
(1) FUME: Manufacturer's Name Type:	НР				
(8) WATER LEVELS: above mean se	a levelft.		<u> </u>		
static level	inch Date				
Artesian water is controlled by	(Can value ata)	······································			
	(Cap, valve, etc.)	Part 18 1 1,000			
9) WELL TESTS: Drawdown is am lowared below st	tatic level is Work	started 8/21/85 1	9	22/25	. 19.
Vas a pump test made? Yes 🗌 No 🗌 If yes, b	y whom?	LL DRILLER'S STA	TEMENT-		
" by Arrliff	"""	his well was drilled up	don my junisdiction of	nd this us	•••
	" " true	to the best of my know	wledge and belief.	na tine le	spor
lecovery data (time taken as zero when pump	turned off) (water level	DTDD WDIT			
Time Water Level Time Water Level	Time Water Level NAM	CE RIEDE WELL	DRILLING		<b></b>
TREREM	- ·~ )	1503 E. No.	b Hill Blud	, e-a or prin	-•)
	Addı	1055 A A	~ <i>D</i> 194.		
Date of test		( ()ملكر	2		
lailer test se frus with I U Pou	wdown afterbrs,   [Sig	100 jan y wan	(Well Driller)		
rtesian flow		No 0122	Data 9/24/	lar	10
DEPARITURE OF WATER DEPARITURES AS		ILANL. >	/ To / 1/.	,ر.م. /	т₩.
CENTRAL REGISTER	·	חית <b>ת אין מ</b> ו	I D Dri TOK	U I	

File Original and First Copy with Department of Ecology Second Copy — Owner's Copy Third Copy — Driller's Copy STATE OF	ELL REPORT Application No WASHINGTON Permit No	»
(1) OWNER: Non Mr. & Mrs. Donald McLaug	hlin Rt 4. Box 216 Ellenst	- <u>/</u>
VIOCATION OF WELL commen Valing	TK TK OO	<u>//#4. K</u>
aring and distance from section or subdivision corner Sun East	Development	9N., B
(3) PROPOSED USE: Domentic Vi Industrial [] Municipal	(10) WELL LOG:	
Irrigation   Test Well   Other	Formation: Describe by color, character, size of material show thickness of squifers and the kind and nature of th	and structure, a material in e
(4) TYPE OF WORK: Owner's number of well	stratum penetrated, with at least one entry for each chi	inge of formati
New well Method: Dug 🗆 Bored	Top Soil has 0	
Reconditioned [] Cable [] Driven [] Reconditioned [] Botary 71, Jetted []	Hard pan boulders han H	
	Yellow clay S	11 11
(5) DIMENSIONS: Diameter of well inches	Brown clay S	11 12
Drilled 2.42. R. Depth of completed well 2.42. P.	Sandstone white M	12 60
(6) CONSTRUCTION DETAILS:	Tan clay Streaks of Sandstone	60 97
Casing installed: 6 " non of a to 154 a	Broken rock and clay brn H	97 11
Threaded []	Broken rock brn VH	144 154
Welded W		
Part and in the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second se	Hole is caving, had to run ca	sing.
remorations: You No D Torch Out	perforated from 114 to 154 ft	
BIZE of perforations // in by 6 in	Torch perforated 6" casing wf	th
50 perforations from 114 tt to 154 tt	20 1/8" x 6" slots	
manual perforations from an and the to an and the to	ox8 packer set at 94 ft.	
mentions from ft. to ft		
Screens: Ver CL No N	Broken rock & shale brn H	154   .16
Manufacturer's Name	15	·
Type Model No	IDUT OG G OF	<del>```</del>
Diam Slot size from	SWL 90.0 IL.	
Diam Slot size from fi to ft	Const 151 64 141 ( 1 1 1	
Gravel packed: Yes D No ff Size of gravel:	Total dopth of well is 160 of	<del>si casin</del>
Gravel placed from ft. to ft	LOCAL HADER OF WELL 15 100 Ft.	┍───┼───
Surface seal: Yes No D To what depthy 18+		
Material used in beal DEAD FOR / M-C.	/	<u> </u>
Did any strata contain unusedie water? Yes D No 5	· · · · · · · · · · · · · · · · · · ·	
Method of sealing strata of		
		<u> </u>
(7) FUMIF: Manufacturer's Name		
туре:		<del></del>
(8) WATER LEVELS: Land-surface elevation		<u>†</u> `- <b>-</b>
itatic level		
rtesian pressureBs. per square inch Date	DEPANTMENT	<del></del> †
Artesian water is controlled by	CENTRAL Health	<u> </u>
(9) WELL TESTS: Inward below static level	Work started 8/21/85 19 Completed 8/2	2/95 .10
Was a pump test made? Yes No i If yes, by whom?		
" but at 1. PL- "	WELL DRILLER'S STATEMENT:	
	This well was drilled under my jurisdiction and true to the best of my knowledge and balled	id this report
Renovery data (fime taken as new when much funded all (and a limit	and we are seen of my Anowiedge and Denel,	
measured from well top to water level)	NAME RIEBE WELL DRILLING	
Time Water Level Time Water Level Time Water Level	(Person, firm, or corporation) (Ty	pe er print)
THERE!	1503 E. Nob Hill Blvd.	-
Date of test		
lafler test ge faile, will U CU I drawdewn after hrs.	[Signed]	
irtesian flow		
Amperature of water LL LL	License No. 0422. Date 8/26/	85, 19
CENTRAL HEGION OFFICE	' Drilled by BAL Rui Han	
(URE ADDITIONAL	BLEFTS IF NECESSARY)	

E-1/2-># 14- > w 14- NF-14-W/2- > w	-Xy-SEXy-NE-1/407 Arc. 28-11	9N R-	18 E4
i Original and First Copy with pertment of Ecology and Copy Owner's Copy per Copy Driller's Copy STATE OF	ELL REPORT Application WAIHINGTON Permit No.	No	
OWNER Danne 1/ Pluss	R4-RVT224-Allert		
LOCATION OF WELL 7.774- SW	Address ( I U ( = >)) ( Longo	wiy.	
ring and distance from section or subdivision corner	NEATT - J WAY DE 1/4 NE 1/4 Sec 2 Y T	<u>[7</u> н., вј.:	<u>8Е</u> .w.м.
PROPOSED USE: Domentic F Industrial T Municipal	(10) WELL LOG:		
Irrigation [] Test Well [] Other	Formation: Describe by color, character, size of materi show thickness of aquifers and the kind and nature of	al and strue the materia	cture, and al in each
) TYPE OF WORK: Owner's number of well (if more than one)	MATERIAL		TO
New well 📋 Method: Dug 🔲 Bored 🖸	Top Sal	0	
Reconditioned [] Cable   Driven	GRAVEL MED ICLAN BRAN		10
	CLAM BEN I SOFT MED	70	377
DIMENSIONS: 305 Diameter of well	CRAVEL MED ISANA BENU	\$270	290
Drilled 5 ft. Depth of completed well 5 ft.	CLAY REN SOTTIMMED	790	343
CONSTRUCTION DETAILS:	GRAVEL MED SAND BEN	343	
Casing installed: 6 up - 0 - 344	WB Seven		
Threaded D "Diam. from the to the			
Welded D'			
Type of perforator used			
perforations from	· · · · · · · · · · · · · · · · · · ·	<u> </u>	· · · · ·
perforations from			
Scheme: No. D. No. C.			1) 
Manufacturer's Name		┥──── ┤	
Type Model No	IRECEIVED	$\downarrow$	
Diam	INLULIVED	┥──┥	·
Diam			···
Gravel packed: Yes I No E Size of gravel	NUV 18 1977	╉────┤	
Gravel placed from	VERTICAL OF FOR DO	╉╍╌╴┦	
Surface and 10	DEPARTMENT OF ELOCUTIN	╂────┤	
Surface seal: Yes g No To what depth? f.		++	
Did any strate contain unusable water? Yes		╋╼╍╴┤	
Type of water?		┼╼╼┽	<del></del>
Method of sealing strate off			
PIMP: New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Address New Addres		<u>† </u> ∤	i i
Type: HP		† †	
		† t	
WATER LEVELS: Land-surface elevation above mean sea level			
ic levelft below top of well Date 11/16/27	· · · · · · · · · · · · · · · · · · ·		
sian pressure			
(Cap, valve, etc.)			
WRIJ. TESTS. Drawdown is amount water level is			
lowered delow static level	Work started 11/ 1977. Completes [1		<u></u>
d: gal/min. with ft. drawdown after hrs.	WELL DRILLER'S STATEMENT	1.4	
	This wall was dvilled under my furiadiation	and shin -	
	true to the best of my knowledge and belieft	aunci unus r	report 15
overy data (time taken as mere when pump turned off) (water level			
ine Water Level   Time Water Level   Time Water Level	NAME DT & WELL DRILLING		
	(Person, firm, or corporation) (	Type er pri	
	Address KT7 Box 600A 4	KimA	A.14
			<b></b>
Data of tast	I Bend Ken is Relations	<b>1</b>	
er teste 121 gal /min, With and tt drawdown after hrs.		1C	1 S.
Han Sowie and State a sharehad maker waster the state	70/00		
Antennes of Anter	Devel I. f.L.	ta pintantania	, <b>1932.</b>
		i i i	
		*'	فعر