

# **REMOVAL OF DIELDRIN- CONTAMINATED SOILS**

**NORTH STAR DEVELOPMENT  
PHASE II REMEDIATION AREA  
TAX LOTS 200, 800 AND 900  
MAP 062W32C, SALEM, OREGON**

OREGON ECSI #6036

Prepared for

**I&E CONSTRUCTION**

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Project #1503.20  
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North Star Development  
Phase II Remediation Area  
Tax Lots 200, 800 and 900  
Map 062W32C, Salem, Oregon

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## 1.0 INTRODUCTION

Anderson Geological, Inc. (AGI) was authorized by I&E Construction to oversee the removal and relocation of shallow soils contaminated by the pesticide dieldrin at Phase II of the North Star residential development in Salem, Oregon. The North Star development is planned for development of 700 single-family homes on 150 acres of land covering five tax lots.

The site remediation is being completed in three phases. Phase I of construction of the North Star development is currently in progress with single-family homes on the east end of the North Star site. Prior to the commencement of the construction, dieldrin-contaminated soil was removed from portions or all of sample cells #8, 9, 10, 13, 14, 15 and 33. The soil removal was conducted in mid- to late 2017. The contaminated soil was placed in a temporary stockpile located on cells 19 and 26, which was to be eventually relocated to a former gravel pit located in Keizer, Oregon (Zielinski Farm). Oregon DEQ granted a partial No Further Action (NFA) letter for Phase I of the development on June 17, 2018.

Phase II of the remediation began in July 2018 with the removal of dieldrin-contaminated soil from cells primarily located on the west area of the North Star development. Phase II of construction is to include apartment buildings on the west end of the site in addition to single-family homes on the rest of the site. This report documents the soil removal, stockpiling, relocation and confirmation sampling completed during Phase II. The report also includes a request from DEQ for a partial No Further Action letter (NFA) for a portion of the Phase II remediation.

Remediation of rest of the North Star site (Phase III) is scheduled for summer and fall, 2019. The boundaries of the Phase I and Phase II portions of the site are shown on Figures 2-4. The proposed Phase III development consists of all other areas of the Northstar development.

### 1.1 SITE LOCATION AND SETTING

The North Star residential development is located within the city limits of Salem, Oregon, in an area that was annexed into the city of Salem in 2002. The property is bounded to the north by Alpha Nursery and single-family homes (across Hazelgreen Road NE), to the south by single-family homes (across Kale Street NE), to the east by orchards operated by Alpha Nursery, and to the west by Copper Creek Estates mobile home park. Properties to the north of Hazelgreen Road are located in unincorporated Marion County, properties south of Kale Street are located within the Salem city limits.

The land between the residential lots on the north side of Constellation Avenue and the north boundary of the North Star development (Phases I and II) is being deeded to the City of Salem and used for a storm water drainage swale for the North Star development. The drainage swale will be a linear feature located below the power lines. The swale is designed to be a combination of storm water storage and conveyance, ultimately discharging to the ditch located on the west end of the development.

## 1.2 PROJECT OBJECTIVES

The purpose of the soil removal was to reduce the risk of human contact with dieldrin-contaminated soil for future residential receptors in the Phase II area of the North Star residential development. The objective was to remove the dieldrin-contaminated soil, up to depths of approximately 6-30 inches below ground surface, so that the dieldrin concentration in the remaining soil is below the DEQ's generic residential risk-based concentrations (RBCs) for ingestion, dermal contact and inhalation. The generic residential RBC for dieldrin, which applies to the single-family development areas, is 0.034 milligrams per kilogram (mg/kg). The generic urban residential RBC, which applies to multi-family development areas, is 0.085 mg/kg.

After the successful completion of the removal of the affected topsoil, the site is to be developed with single-family homes and apartment buildings.

## 2.0 BACKGROUND

### 2.1 SITE HISTORY

The North Star property was farmed by the Zielinski family and others since the 1890's. According to Doug Zielinski, owner of Alpha Nursery and former lessee of the subject property, his family farmed all portions of the subject property during various periods from the 1890's until 2017. His family grew row crops (beans, corn) in the earlier years and grass and grain crops in recent years. DDT was used on the site for pest control in the 1950's. No areas of the North Star site are currently being farmed.

A previous owner of tax lot 900 reportedly grew strawberries on the lot in the late 1950's and early 1960's. According to Doug Zielinski, the pesticide aldrin, which naturally breaks down to dieldrin, was used on the strawberry crop. Other row crops grown on tax lots 200, 800 and 900 included green beans and cauliflower. Two areas on the north half of tax lot 200 and one area on the west half of tax lot 1000 were planted in filberts beginning in the 1940's until the trees were removed in the 1980's.

Mr. Zielinski's family sold the land to Granada Land Company in 2005 and leased the land back for farming grass and grain crops from 2005 until spring 2017, when the final crop of wheat was harvested. The property was purchased by I&E Construction in July 2017.

## 2.2 PREVIOUS INVESTIGATIONS

Northstar Development  
Preliminary Soil Analysis  
Multi/Tech Engineering Services, Inc.  
August 17, 2015

In July 2015, Multi/Tech collected soil samples from locations across the subject property for analysis for residual pesticides. The samples were collected from a depth of approximately 6 inches below ground surface (bgs). The samples were analyzed for organochlorine pesticides (EPA Method 8081B), organophosphorous pesticides (EPA Method 8270D) and heavy metals (RCRA 8 metals). No organophosphorous pesticides were reported above the laboratory reporting limits. The metals were reported at concentrations within natural background levels.

Organochlorine pesticides reported in the samples included 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, dieldrin and endosulfan sulfate. Of these compounds, only dieldrin was present above Oregon risk-based concentrations (RBCs) for residential properties.

Dieldrin was detected in seven of the ten soil samples at concentrations ranging from 0.0266 and 0.196 milligrams per kilogram (mg/kg). The dieldrin concentrations exceeded RBCs for the residential ingestion/inhalation/dermal contact exposure pathway in six of these samples.

Northstar Development  
Assessment of Pesticides in Shallow Soil  
Anderson Geological, Inc.  
December 22, 2105

In September 2015, Anderson Geological, Inc. (AGI) collected soil samples from locations across the subject property for analysis for residual pesticides. Samples were collected from depth intervals of 0-6 inches and 6-12 inches below ground surface.

The residual impacts from historical agricultural use of pesticides were evaluated by collecting shallow soil samples across the site. The pesticides aldrin, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, endosulfan sulfate, endrin ketone and dieldrin were detected in composite samples collected from a depth of 0-6 inches. Based on the comparison of the sample results of the initial sampling to the residential RBCs, dieldrin was identified as the only contaminant of concern (COC). Further analysis of deeper samples showed dieldrin at concentrations above residential screening levels for the *dermal contact, ingestion, inhalation* pathway in several areas to depths of at least 12 inches. The maximum depth of the impacted soil was not determined in many areas. Additional characterization of the dieldrin-impacted soils was recommended to identify the depth of soils contaminated above RBCs.

Northstar Development  
Remedial Investigation/Feasibility Study  
Anderson Geological, Inc.  
August 9, 2016

Additional soil sampling ruled out other potential pesticides and metals as contaminants of concern, and further defined the approximate depth of dieldrin-contaminated soil above residential and urban residential screening levels. It was determined that dieldrin-contaminated soil would need to be removed, primarily from locations on the west portion and north extension of the subject property, generally to depths of up to 30 inches.

It was concluded that the most appropriate remedial option for the site was removal of soil that exceed applicable residential risk-based concentrations (soil ingestion, dermal contact and inhalation), and placing the excavated soil in an engineered containment cell on a portion of the North Star site that removes the soil from human contact.

It was later decided that re-use of the soils at an off-site location would be a more economical and practical alternative. The dieldrin-contaminated soil will be transported to an agriculture land located at 6848 Windsor Island Road, Keizer, Oregon on Marion County Map and Tax Lot 063W28 00300. The soil will be used to infill two abandoned gravel pits on the property. The soil will be covered with 3 feet of cleaner fill and will be reused as farm land to grow hazelnuts. The in-filling of the pits with dieldrin-contaminated soil is being done under a Solid Waste Permit Exemption through Oregon DEQ.

## **2.3 Site Remediation – Phase I (2017)**

### **2.3.1 Remediation Work Plan**

A Remedial Action Work Plan for the remediation of the entire 150-acre North Star site, dated March 28, 2017, was submitted to Oregon DEQ. The plan provided details of the soil removal, loading of trucks, hauling of soil to the off-site in-fill location at the Zielinski Farm (6848 Windsor Island Road, Keizer, Oregon), confirmation sampling, and decontamination of heavy equipment and sampling equipment.

The relocation of the soil to infill two abandoned quarry pits at the Zielinski Farm was approved by DEQ under a Solid Waste Permit Exemption. It was later determined that one of the two quarry pits (“south pit”) was located within the 100-year flood plain and also contained jurisdictional wetlands. Special permitting for placement of fill in the flood plain would be required, and identification and mitigation of wetlands was required before fill could be placed in the pit. DEQ revised the Permit Exemption, specifying that the south quarry pit could not be infilled until the appropriate permits were obtained. The time needed for the permitting and wetland survey in the south pit was not compatible with the construction schedule, which required commencement of excavation activities by August 1, 2017. No special permits were required for the north pit as the pit is located outside of the 100-year flood plain and no wetlands were identified in the pit

In June, 2017, DEQ solicited public comments on the proposed remediation. Respondents included nearby residents who were concerned over potential dust generation and public exposure to airborne contaminants during removal of the contaminated soil. Other concerns involved potential public exposure to dieldrin in soil and dust during transportation of the material on public roadways and potential exposure at the pit in-fill site. A concern was also raised over possible spills of contaminated soils during transport of the material. This concern was addressed by a Spill Response Plan that was issued to all truck drivers.

### **2.3.2 Revised Work Plan**

In order to address these concerns and to complete as much of the remediation and construction as efficiently as possible, the work was originally planned to be executed in two phases. Phase I would involve the removal of dieldrin-contaminated soil that exceeds the applicable residential risk standard from the affected cells on the east portion of the North Star site (cells #8, 9, 10, 13, 14, 15, and 33). The dieldrin-contaminated soil would be temporarily stockpiled in cells 19 and 26, located in the Phase II area of the North Star site until it could be transported to the agriculture site to infill the quarries.

The revised scope of work was described in the Addendum #1 to the Remedial Action Work Plan, dated August 6, 2017, which included details for maintaining dust control, decontamination of equipment before leaving the site, conducting air monitoring and dust monitoring during excavation and transport activities and constructing and maintaining the soil stockpile. The addendum also included procedures for decontaminating equipment before leaving the job site.

### **2.3.3 Remedial Action – Phase I**

Approximately 37,700 cubic yards of dieldrin-contaminated soil was removed from cells 8, 9, 10, 13, 14, 15 and 33 between August and November, 2017. Soil samples collected from the finished excavations showed that dieldrin concentrations were below risk-based concentrations for direct contact with residential receptors (0.034 milligrams per kilogram). All of the excavated soils were placed in the stockpile on cells 19 and 26 and seeded to stabilize the soil surface over the winter and until transport to the agriculture site.

Oregon DEQ issued a partial No Further Action (NFA) letter for the Phase I remediation area on June 7, 2018. Construction on the Phase I area began soon after the removal of the contaminated soil with preparing of roads and Installation of underground utilities. The lots were sold to a developer and construction of housing began in 2018.

### 3.0 PURPOSE AND SCOPE

The purpose of the soil removal was to reduce the risk of human contact with dieldrin-impacted soil for future residential receptors. The objective was to remove the shallow soil in specific locations, up to approximately 30 inches below ground surface, so that the dieldrin concentration in the remaining soil is below applicable residential risk-based concentrations (RBCs). After the successful completion of the removal of the affected topsoil, the site will be re-graded and developed with single-family homes.

The scope of work consisted of the following tasks:

- Mark the corners of the sampling grids using surveyor's stakes. Task was completed by surveyors.
- Remove the topsoil from selected quarter-cells using earth-moving scrapers to the pre-determined depth, based on the results of the previous soil sampling.
- Collect composite confirmation soil samples from excavated areas to verify the effectiveness of the soil removal. Analyze the composite samples for dieldrin (EPA Method 8081B).
- Remove additional soil from areas where confirmation soil sample indicate dieldrin concentrations above risk-based concentrations.
- Prepared this report documenting the results and conclusions of the remediation.

### 4.0 MODIFICATIONS TO ORIGINAL WORK PLAN (PHASE II)

#### 4.1 Spill Response Plan

Phase II marked the first hauling of dieldrin-contaminated soil on public roadways. In response to concerns of potential spills from the public and the City of Keizer, a Spill Response Plan dated April 30, 2018 was issued to drivers hauling dieldrin-impacted soil from the construction site to the quarry. The purpose of the Plan was to help the drivers prepare for, and respond quickly and safely to, spill incidents that may occur during transportation of soil on public and private roadways.

#### 4.3 Request for Explanation of Significant Difference to FS/ROD (Phase II)

The site remediation of Phase I involved the removal of approximately 66% more contaminated soil than was initially estimated, raising a concern that the gravel pits at the Zielinski farm may not accommodate all of the soil from Phases I - III. In addition, the multifamily area of the North Star development was in need of fill material to raise the ground elevation prior to construction.

In order to address these issues, I&E Construction proposed that soils from the single-family residential (SFR) areas that exceed the residential RBC (0.034 mg/kg) but are below the urban residential RBC (0.085 mg/kg) would be relocated to the multi-family area where they would be used as structural fill. Since this would involve a modification to the Feasibility Study, it would require a formal Request for Explanation of Significant Difference, which was submitted to and approved by DEQ on April 30, 2018.

## 5.0 FIELD ACTIVITIES

### 5.1 SOIL REMOVAL AND CONFIRMATION SAMPLING – Phase II

The Phase II remedial activities consisted of the removal of dieldrin-contaminated soils above risk-based concentrations from some or all of cells 2, 3, 4, 5, 18, 19, 20, 21, 23, 24, 25, 26, and 38 (see Figure 4). The soils excavated from these cells was placed directly into the soil stockpile that was created for the Phase I remediation. As this work progressed, the previously stockpiled soil was loaded onto trucks which transported the material to the Zielinski Farm on Windsor Island Road, Keizer, for placement into the north quarry pit. The Phase II activities were completed between June 27 and October 16, 2018.

#### 5.1.1 Site Preparation

For several weeks leading up to the beginning of the soil removal on June 27, 2018, the ground surface in selected cells of the Phase II area was watered using mobile sprinklers and water trucks to minimize dust generation in the excavation areas. The existing stockpile of dieldrin-contaminated soil from Phase I on cells 19 and 26 from the Phase I remediation was also watered with mobile sprinklers to minimize dust emissions during the loading of trucks with the stockpiled material. Water was obtained from two water wells located on tax lots 800 and 900. All of I&E's trucks and heavy equipment was dedicated to the North Star site, and no equipment left the site without being decontaminated, as described in the work plan.

Between June 27 and July 9, 2018, I&E constructed a temporary gravel-covered haul road along the west side of the soil stockpile for the loading of trucks with soil from the stockpile for placement at the Zielinski farm. A one half-acre area adjacent to the haul road on the southwest corner of cell 26 was also cleared and covered with crushed rock for vehicle parking and equipment staging, including an elevated water tank for storage of water for dust suppression. Dieldrin-contaminated soil was removed, and confirmation samples verified the removal of soils containing dieldrin above risk-based concentrations from the haul road and parking lot before the areas were finished with crushed rock. The locations of the haul road and parking lot are shown on Figures 4 and 5.

Other temporary dirt haul roads for transporting dieldrin-contaminated soils from the cells to the stockpile were located primarily along future street locations.

A temporary vehicle wash bar was constructed on the haul road to rinse dust from the vehicles and to wet the soils in the truck/trailer beds before leaving the site. The wash bar was equipped with five spray nozzles and a magnetic sensor that automatically activated the sprayers when the truck and trailers entered the spray area.

AGI was on site for the first week of the excavation to monitor the soil removal and dust suppression activities, and periodically thereafter to monitor the remediation and collect soil samples.

### **5.1.2 Soil Removal from Cells**

Each cell and quarter-cell in the Phase II area was field-marked by a surveying team with wooden stakes to guide the scrapers.

The scrapers removed and transported the excavated contaminated soil via the haul roads directly to either the soil stockpile or to the multi-family area where the load was dumped. The scrapers ran in a loop between the contaminated cells and the stockpile area/multi-family area on the designated haul roads. Water was periodically applied to the ground surface using water trucks in the cells and haul roads for dust suppression during scraping, hauling and dumping. Upon completion of the removal of all contaminated soil from the Phase II area, the upper 2-3 inches of soil was removed from the haul roads using scrapers and placed in the stockpile.

### **5.1.3 Truck Loading from Soil Stockpile**

Concurrent with the removal of contaminated soil from the cells, soil from the existing stockpile on cells 19 and 26 was loaded directly onto truck-trailer combinations and side-dump trucks and transported to the Zielinski farm in Keizer for infilling the north quarry pit. In addition to pre-wetting the stockpiled soils before excavating, water was applied as needed to the soils during loading using hoses to minimize dust emissions. Two water wells on the site provided ample water for these purposes.

In accordance with the work plan, each loaded truck was inspected by the driver and any loose dirt was removed from the exterior of the truck and trailer. Each vehicle was run through the wash bar which rinsed dust from the exterior of the vehicles and provided additional moisture to the soil for dust suppression. All trucks and trailers were equipped with automatic load-covering features which covered the loads before the vehicle left the site. The trucks followed a pre-determined route along public streets between the North Star site and the Zielinski farm. Each driver was provided with a Spill Response plan and was briefed on its contents.

### **5.1.4 Placement of Soil at North Pit - Zielinski Farm**

All truck/trailer loads of soil were dumped directly into the north pit at the Zielinski farm. The deposited soil was spread, graded and compacted with an excavator and dozer. Upon reaching an elevation of “finished elevation minus three feet”, no additional contaminated soil was placed in the pit. Elevation control stakes, marked with the proposed finished ground elevation, were placed throughout the area to assist the contractor in placing the required thickness of cleaner fill over the contaminated material.

Cleaner fill, obtained from the Phase I remediation area of the North Star Phase I site, was trucked to the site and placed over the compacted soils and compacted to meet the required three feet of clean fill across the north pit site. The cleaner fill was obtained from areas that had been previously tested and found to contain dieldrin below residential RBCs. No contaminated soil or cleaner fill was placed in the south pit area at the Zielinski farm.

### 5.1.5 Relocation of Soil from Single-Family Areas to Multi-Family Area

Soil that contained dieldrin between 0.034 mg/kg (residential RBC) and 0.085 mg/kg (urban residential RBC) was deemed acceptable for use as fill in the multi-family area and was transferred directly to the multi-family area after being excavated from the single-family area. All soils transferred in this manner were done so in accordance with the Request for Explanation of Significant Difference document.

As laboratory data became available, individual requests were made to DEQ to relocate soils in this manner, and no soils were relocated without approval from DEQ. Approximately 25,000 cubic yards of soil was relocated to the multi-family area where it was graded and compacted.

## 5.2 Soil Confirmation Sampling

Upon completion of the excavation in each quarter cell, confirmation composite samples were collected. In each quarter cell, eight discrete soil samples were collected to create two composite confirmation samples (four discrete samples per composite sample). This methodology resulted in an average of one discrete soil sample per 5,500 square-foot residential lot. The discrete samples were collected from evenly distributed locations within each sub-cell. The sample collection strategy and sample labeling convention are shown graphically in Figure 8.

Each discrete sample was collected from a depth of 0-3 inches using a hand-operated soil auger and was homogenized in a resalable plastic bag. Composite samples were created from four adjacent discrete samples by placing equal volumes of homogenized discrete samples into the plastic bag and thoroughly blending the sample with a clean, nitrile-gloved hand. The sampling equipment was decontaminated between each composite sample as described in the remediation work plan.

Each composite sample was placed into a labeled 4-ounce glass sample jar which was placed in a chilled cooler and hand-delivered to the project laboratory (Apex Labs, Tigard, Oregon). Portions of each discrete sample was placed in separate 4-ounce glass sample jars and held for possible analysis. The samples were analyzed for dieldrin by EPA Method 8081B, with a minimum reporting limit of 0.007 mg/kg. The holding time for test method EPA 8081B is 14 calendar days. The composite samples were analyzed on turnaround times ranging from 1 to 5 business days.

Any sub-cells in which the composite samples exceeded  $\frac{1}{4}$  of the RBC (0.0085 mg/kg for residential and 0.02125 mg/kg for multifamily residential) were either excavated an additional 6-12 inches and re-sampled, or the corresponding discrete samples were analyzed to attempt to further define the location of the contaminated soil and reduce the volume of soil to be excavated. All locations in which the discrete sample exceeded the (0.034 mg/kg for residential and 0.085 mg/kg for multifamily residential) was excavated an additional 6-12 inches and resampled for discrete analysis. The soil removal and sampling continued in this manner until the RBC was achieved.

The sample results and sample depths are summarized in Table 1. The laboratory reports are included in Appendix A.

### 5.3 AIRBORNE ANALYSIS OF DIELDRIN DURING SITE REMEDIATION

#### 5.3.1 Calculation of Risk-Based Airborne Concentration

Air monitoring was performed during the first week of soil removal in the contaminated cells of the Phase II area to document dieldrin exposure to workers and the general public via airborne dust.

Prior to beginning the air monitoring, a site specific residential risk-based concentration (RBC) for airborne dieldrin was calculated. The published default airborne RBC<sub>1</sub> for dieldrin (0.0006 micrograms per cubic meter -  $\mu\text{g}/\text{m}^3$ ) is based on long-term exposure parameters which did not accurately reflect the conditions at the North Star site. The RBC was re-calculated using exposure parameters (exposure duration, frequency and time) that more accurately reflect the transient nature of the exposure during the excavation activities.

The exposure duration was changed from the default level of 26 years (adults) and 6 years (child) to 0.27 years (14 weeks), the exposure frequency was changed from 350 days/year to 98 days/year, and the exposure time was changed from 24 hours/day to 12 hours/day. The resulting, site-specific RBC was calculated to be 0.11  $\mu\text{g}/\text{m}^3$  for residential receptors.

#### 5.3.2 Air Monitoring

Exposure air monitoring and general project oversight was conducted by Certified Industrial Hygienists employed by PBS Engineering and Environmental (PBS) during the first five days of soil removal from cell #23 between August 16 and August 20, 2018. PBS collected air samples using a combination of high-volume and low-volume vacuum pumps and both pre-weighed filter cassettes and OSHA OVS sample tubes. The filter cassettes were used to collect total airborne dust samples and the OVS sample tubes were used to collect airborne dieldrin samples.

The samples were collected from inside the cabs of various pieces of excavation equipment and from fence lines immediately adjacent to and downwind of the excavations.

No dieldrin was reported in the OVS samples above the method reporting limit (0.0035 to 0.0046  $\mu\text{g}/\text{m}^3$ ). The dust concentrations were very low, and the dieldrin levels in the air, based on an assumed dieldrin soil concentration of 1.0 milligrams per kilogram, were calculated to be less than 0.0013  $\mu\text{g}/\text{m}^3$ . Based on these results and on PBS' observations during the soil removal, the dieldrin levels were significantly below the RBC and additional air monitoring was not warranted as long as airborne dust levels were

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1 From Oregon DEQ document *Risk-Based Decision Making for the Remediation of Contaminated Sites*, Sept. 2003 (revised November 1, 2015)

controlled. A copy of the air monitoring report is included in Appendix B.

#### **5.4 Winterization of Site**

The Phase II excavation activities and placement of contaminated soil in the stockpile was completed for the season in October 2018, before winter rains made continued earth work impossible. The ground surfaces in the cells and the surface of the soil stockpile were hydroseeded with grass seed to stabilize the surfaces and limit erosion of the exposed soil during the winter precipitation events. A silt fence was installed around the perimeter of the soil stockpile to limit runoff from the stockpile from entering surface water bodies.

The stockpile and silt fence were periodically inspected by AGI through the winter and were found to have effectively controlled erosion and storm water runoff from the area.

### **6.0 CONCLUSIONS**

#### **6.1 Residential Lots and Roadways**

With the exception of two of the residential lots on cell #4 (discussed in section 6.2), all of the final confirmation soil samples collected from future single-family residential lots and roadways contained dieldrin below risk-based concentrations (composite samples: 0.0085 mg/kg, discrete samples 0.034 mg/kg). All of the final confirmation soil samples collected from future multi-family residential lots and roadways contained dieldrin below risk-based concentrations (composite samples: 0.02125 mg/kg, discrete samples 0.085 mg/kg).

A total volume of approximately 72,390 cubic yards of dieldrin-contaminated soil was removed from cells within the Phase II remediation area and placed in the soil stockpile or re-used in the multi-family area. The RBCs were achieved by excavating to the predicted depths in seventeen of the thirty-six quarter cells. The remaining nineteen quarter cells required excavation of an additional 6-18 inches of soil before the RBC was achieved.

The sample results and excavation depths are summarized in Table 1.

#### **6.2 Power Line Tower on Cell #4**

The remaining soil within an area of approximately 100' by 100' around the electrical power line tower on cell #4 contains dieldrin above the applicable residential RBC to a minimum depth of 18 inches<sup>2</sup>. The location of this area is shown on Figures 4 and 6. Bonneville Power Administration, which owns and

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<sup>2</sup> The initial soil sampling completed in 2015 identified 0.294 mg/kg dieldrin in the composite sample from 0-6 inches depth in cell #4.

maintains the electrical tower and manages the right of way along the power line alignment, prohibits excavations within 50 feet of the base of the towers, therefore additional dieldrin-contaminated soil cannot be removed without approval from BPA.

The current development plans include two single-family residential (SFR) lots that extend across the BPA right of way in the area where dieldrin concentrations in the soil exceed residential RBCs around the tower (Figure 6). Deed restrictions limiting contact with shallow soil cannot be placed on SFR lots, therefore the impacted soil may need to be removed or remediated in-situ before developing these two lots for residential use.

### **6.3 North Pit at Zielinski Farm**

Approximately 44,000 cubic yards of dieldrin-contaminated soil was placed in the north pit at the Zielinski farm. The dieldrin-contaminated soil was covered with three feet of cleaner fill, as required in the approved remediation work plan, to reduce the chances of direct contact of the soil with food crops. The property owner (Mr. Doug Zielinski) plans to plant hazelnut trees on the site. According to the Oregon Department of Agriculture, hazelnuts do not take up dieldrin like some row crops.

The dieldrin in the buried soils is not expected to pose a threat to groundwater or surface water since dieldrin has a very low solubility in water and binds very tightly to soil. It is these properties that are the reasons for dieldrin's persistence in the soil even though its use was banned in the 1970's.

Based on this information, the dieldrin-contaminated soils placed in the north quarry are not expected to pose an unacceptable risk to human health or the environment.

### **6.4 Phase III Remediation**

The next and final phase of remediation at the North Star site is planned for the remaining cells (all or parts of cells 18, 19, 26, 27, 34, 35, 36, 37 and 38) for the summer and fall, 2019. The dieldrin-contaminated soils from these cells, as well as the remaining stockpiled soil, will be placed in the south quarry pit at the Zielinski Farm. A floodplain development permit has been obtained from Marion County for placing fill in the identified 100-year floodplain within the south pit.

Jurisdictional wetlands have been mapped in the south portion of the south pit, therefore the project engineers will arrange for wetland mitigation before filling the southern portion of the pit. Until that time, soil will be placed only in the north portion of the pit.

**6.5 Request for Partial No Further Action Letter**

Based on these findings, it is recommend that Oregon DEQ issue a partial No Further Action letter for the portion of the north Star site covered by all of cells #1, 2, 3, 20, 21, 22, 23, 24 and 25 (see Figure 9). A legal description of this area is included in Appendix C. The remaining areas of the Phase II remediation will be included in the future NFA for the Phase III remediation.

**7.0 LIMITATIONS**

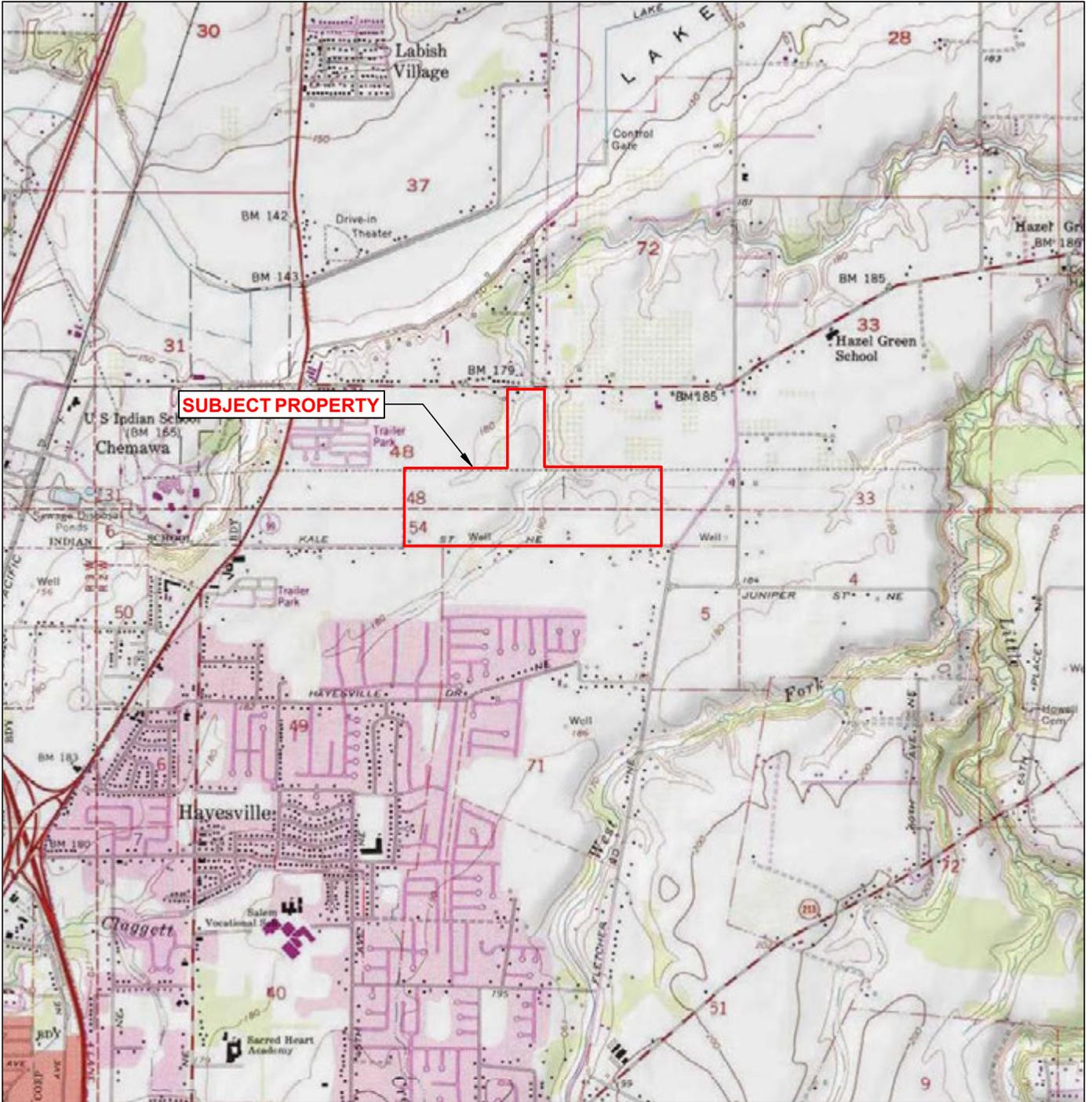
This report was prepared for I&E Construction, Inc. for Phase II of the North Star development on tax lots 200, 800 and 900, Map 062W32C, Salem, Oregon. This report is not intended for use by others without written consent from Anderson Geological, Inc. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time the report was prepared. No warranty or other conditions, expressed or implied, should be understood.

**ANDERSON GEOLOGICAL, INC.**

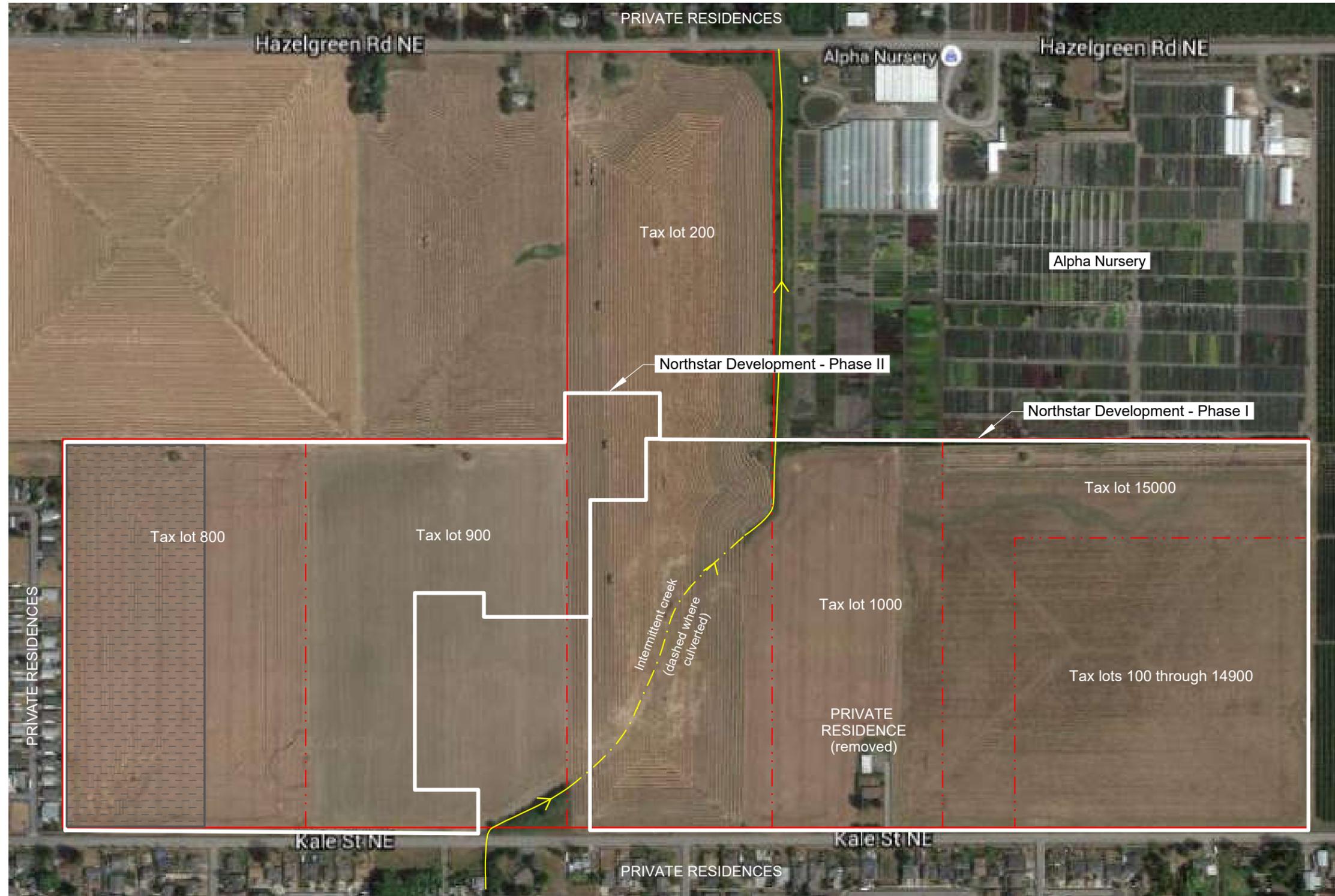


\_\_\_\_\_ expires 4/01/2020

Erik Anderson, R.G.  
Hydrogeologist

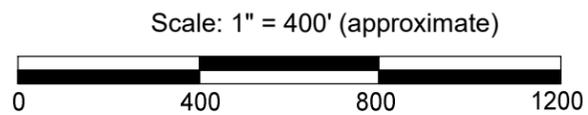


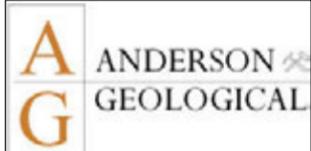
 <b>ANDERSON</b> <b>GEOLOGICAL</b>	<b>SITE LOCATION MAP</b>	
	Northstar Development - Phase II Salem, Oregon	
SIZE <b>A</b>	PROJECT NO. 1503.20	REV 1
	April 2019	FIGURE 1



**LEGEND**

 Area of North Star development zoned for multifamily use (apartments).  
 All other areas are zoned for single-family residential use.

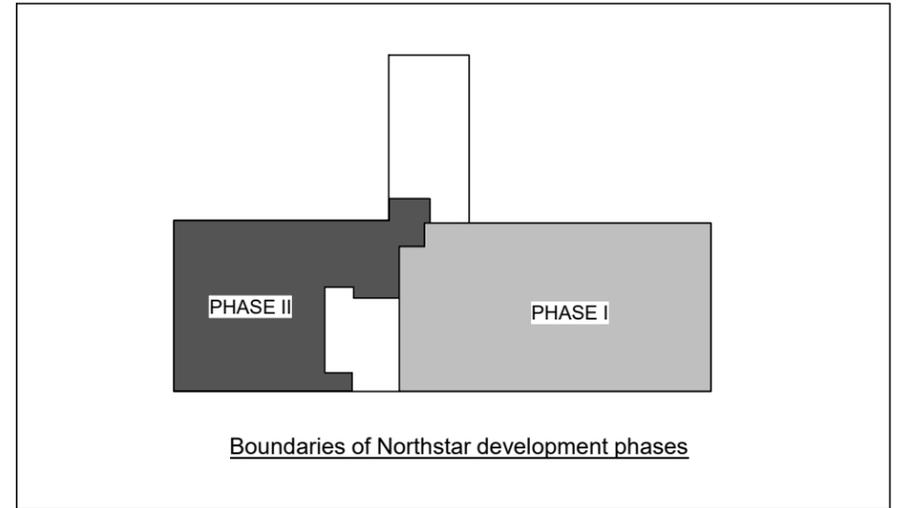


		<b>HISTORICAL AERIAL PHOTOGRAPH (C. 2015)</b>		
		Proposed Northstar Development - Phase II Salem, Oregon		
SIZE <b>B</b>	CAGE CODE	DWG NO	PROJECT No.	
		April 2019	FIGURE 2	



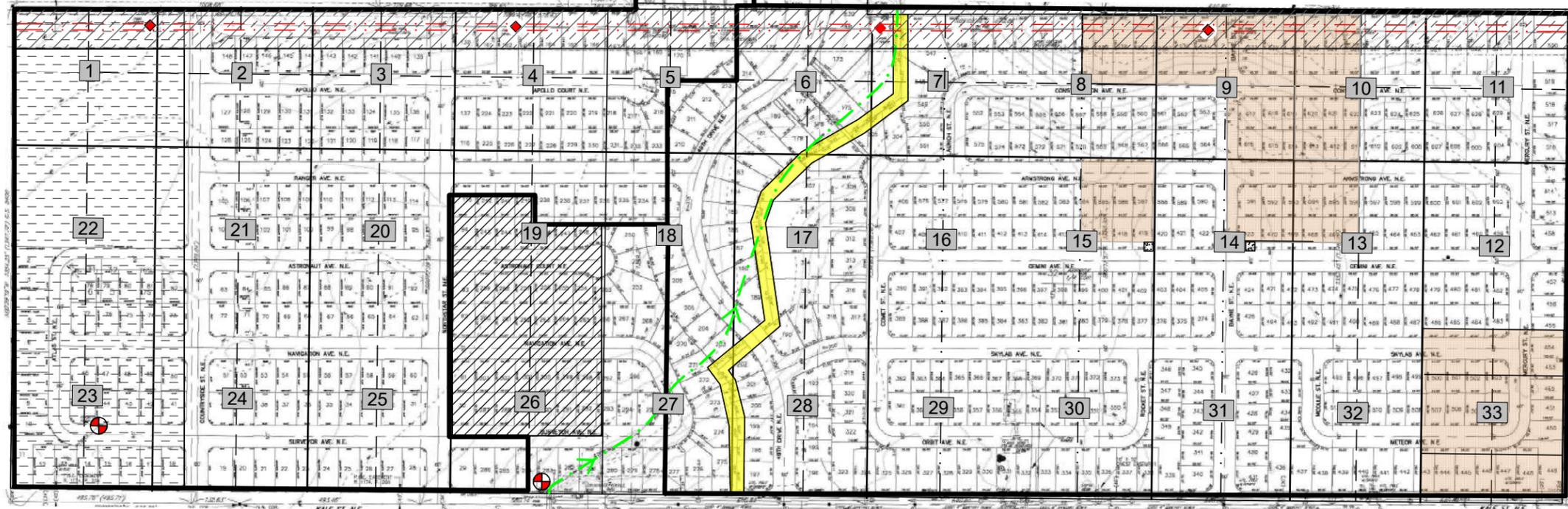
**LEGEND**

-  Areas where dieldrin-contaminated soil was removed (Phase I - 2017)
-  General location of stockpile of dieldrin-contaminated soil from Phase I and Phase II
-  Power line transmission corridor and future drainage swale, to be deeded to City of Salem
-  Area of North Star development zoned for multifamily use (apartments). All other areas are zoned for single-family residential use.
-  Future route of open-air ditch
-  Cell number
-  Existing ditch/swale
-  Water well
-  Elevated water tank for storage of dust suppression water
-  Power line tower
-  Power lines



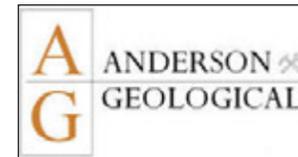
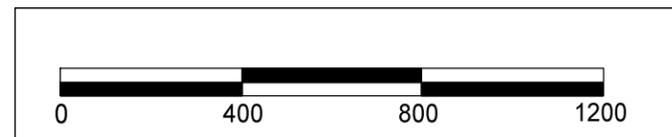
ALPHA NURSERY

PRIVATE RESIDENCES



ORCHARD

PRIVATE RESIDENCES



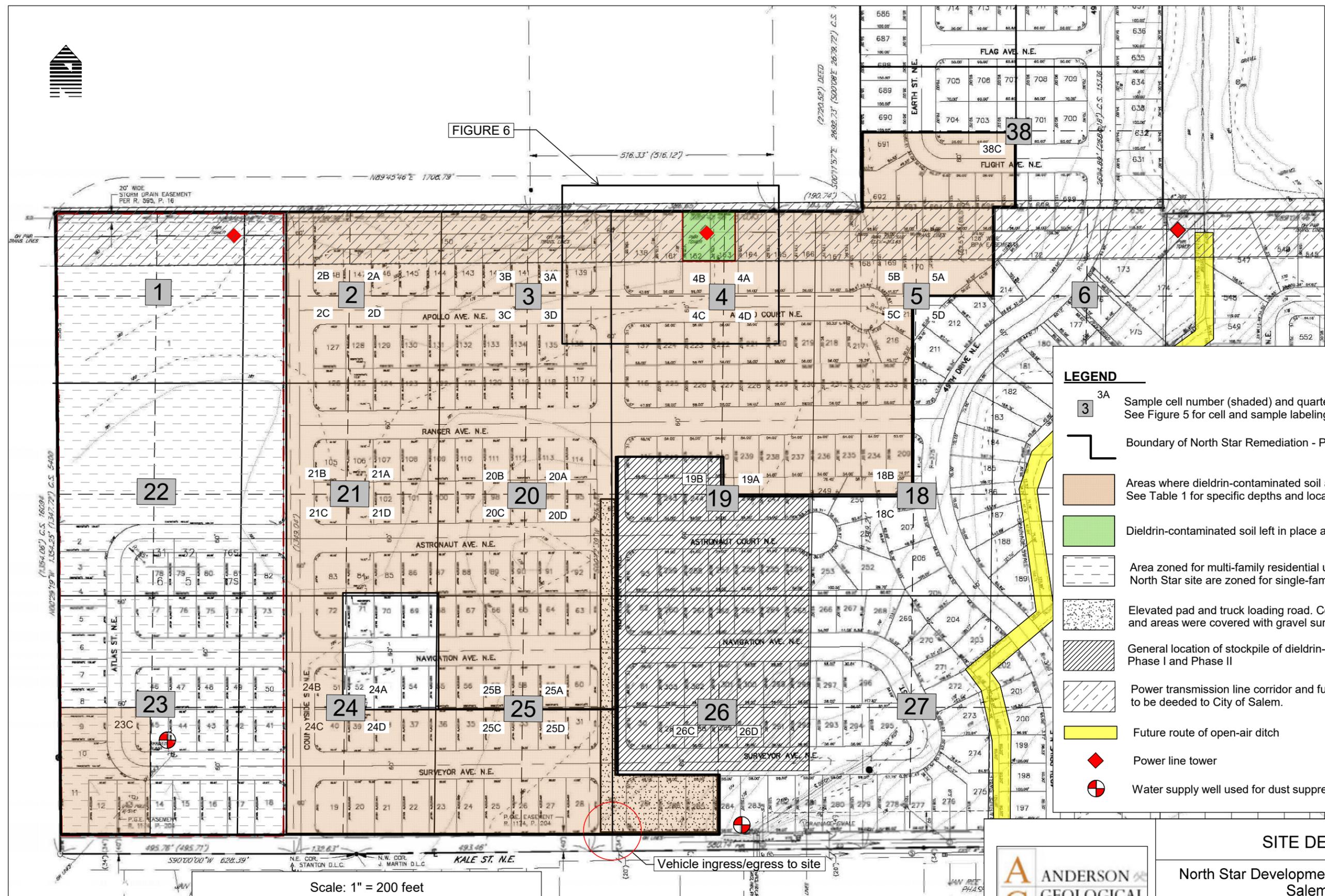
**SITE PLAN - NORTH STAR DEVELOPMENT**

North Star Development - Phase II  
Salem, Oregon

SIZE	CAGE CODE	DWG NO	PROJECT No.
B		April 2019	FIGURE 3

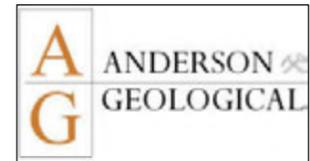
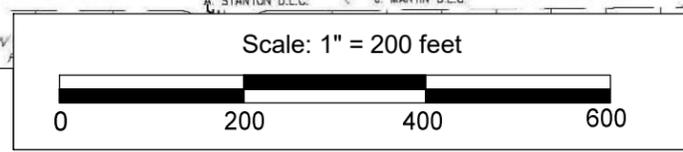


FIGURE 6



**LEGEND**

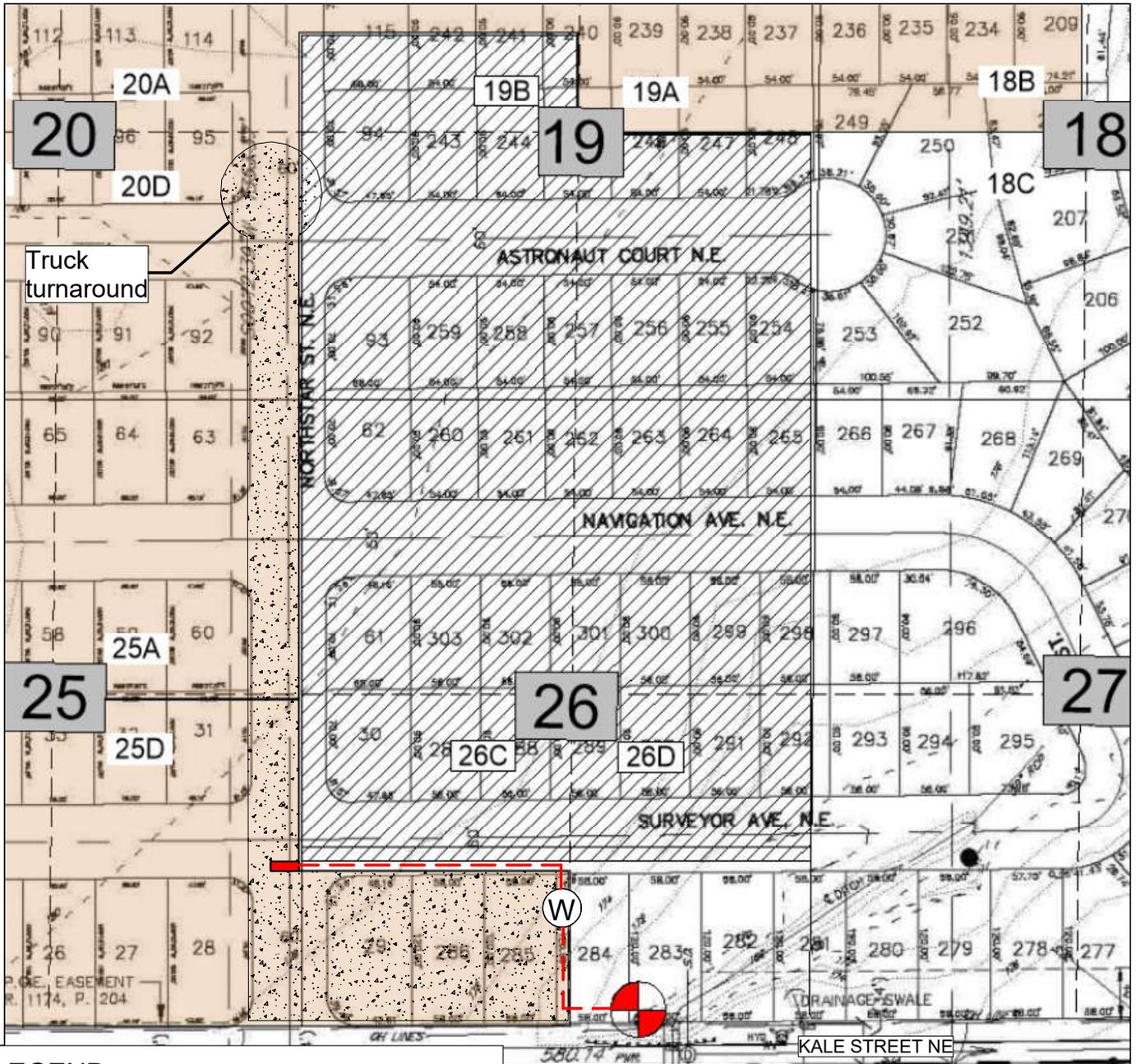
- 3A Sample cell number (shaded) and quarter-cell designation number. See Figure 5 for cell and sample labeling convention.
- Boundary of North Star Remediation - Phase II
- Areas where dieldrin-contaminated soil above RBC was removed. See Table 1 for specific depths and locations.
- Dieldrin-contaminated soil left in place above residential RBC.
- Area zoned for multi-family residential use. All other areas of the North Star site are zoned for single-family residential use.
- Elevated pad and truck loading road. Contaminated soil was removed and areas were covered with gravel surface.
- General location of stockpile of dieldrin-contaminated soil from Phase I and Phase II
- Power transmission line corridor and future storm drainage swale, to be deeded to City of Salem.
- Future route of open-air ditch
- Power line tower
- Water supply well used for dust suppression



**SITE DETAIL PLAN**

North Star Development - Phase II Remediation  
Salem, Oregon

SIZE	CAGE CODE	DWG NO	PROJECT No.	REV
B		April 2019	FIGURE 4	



**LEGEND**

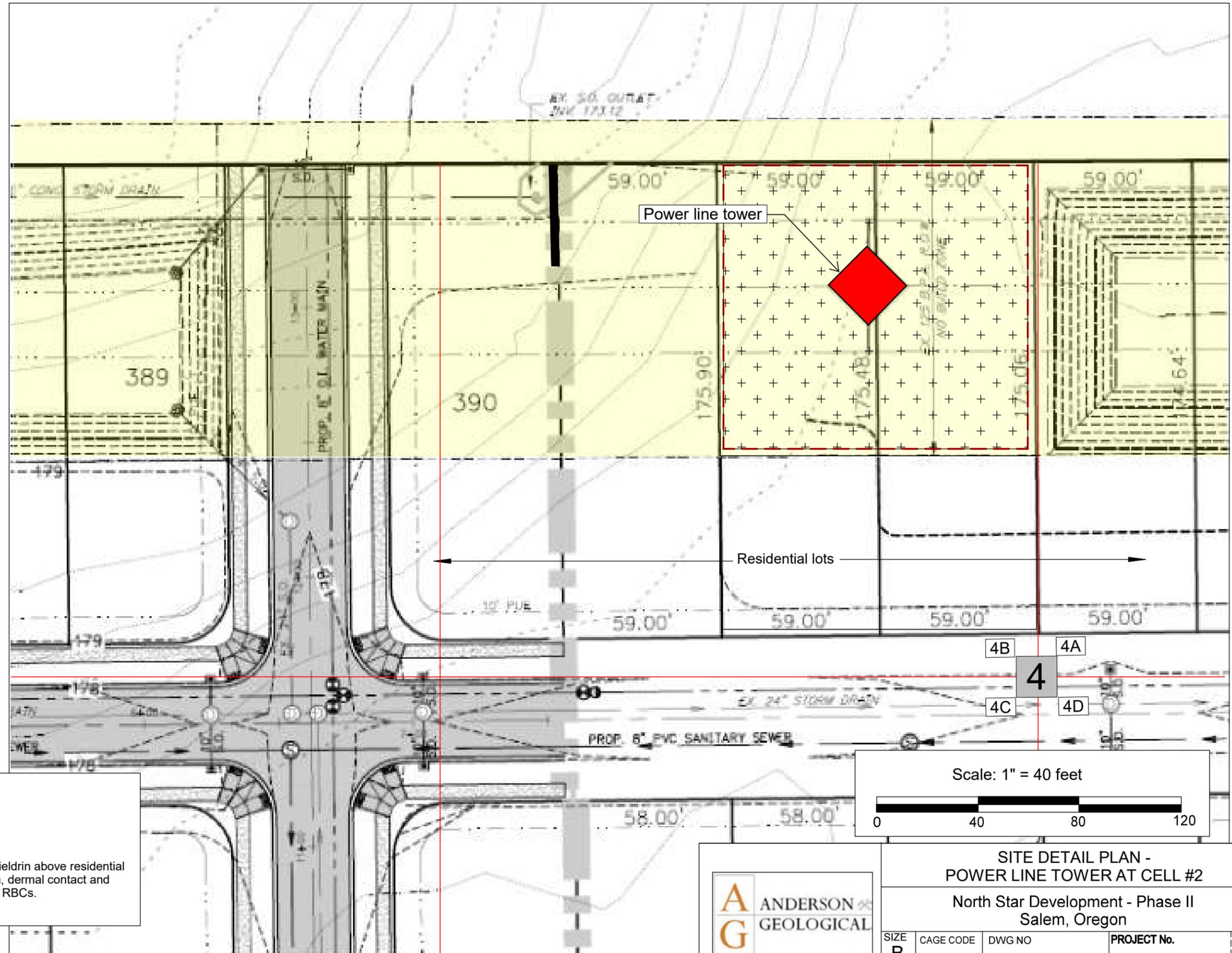
-  General location of stockpile of contaminated soil from Phase I and Phase II
-  Cell number
-  Elevated pad and truck loading road. Contaminated soil was removed and areas were covered with gravel surface.
-  Overhead spray bar for wetting soil loads and rinsing trucks before leaving site.
-  Water supply well
-  Water tank for storage of water used for dust suppression and truck wash bar



**SOIL STOCKPILE AND TRUCK LOADING AREA**

Northstar Development - Phase II  
Salem, Oregon

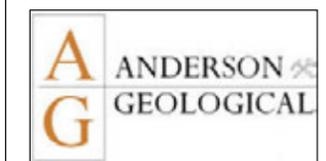
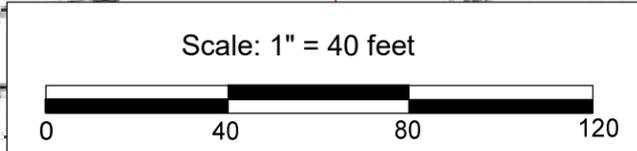
SIZE A	PROJECT NO. 1503.20	REV
	APRIL 2019	FIGURE 5



Base map from Multi/Tech Engineering

**LEGEND**

- BPA electrical transmission line right of way.
- Unexcavated area where shallow soil contains dieldrin above residential risk-based concentration (RBC) for soil ingestion, dermal contact and inhalation, and below all applicable occupational RBCs.



<b>SITE DETAIL PLAN - POWER LINE TOWER AT CELL #2</b>				
North Star Development - Phase II Salem, Oregon				
SIZE <b>B</b>	CAGE CODE	DWG NO	PROJECT No.	REV
		April 2019	<b>FIGURE 6</b>	



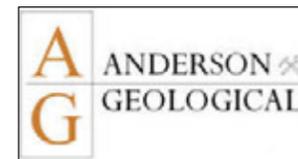
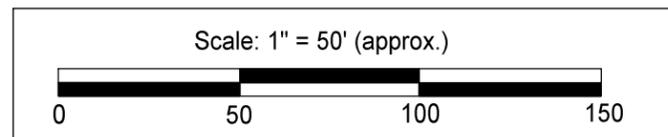
After filling (Sept. 26, 2018)



North Pit

South Pit

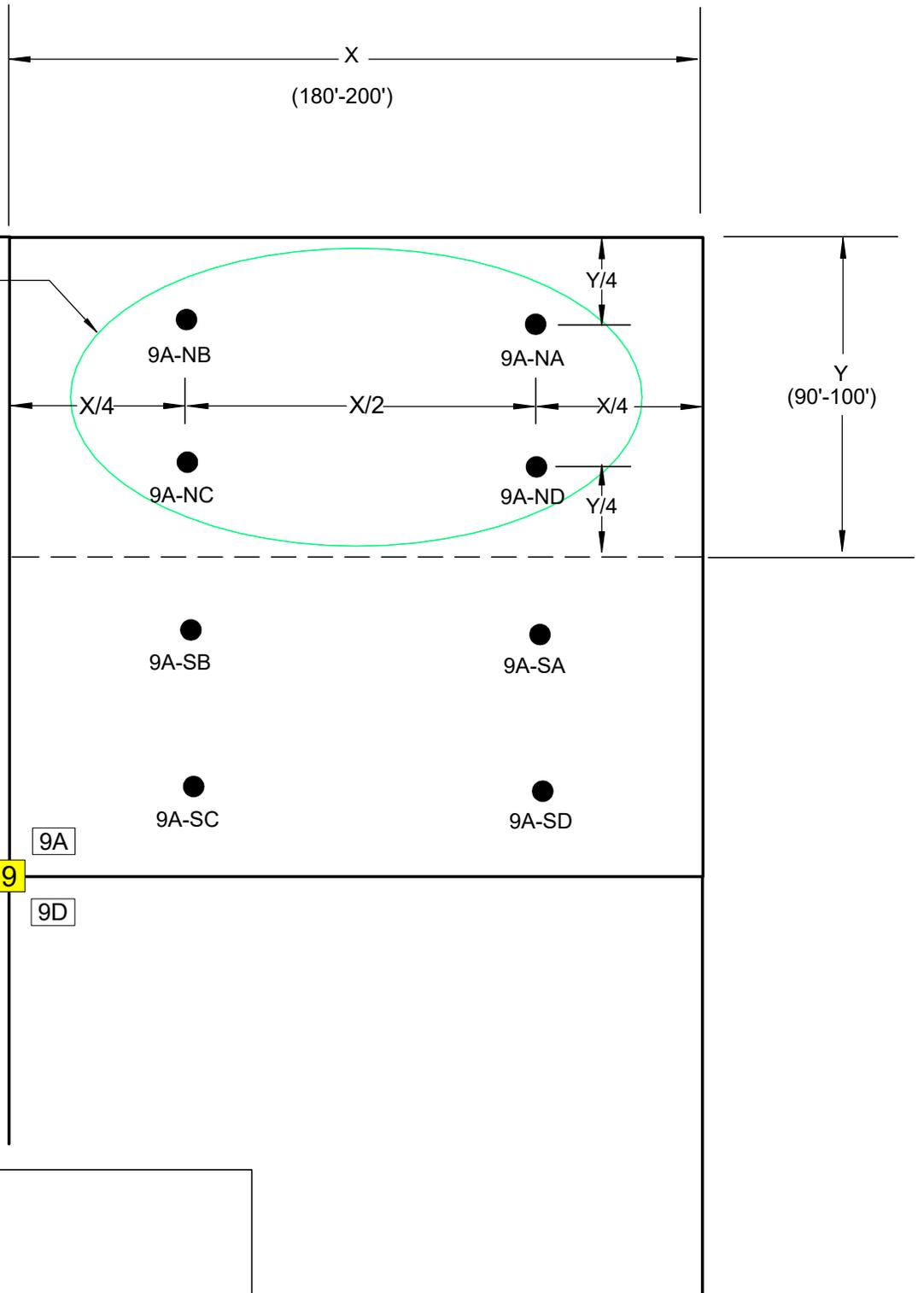
Before filling (July 2017)



NORTH SOIL IN-FILL PIT - ZIELINSKI FARM

North Star Development - Phase II  
Salem, Oregon

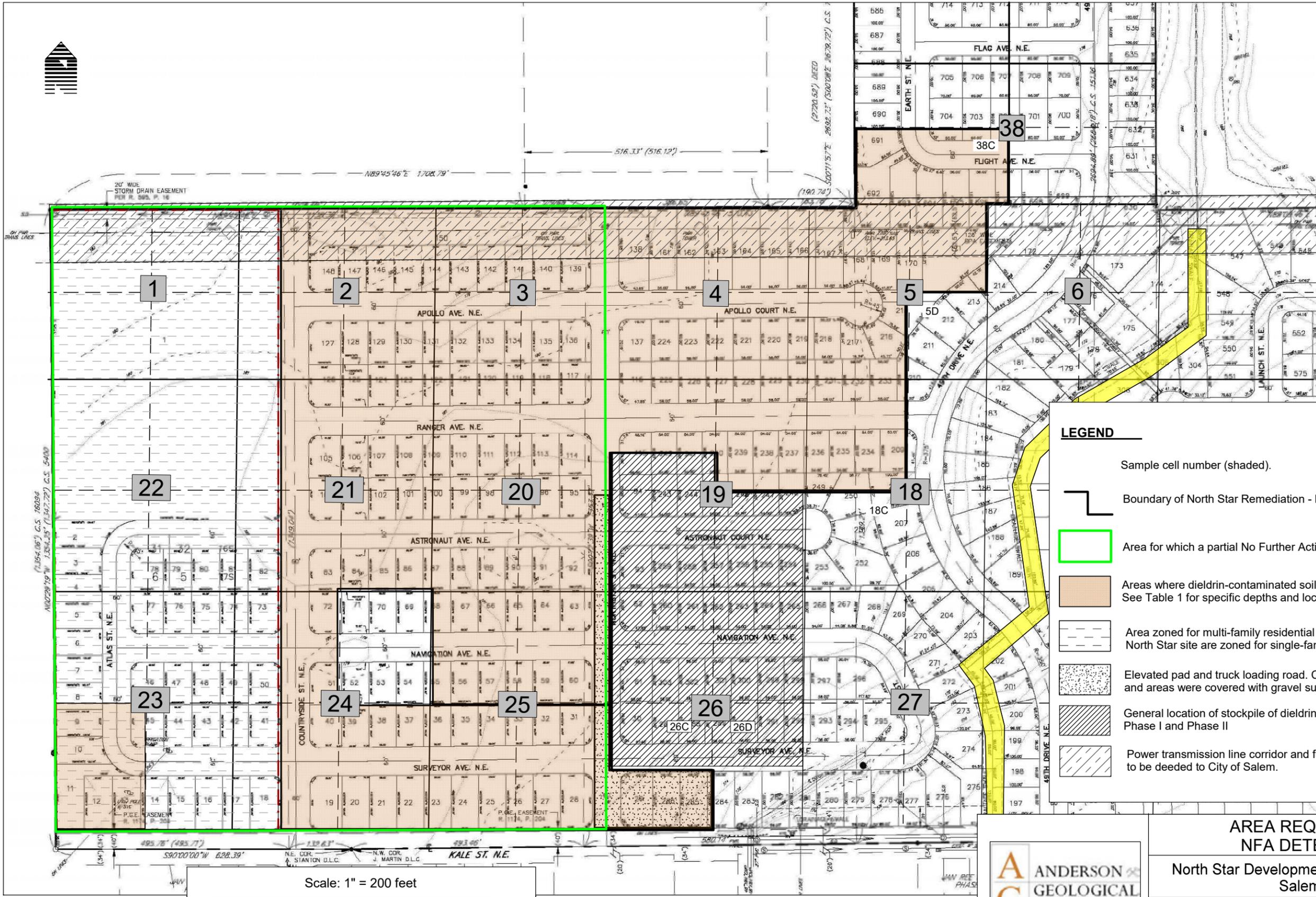
SIZE	CAGE CODE	DWG NO	PROJECT No.
B		April 2019	FIGURE 7



**LEGEND**

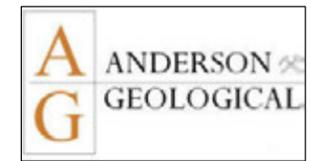
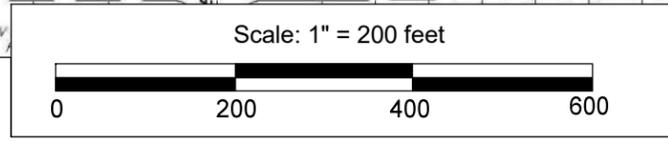
- 9 Sampling cell number
- 9D Quarter cell number
- Discrete sample location
- 9A-SC Discrete sample number. If re-sampled, sample generation is indicated by parentheses [9A-SC(2)]

 <b>ANDERSON</b> <b>GEOLOGICAL</b>	<b>CELL and SAMPLE LABELING CONVENTION</b>		
	Northstar Development - Phase II Salem, Oregon		
	SIZE <b>A</b>	PROJECT NO. 1503.20	REV 1
	APRIL 2017	FIGURE 8	



**LEGEND**

- Sample cell number (shaded).
- Boundary of North Star Remediation - Phase II
- Area for which a partial No Further Action is requested.
- Areas where dieldrin-contaminated soil above RBC was removed. See Table 1 for specific depths and locations.
- Area zoned for multi-family residential use. All other areas of the North Star site are zoned for single-family residential use.
- Elevated pad and truck loading road. Contaminated soil was removed and areas were covered with gravel surface.
- General location of stockpile of dieldrin-contaminated soil from Phase I and Phase II
- Power transmission line corridor and future storm drainage swale, to be deeded to City of Salem.



AREA REQUESTED FOR NFA DETERMINATION				
North Star Development - Phase II Remediation Salem, Oregon				
SIZE	CAGE CODE	DWG NO	PROJECT No.	REV
B			April 2019	FIGURE 9

Table 1  
 Lab Results (Dieldrin) and Soil Removal Volumes per Cell  
 Northstar Development - Phase II, Salem, Oregon  
 Summer/Fall 2018

Cell #	Cell Quadrant	Composite Sample #	Discrete Sample #	Date Sampled (2018)	Depth of removed soil, below original ground surface (in.)	Dieldrin concentration at base of excavation (mg/kg)	Applicable Generic RBC (mg/kg)	Composite RBC <sub>1</sub> (mg/kg)	Est. Volume to Stockpile (CY)	Est. Vol to MFR Area (CY)	Disposal Location <sub>2</sub> (SP:Stockpile, MFR: Multifamily)	Apex Lab Report ID	
Cell 2	2A	2A-NCOMP	---	17-Aug	0-12	0.0510	0.034	0.0085	375	375	MFR (6"-12")	A8H0523	
		2A-NCOMP(2)	---	19-Sep	12-18	0.0486	0.034	0.0085	0	375	MFR	A8I0508	
		2A-NCOMP(3)	---	10-Oct	18-24	0.0374	0.034	0.0085	0	375	MFR	A8J0331	
		2A-NCOMP(4)	---	16-Oct	24-30	<0.00111	0.034	0.0085	0	375	MFR	A8J0456	
		2A-SCOMP	---	17-Aug	0-12	0.044	0.034	0.0085	375	375	MFR (6"-12")	A8H0523	
		2A-SCOMP(2)	---	19-Sep	12-18	0.0164	0.034	0.0085	0	375	MFR	A8I0508	
		---	2A-SA(2)	19-Sep	---	0.00341	0.034	---	---	---	---	---	A8I0755
		---	2A-SB(2)	19-Sep	---	<0.0010	0.034	---	---	---	---	---	A8I0755
		---	2A-SC(2)	19-Sep	---	<0.00115	0.034	---	---	---	---	---	A8I0755
	---	2A-SD(2)	19-Sep	---	0.0782	0.034	---	---	---	---	---	A8I0755	
	---	2A-SD(3)	10-Oct	18-24	<0.00113	0.034	---	0	100	MFR	A8J0331		
	2B	2B-NCOMP	---	17-Aug	0-12	0.0646	0.034	0.0085	140	140	MFR (6"-12")	A8H0523	
		2B-NCOMP(2)	---	19-Sep	12-18	0.0614	0.034	0.0085	0	280	MFR	A8I0508	
		2B-NCOMP(3)	---	10-Oct	18-24	0.0112	0.034	0.0085	0	280	MFR	A8J0331	
		2B-NCOMP(4)	---	16-Oct	24-30	<0.00112	0.034	0.0085	0	280	MFR	A8J0456	
		2B-SCOMP	---	17-Aug	0-12	0.0286	0.034	0.0085	140	140	MFR (6"-12")	A8H0523	
		2B-SCOMP(2)	---	19-Sep	12-18	0.0113	0.034	0.0085	0	280	MFR	A8I0508	
		---	2B-SA(2)	19-Sep	---	<0.00115	0.034	---	---	---	---	---	A8I0755
		---	2B-SB(2)	19-Sep	---	0.034	0.034	---	---	---	---	---	A8I0755
		---	2B-SC(2)	19-Sep	---	0.0107	0.034	---	---	---	---	---	A8I0755
	---	2B-2D(2)	19-Sep	---	<0.00108	0.034	---	---	---	---	---	A8I0755	
	2C	2C-NCOMP	---	17-Aug	0-12	0.416	0.034	0.0085	140	140	MFR (6"-12")	A8H0523	
		2C-NCOMP(2)	---	19-Sep	12-18	<0.00101	0.034	0.0085	0	280	MFR	A8I0508	
		2C-SCOMP	---	17-Aug	0-12	0.052	0.034	0.0085	140	140	MFR (6"-12")	A8H0523	
		2C-SCOMP(2)	---	19-Sep	12-18	<0.00110	0.034	0.0085	0	280	MFR	A8I0508	
	2D	2D-NCOMP	---	17-Aug	0-12	0.0570	0.034	0.0085	185	185	MFR (6"-12")	A8H0523	
		2D-NCOMP(2)	---	19-Sep	12-18	0.0145	0.034	0.0085	0	375	MFR	A8I0508	
		---	2D-NA(2)	19-Sep	---	0.0453	0.034	---	---	---	---	---	A8I0755
		---	2D-NA(3)	10-Oct	18-24	<0.00105	0.034	---	0	100	MFR	A8J0331	
		---	2D-NB(2)	19-Sep	---	0.0131	0.034	---	---	---	---	---	A8I0755
		---	2D-NC(2)	19-Sep	---	0.130	0.034	---	---	---	---	---	A8I0755
		---	2D-NC(3)	10-Oct	18-24	<0.00114	0.034	---	100	0	MFR	A8J0331	
		---	2D-ND(2)	19-Sep	---	<0.00105	0.034	---	---	---	---	---	A8I0755
---		2D-SCOMP	---	17-Aug	0-12	0.0254	0.034	0.0085	185	185	MFR (6"-12")	A8H0523	
---	2D-SCOMP(2)	---	19-Sep	12-18	0.00138	0.034	0.0085	0	375	MFR	A8I0508		
3A	3A-NCOMP	---	7-Aug	0-30	0.00125	0.034	0.0085	1875	0	SP	A8H0202		

Cell 3	3B	3A-SCOMP	---	7-Aug	0-30	0.00275	0.034	0.0085	1875	0	SP	A8H0202
		3B-NCOMP	---	3-Aug	0-12	0.00268	0.034	0.0085	750	0	SP	A8H0097
		3B-SCOMP	---	3-Aug	0-12	0.0953	0.034	0.0085	750	0	SP	A8H0097
		3B-SCOMP(2)	---	23-Aug	12-18	<0.000989	0.034	0.0085	375	0	SP	A8H0676
	3C	3C-NCOMP	---	3-Aug	0-6	0.0529	0.034	0.0085	375	0	SP	A8H0097
		3C-NCOMP(2)	---	23-Aug	6-18	0.0511	0.034	0.0085	0	750	MFR	A8H0676
		3C-NCOMP(3)	---	19-Sep	18-24	<0.000966	0.034	0.0085	0	375	MFR	A8I0508
		3C-SCOMP	---	3-Aug	0-6	0.0573	0.034	0.0085	375	0	SP	A8H0097
	3D	3C-SCOMP(2)	---	23-Aug	6-18	0.00486	0.034	0.0085	0	750	MFR	A8H0676
		3D-NCOMP	---	7-Aug	0-12	0.011	0.034	0.0085	750	0	SP	A8H0202
		3D-NCOMP(2)	---	28-Aug	12-24	0.00103	0.034	0.0085	0	750	MFR	A8H0788
		3D-SCOMP	---	7-Aug	0-12	0.076	0.034	0.0085	750	0	SP	A8H0202
Cell 4	4A	3D-SCOMP(2)	---	28-Aug	12-24	0.00169	0.034	0.0085	0	750	MFR	A8H0788
		4A-NCOMP	---	31-Aug	0-12	0.0798	0.034	0.0085	750	0	SP	A8H0917
		4A-NCOMP(2)	---	25-Sep	12-18	0.00452	0.034	0.0085	0	375	MFR	A8I0654
		4A-SCOMP	---	31-Aug	0-12	0.0215	0.034	0.0085	750	0	SP	A8H0917
	4B	4A-SCOMP(2)	---	25-Sep	12-18	0.00182	0.034	0.0085	0	375	MFR	A8I0654
		4B-NWCOMP	---	11-Aug	0-12	0.237	0.034	0.0085	375	0	SP	A8H0310
		4B-NWCOMP(2)	---	28-Aug	12-20	0.156	0.034	0.0085	250	0	SP	A8H0788
		4B-NWCOMP(3)	---	25-Sep	20-26	0.0014	0.034	0.0085	180	0	SP	A8I0654
		4B-SCOMP	---	11-Aug	0-12	0.0128	0.034	0.0085	750	0	SP	A8H0310
		4B-SCOMP(2)	---	28-Aug	12-20	0.00246	0.034	0.0085	500	0	SP	A8H0788
	4C	4C-NCOMP	---	11-Aug	0-12	0.0673	0.034	0.0085	750	0	SP	A8H0310
		4C-NCOMP(2)	---	28-Aug	12-20	<0.00102	0.034	0.0085	500	0	SP	A8H0788
		4C-SCOMP	---	11-Aug	0-12	0.0969	0.034	0.0085	750	0	SP	A8H0310
		4C-SCOMP(2)	---	28-Aug	12-20	0.0013	0.034	0.0085	500	0	SP	A8H0788
	4D	4D-NCOMP	---	31-Aug	0-12	0.055	0.034	0.0085	750	0	SP	A8H0917
		4D-NCOMP(2)	---	25-Sep	12-18	0.0088	0.034	0.0085	0	375	MFR	A8I0654
		---	4D-NA(2)	2-Oct	---	<0.00109	0.034	---	---	---	---	A8J0039
		---	4D-NB(2)	2-Oct	---	0.00438	0.034	---	---	---	---	A8J0039
		---	4D-NC(2)	2-Oct	---	<0.00112	0.034	---	---	---	---	A8J0039
		---	4D-ND(2)	2-Oct	---	<0.00106	0.034	---	---	---	---	A8J0039
4D-SCOMP		---	31-Aug	0-12	0.0318	0.034	0.0085	750	0	SP	A8H0917	
4D-SCOMP(2)	---	25-Sep	12-18	<0.00105	0.034	0.0085	0	375	MFR	A8I0654		
Cell 5	5A	4D-NCOMP	---	31-Aug	0-12	0.055	0.034	0.0085	750	0	SP	A8H0917
		4D-NCOMP(2)	---	25-Sep	12-18	0.0088	0.034	0.0085	0	375	MFR	A8I0654
	5B	5A-NCOMP	---	11-Sep	0-12	<0.00102	0.034	0.0085	750	0	SP	A8I0238
		5A-SCOMP	---	11-Sep	0-12	<0.00100	0.034	0.0085	750	0	SP	A8I0238
		5B-NCOMP	---	6-Sep	0-12	0.0103	0.034	0.0085	750	0	SP	A8I0126
		5B-NCOMP(2)	---	20-Sep	12-18	0.00111	0.034	0.0085	0	375	MFR	A8I0581
	5C	5B-SCOMP	---	6-Sep	0-12	0.0114	0.034	0.0085	750	0	SP	A8I0126
		5B-SCOMP(2)	---	20-Sep	12-18	0.00149	0.034	0.0085	0	375	MFR	A8I0581
5C-NCOMP		---	6-Sep	0-12	0.0411	0.034	0.0085	750	0	SP	A8I0126	
5C-NCOMP(2)		---	20-Sep	12-18	0.00119	0.034	0.0085	0	375	MFR	A8I0581	
18R	5C-SCOMP	---	6-Sep	0-12	0.0378	0.034	0.0085	750	0	SP	A8I0126	
	5C-SCOMP(2)	---	20-Sep	12-18	0.00132	0.034	0.0085	0	375	MFR	A8I0581	
Cell 18	18R	18B-NCOMP	---	6-Sep	0-12	0.0367	0.034	0.0085	750	0	SP	A8I0126
		18B-NCOMP(2)	---	20-Sep	12-18	<0.00108	0.034	0.0085	0	375	MFR	A8I0581

Cell 18	18B	18B-SCOMP	---	6-Sep	0-12	0.0377	0.034	0.0085	750	0	SP	A8I0126	
		18B-SCOMP(2)	---	20-Sep	12-18	0.00144	0.034	0.0085	0	375	MFR	A8I0581	
Cell 19	19A	19A-NCOMP	---	31-Aug	0-12	0.051	0.034	0.0085	750	0	SP	A8H0917	
		19A-NCOMP(2)	---	25-Sep	12-18	<0.00105	0.034	0.0085	0	375	MFR		
		19A-SCOMP	---	31-Aug	0-12	0.0426	0.034	0.0085	750	0	SP	A8H0917	
		19A-SCOMP(2)	---	25-Sep	12-18	0.00741	0.034	0.0085	0	375	MFR		
	19B	19B-NCOMP	---	11-Aug	0-12	0.087	0.034	0.0085	750	0	SP	A8H0310	
		19B-NCOMP(2)	---	28-Aug	12-24	<0.00106	0.034	0.0085	750	0	SP	A8H0788	
		19B-SNCOMP	---	11-Aug	0-12	0.148	0.034	0.0085	375	0	SP	A8H0310	
		19B-SNCOMP(2)	---	28-Aug	12-24	0.00123	0.034	0.0085	375	0	SP	A8H0788	
Cell 20	20A	20A-NCOMP	---	7-Aug	0-12	0.0287	0.034	0.0085	750	0	SP	A8H0202	
		20A-NCOMP(2)	---	28-Aug	12-18	<0.00104	0.034	0.0085	0	375	MFR	A8H0788	
		20A-SCOMP	---	7-Aug	0-12	0.0138	0.034	0.0085	750	0	SP	A8H0202	
		20A-SCOMP(2)	---	28-Aug	12-18	0.00149	0.034	0.0085	0	375	MFR	A8H0788	
	20B	20B-NCOMP	---	3-Aug	0-6	0.0627	0.034	0.0085	375	0	SP	A8H0097	
		20B-NCOMP(2)	---	23-Aug	6-18	0.00218	0.034	0.0085	0	750	MFR	A8H0676	
		20B-SCOMP	---	3-Aug	0-6	0.067	0.034	0.0085	375	0	SP	A8H0097	
		20B-SCOMP(2)	---	23-Aug	6-18	0.00648	0.034	0.0085	0	750	MFR	A8H0676	
	20C	20C-NCOMP	---	1-Aug	0-6	0.0632	0.034	0.0085	375	0	SP	A8H0017	
		20C-NCOMP(2)	---	23-Aug	6-14	0.0045	0.034	0.0085	0	500	MFR	A8H0676	
		20C-SCOMP	---	1-Aug	0-6	0.0645	0.034	0.0085	375	0	SP	A8H0017	
		20C-SCOMP(2)	---	23-Aug	6-14	0.00798	0.034	0.0085	0	500	MFR	A8H0676	
	20D	20D-ECOMP	---	3-Jul	0-18	0.0151	0.034	0.0085	500	0	SP	A8G0058	
		20D-ECOMP(2)	---	9-Jul	18-30	<0.00109	0.034	0.0085	300	0	SP	A8G0159	
		20D-NCOMP	---	31-Aug	0-18	0.0341	0.034	0.0085	900	0	SP	A8H0917	
		20D-NCOMP(2)	---	1-Oct	18-24	<0.00109	0.034	0.0085	0	300	MFR	A8J0010	
		20D-SCOMP	---	31-Aug	0-18	0.00367	0.034	0.0085	900	0	SP	A8H0917	
Cell 21	21A	21A-NCOMP	---	21-Aug	0-12	0.00788	0.034	0.0085	375	375	MFR (6"-12")	A8H0580	
		21A-SCOMP	---	21-Aug	0-12	0.00493	0.034	0.0085	375	375	MFR (6"-12")	A8H0580	
	21B	21B-NCOMP	---	21-Aug	0-18	<0.00103	0.034	0.0085	280	560	MFR (6"-18")	A8H0580	
		21B-SCOMP	---	21-Aug	0-18	0.00398	0.034	0.0085	280	560	MFR (6"-18")	A8H0580	
	21C	21C-NCOMP	---	21-Aug	0-18	<0.00106	0.034	0.0085	280	560	MFR (6"-18")	A8H0580	
		21C-SCOMP	---	21-Aug	0-18	0.00167	0.034	0.0085	280	560	MFR (6"-18")	A8H0580	
	21D	21D-NCOMP	---	1-Aug	0-6	0.036	0.034	0.0085	375	---	SP	A8H0017	
		21D-NCOMP(2)	---	23-Aug	6-14	<0.00105	0.034	0.0085	0	560	MFR	A8H0676	
21D-SCOMP		---	1-Aug	0-6	0.0546	0.034	0.0085	375	0	SP	A8H0017		
21D-SCOMP(2)		---	23-Aug	6-14	0.00636	0.034	0.0085	0	500	MFR	A8H0676		
Cell 23	23C	23C-NCOMP	---	19-Jul	0-12	0.0241	0.085	0.02125	750	0	SP	A8G0498	
		23C-NCOMP(2)	---	24-Jul	12-18	<0.00108	0.085	0.02125	375	0	SP	A8G0620	
		23C-SCOMP	---	19-Jul	0-12	0.00458	0.085	0.02125	750	0	SP	A8G0498	
Cell 24	24B	24B-NCOMP	---	21-Aug	0-12	0.00559	0.034	0.0085	300	300	MFR (6"-12")	A8H0580	
		24B-SCOMP	---	21-Aug	0-12	0.004	0.034	0.0085	300	300	MFR (6"-12")	A8H0580	
	24C	24C-NCOMP	---	30-Jul	0-18	<0.00102	0.034	0.0085	300	600	MFR (6"-18")	A8G0785	
		24C-SCOMP	---	30-Jul	0-18	<0.00106	0.034	0.0085	300	600	MFR (6"-18")	A8G0785	
			24D-NCOMP	---	30-Jul	0-12	0.00993	0.034	0.0085	375	375	MFR (6"-12")	A8G0785
			---	24D-NA	30-Jul	0-12	0.0198	0.034	---	---	---	---	A8H0254

Cell 24	24D	---	24D-NB	30-Jul	0-12	<0.00105	0.034	---	---	---	---	A8H0254
		---	24D-NC	30-Jul	0-12	0.00944	0.034	---	---	---	---	A8H0254
		---	24D-ND	30-Jul	0-12	<0.00101	0.034	---	---	---	---	A8H0254
		24D-SCOMP	---	30-Jul	0-12	0.0134	0.034	0.0085	375	375	MFR (6"-12")	A8G0785
		---	24D-SA	30-Jul	0-12	0.00236	0.034	---	---	---	---	A8H0254
		---	24D-SB	30-Jul	0-12	0.01198	0.034	---	---	---	---	A8H0254
		---	24D-2C	30-Jul	0-12	0.0179	0.034	---	---	---	---	A8H0254
		---	24D-SD	30-Jul	0-12	0.00576	0.034	---	---	---	---	A8H0254
Cell 25	25A	25A-ECOMP	---	3-Jul	0-18	0.00496	0.034	0.0085	500	0	SP	A8G0058
		25A-NCOMP	---	24-Jul	0-18	<0.00103	0.034	0.0085	900	0	SP	A8G0620
		25A-SCOMP	---	24-Jul	0-18	<0.00104	0.034	0.0085	900	0	SP	A8G0620
	25B	25B-NCOMP	---	24-Jul	0-6	0.0683	0.034	0.0085	375	0	SP	A8G0620
		25B-NCOMP(2)	---	18-Sep	6-12	<0.00118	0.034	0.0085	0	375	MFR	A8I0508
		25B-SCOMP	---	24-Jul	0-6	0.073	0.034	0.0085	375	0	SP	A8G0620
		25B-SCOMP(2)	---	18-Sep	6-12	<0.00112	0.034	0.0085	0	375	MFR	A8I0508
	25C	25C-NCOMP	---	13-Jul	0-6	0.0238	0.034	0.0085	375	0	SP	A8G0337
		25C-NCOMP(2)	---	27-Jul	6-12	<0.000976	0.034	0.0085	0	375	MFR	A8G0765
		25C-SCOMP	---	13-Jul	0-6	0.0376	0.034	0.0085	375	0	SP	A8G0337
		25C-SCOMP(2)	---	27-Jul	6-12	0.00264	0.034	0.0085	0	375	MFR	A8G0765
	25D	25D-ECOMP	---	3-Jul	0-18	0.0103	0.034	0.0085	500	0	SP	A8G0058
		25D-ECOMP(2)	---	9-Jul	18-30	0.00179	0.034	0.0085	300	0	SP	A8G0159
		25D-NCOMP	---	13-Jul	0-12	<0.000216	0.034	0.0085	600	0	SP	A8G0337
25D-SCOMP		---	13-Jul	0-12	<0.000225	0.034	0.0085	600	0	SP	A8G0337	
Cell 26	26C	26C-SCOMP	---	5-Jul	0-18	0.112	0.034	0.0085	1125	0	SP	A8G0100
		26C-SCOMP(2)	---	10-Jul	18-36	0.00325	0.034	0.0085	1125	0	SP	A8G0178
Cell 38	38C	38C-ECOMP	---	11-Sep	0-18	<0.0011	0.034	0.0085	475	950	MFR (6"-18")	A8I0238
		38C-WCOMP	---	11-Sep	0-18	<0.00108	0.034	0.0085	475	950	MFR (6"-18")	A8I0238

TOTAL VOLUME (cubic yards)

47055

25335

1) One-quarter of the generic RBC is used as the RBC for all four-point composite samples to account for potential dilution of discrete sample components.

The whole generic RBC (residential: 0.034 mg/kg, urban residential: 0.085 mg/kg) is used for discrete samples.

2) All soils between depths of 0"-6" were placed in the soil stockpile due to presence of roots and other organic matter which made the soils unsuitable for re-use on site.

CY: Cubic yards. All volumes are approximate.

MFR: Multifamily residential

RBC: Risk-based concentration, from DEQ guidance: *Risk-Based Decision Making for Cleanup of Contaminated Sites (September 2003, revised November 1, 2015)*

Sample result used for final confirmation. Areas represented by unshaded cells underwent additional excavation and testing.



PHOTO 1: Aerial view of Phase II, view looking west from Phase I area (July 16, 2018).  
Arrow points to soil stockpile.



PHOTO 2: Aerial view of Phase II area, view looking northwest. Soil stockpile is in right foreground (July 16, 2018).



PHOTO 3: Aerial view of Phase II, view looking northeast from southwest corner of site. Mobile home park is on the left. (July 16, 2018).



PHOTO 4: Pre-watering ground for dust suppression prior to excavating (July 16, 2018).



PHOTO 5: Soil scrapers working on cell 24. Arrow points to air sampling pumps for dust and dieldrin sampling (July 17, 2018).



PHOTO 6: Gravel surface placed on vehicle parking area on southwest corner of cell 26 (July 24, 2018).



PHOTO 7: Finished surface on cell 25, soil stockpile in background. View looking east (July 24, 2018).



PHOTO 8: Aerial view of soil stockpile and gravel-covered haul road (August 7, 2018).



PHOTO 9: Aerial view of cells 3, 4, 19 and 20 and truck turnaround at north end of haul road. View looking northeast. Water truck in foreground. (August 7, 2018).



PHOTO 10: West half of Phase II area, view looking west-northwest (August 7, 2018).



PHOTO 11: Applying water to stockpiled soil during excavation and loading onto trucks (August 9, 2018).



PHOTO 12: Loading trucks at soil stockpile area (August 10, 2018).



PHOTO 13: Loaded truck running through water spray bar (August 10, 2018).



PHOTO 14: Truck being covered with automatic tarp after running through wash bar (August 10, 2018).



PHOTO 15: Aerial view of soil stockpile, haul road, wash area and parking lot. View looking northeast (August 22, 2018).



PHOTO 16: Dump truck and side-dump being loaded from stockpile (August 22, 2018).



PHOTO 17: Aerial view of haul road, wash area and parking lot. Kale Street in background (August 22, 2018).

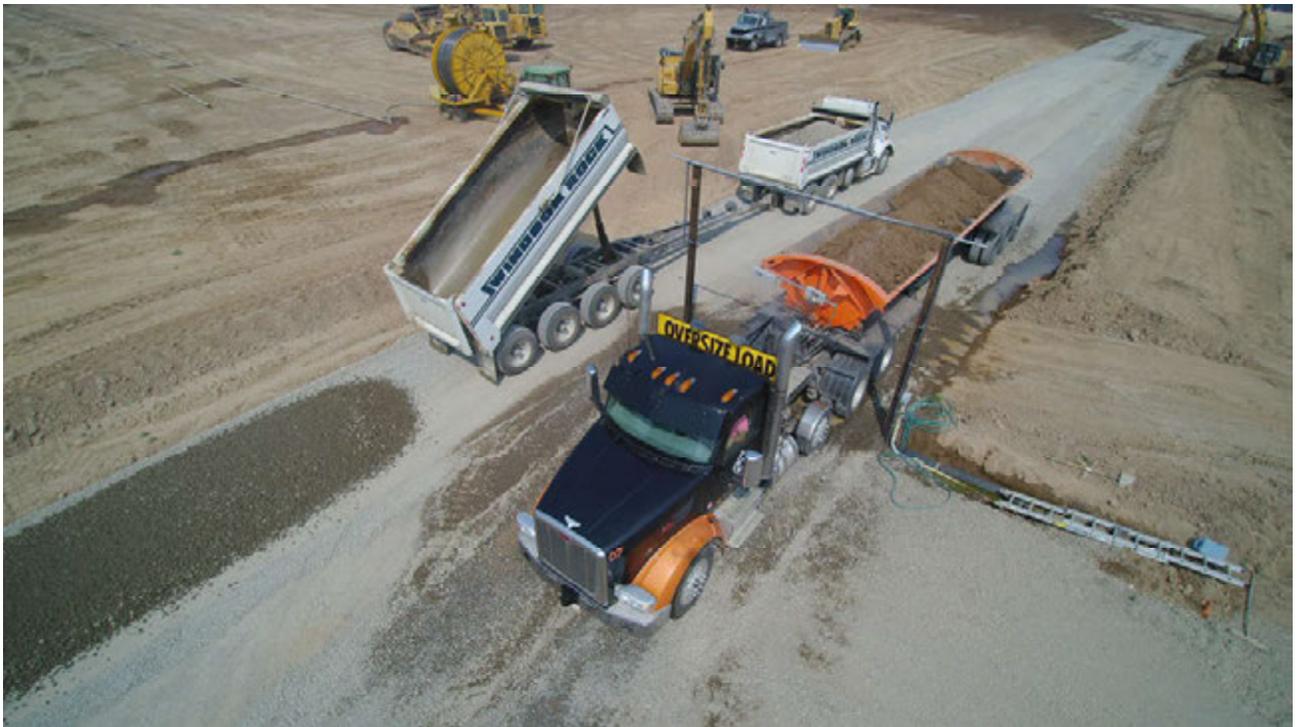


PHOTO 18: Side-dump truck running through wash bar and rock truck paving gravel on the temporary road (August 22, 2018).



PHOTO 19: Aerial view of Phase II area, view looking west (September 26, 2018).



PHOTO 20: Aerial view of soil stockpile (foreground) and cells on the northeast corner of Phase II (Sept. 26, 2018)



PHOTO 21: Aerial view of west portion of Phase II remediation area (April 2, 2019)



PHOTO 22: Aerial view of stockpile and east portion of Phase II remediation area (April 2, 2019)



PHOTO 23: Dumping dieldrin-contaminated soil at north pit at Zielinski farm (August 9, 2019).



PHOTO 24: Partially-filled north pit at Zielinski farm. View looking east (Sept. 5, 2018).



PHOTO 25: Partially-filled north pit at Zielinski farm (September 18, 2018).



PHOTO 26: Partially-filled north pit at Zielinski farm (September 18, 2018).



PHOTO 27: Aerial view of partially-filled north pit, view looking east (August 22, 2018).



PHOTO 28: Aerial view of north pit filled to within 3 feet of finished elevation being prepared for cleaner fill (Sept. 26, 2018).



PHOTO 29: Aerial view of north pit filled to within 3 feet of finished elevation, being prepared for cleaner fill (Sept. 26, 2018).



PHOTO 30: Elevation control stakes used to guide filling of area with three feet of cleaner fill (Sept. 26, 2018).

**APPENDIX A**  
**Laboratory Reports and Sample Chains of Custody**



Monday, October 22, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8J0456 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8J0456, which was received by the laboratory on 10/16/2018 at 1:37:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [DAuvil@apex-labs.com](mailto:DAuvil@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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Cooler Receipt Info (See Cooler Receipt Form for Details)

Default Cooler      3.5 degC

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

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Darrell Auvil For Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8J0456 - 10 22 18 1124**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
2A-NCOMP(4)	A8J0456-01	Soil	10/16/18 12:33	10/16/18 13:37
2B-NCOMP(4)	A8J0456-02	Soil	10/16/18 12:36	10/16/18 13:37

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Darrell Auvil For Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0456 - 10 22 18 1124</b>
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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>2A-NCOMP(4) (A8J0456-01)</b>				<b>Matrix: Soil</b>		<b>Batch: 8101108</b>		
Dieldrin	ND	---	1.11	ug/kg dry	1	10/18/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 75 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/18/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>84 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/18/18</i>	<i>EPA 8081B</i>
<b>2B-NCOMP(4) (A8J0456-02)</b>				<b>Matrix: Soil</b>		<b>Batch: 8101108</b>		
Dieldrin	ND	---	1.12	ug/kg dry	1	10/18/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 66 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/18/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>77 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/18/18</i>	<i>EPA 8081B</i>

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**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0456 - 10 22 18 1124</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>2A-NCOMP(4) (A8J0456-01)</b>				<b>Matrix: Soil</b>		<b>Batch: 8101079</b>		
% Solids	83.5	---	1.00	% by Weight	1	10/18/18	EPA 8000C	
<b>2B-NCOMP(4) (A8J0456-02)</b>				<b>Matrix: Soil</b>		<b>Batch: 8101079</b>		
% Solids	84.4	---	1.00	% by Weight	1	10/18/18	EPA 8000C	

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Darrell Auvil For Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0456 - 10 22 18 1124</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8101108 - EPA 3546</b>						<b>Soil</b>						
<b>Blank (8101108-BLK1)</b>			Prepared: 10/17/18 15:10 Analyzed: 10/18/18 14:48									
<b>EPA 8081B</b>												
Aldrin	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
alpha-BHC	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
beta-BHC	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
delta-BHC	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
gamma-BHC (Lindane)	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
cis-Chlordane	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
trans-Chlordane	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
4,4'-DDD	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
4,4'-DDE	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
4,4'-DDT	<b>5.41</b>	---	0.909	ug/kg wet	1	---	---	---	---	---	---	B
Dieldrin	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
Endosulfan I	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
Endosulfan II	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	B-02
Endosulfan sulfate	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
Endrin	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	B-02
Endrin Aldehyde	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
Endrin ketone	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
Heptachlor	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
Heptachlor epoxide	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
Methoxychlor	ND	---	2.73	ug/kg wet	1	---	---	---	---	---	---	
Chlordane (Technical)	ND	---	27.3	ug/kg wet	1	---	---	---	---	---	---	
Toxaphene (Total)	ND	---	27.3	ug/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 78 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>88 %</i>		<i>65-151 %</i>		<i>"</i>						

<b>LCS (8101108-BS1)</b>						Prepared: 10/17/18 15:10 Analyzed: 10/18/18 15:05						
<b>EPA 8081B</b>												
Aldrin	52.1	---	1.00	ug/kg wet	1	50.0	---	104	45-136%	---	---	
alpha-BHC	53.6	---	1.00	ug/kg wet	1	50.0	---	107	45-137%	---	---	
beta-BHC	59.1	---	1.00	ug/kg wet	1	50.0	---	118	50-136%	---	---	Q-41
delta-BHC	58.8	---	1.00	ug/kg wet	1	50.0	---	118	47-139%	---	---	Q-41
gamma-BHC (Lindane)	55.6	---	1.00	ug/kg wet	1	50.0	---	111	49-135%	---	---	Q-41
cis-Chlordane	51.2	---	1.00	ug/kg wet	1	50.0	---	102	54-133%	---	---	

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Darrell Auvil For Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0456 - 10 22 18 1124</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8101108 - EPA 3546</b>												
<b>Soil</b>												
<b>LCS (8101108-BS1)</b>												
Prepared: 10/17/18 15:10 Analyzed: 10/18/18 15:05												
trans-Chlordane	51.8	---	1.00	ug/kg wet	1	50.0	---	104	53-135%	---	---	
4,4'-DDD	59.3	---	1.00	ug/kg wet	1	50.0	---	119	56-139%	---	---	Q-41
4,4'-DDE	56.4	---	1.00	ug/kg wet	1	50.0	---	113	56-134%	---	---	
4,4'-DDT	56.9	---	1.00	ug/kg wet	1	50.0	---	114	50-141%	---	---	B
Dieldrin	51.6	---	1.00	ug/kg wet	1	50.0	---	103	56-136%	---	---	
Endosulfan I	50.9	---	1.00	ug/kg wet	1	50.0	---	102	52-132%	---	---	
Endosulfan II	51.6	---	1.00	ug/kg wet	1	50.0	---	103	53-134%	---	---	B-02
Endosulfan sulfate	52.0	---	1.00	ug/kg wet	1	50.0	---	104	55-136%	---	---	
Endrin	55.8	---	1.00	ug/kg wet	1	50.0	---	112	56-140%	---	---	B-02
Endrin Aldehyde	54.6	---	1.00	ug/kg wet	1	50.0	---	109	35-137%	---	---	
Endrin ketone	55.0	---	1.00	ug/kg wet	1	50.0	---	110	55-136%	---	---	
Heptachlor	55.9	---	1.00	ug/kg wet	1	50.0	---	112	47-136%	---	---	Q-41
Heptachlor epoxide	50.3	---	1.00	ug/kg wet	1	50.0	---	101	52-136%	---	---	
Methoxychlor	61.8	---	3.00	ug/kg wet	1	50.0	---	124	52-143%	---	---	

Surr: 2,4,5,6-TCMX (Surr) Recovery: 84 % Limits: 42-129 % Dilution: 1x  
Decachlorobiphenyl (Surr) 98 % 65-151 % "

**Duplicate (8101108-DUP1)** Prepared: 10/17/18 15:10 Analyzed: 10/18/18 15:52

**QC Source Sample: Non-SDG (A8J0340-41)**

Aldrin	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	
alpha-BHC	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	
beta-BHC	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	
delta-BHC	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	
gamma-BHC (Lindane)	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	
cis-Chlordane	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	
trans-Chlordane	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	
4,4'-DDD	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	
4,4'-DDE	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	
4,4'-DDT	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	
Dieldrin	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	
Endosulfan I	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	
Endosulfan II	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	
Endosulfan sulfate	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	
Endrin	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	

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Darrell Auvil For Darwin Thomas, Business Development Director



<b>Anderson Geological</b>	Project: <b>Northstar</b>	
PO Box 649	Project Number: <b>1503.20</b>	<b>Report ID:</b>
Wilsonville, OR 97070	Project Manager: <b>Erik Anderson</b>	<b>A8J0456 - 10 22 18 1124</b>

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8101108 - EPA 3546</b>												
<b>Soil</b>												
<b>Duplicate (8101108-DUP1)</b>												
Prepared: 10/17/18 15:10 Analyzed: 10/18/18 15:52												
<b>QC Source Sample: Non-SDG (A8J0340-41)</b>												
Endrin Aldehyde	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	
Endrin ketone	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	
Heptachlor	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	
Heptachlor epoxide	ND	---	0.941	ug/kg dry	1	---	ND	---	---	---	30%	
Methoxychlor	ND	---	2.82	ug/kg dry	1	---	ND	---	---	---	30%	
Chlordane (Technical)	ND	---	28.2	ug/kg dry	1	---	ND	---	---	---	30%	
Toxaphene (Total)	ND	---	28.2	ug/kg dry	1	---	ND	---	---	---	30%	
Surr: 2,4,5,6-TCMX (Surr) Recovery: 53 % Limits: 42-129 % Dilution: 1x												
Decachlorobiphenyl (Surr) 60 % 65-151 % "												
S-03												

<b>Matrix Spike (8101108-MS1)</b>												
Prepared: 10/17/18 15:10 Analyzed: 10/18/18 17:36												
<b>QC Source Sample: 2B-NCOMP(4) (A8J0456-02)</b>												
<b>EPA 8081B</b>												
Aldrin	51.8	---	1.11	ug/kg dry	1	55.7	ND	93	45-136%	---	---	
alpha-BHC	55.1	---	1.11	ug/kg dry	1	55.7	ND	99	45-137%	---	---	
beta-BHC	64.9	---	1.11	ug/kg dry	1	55.7	ND	117	50-136%	---	---	Q-41
delta-BHC	62.1	---	1.11	ug/kg dry	1	55.7	ND	111	47-139%	---	---	Q-41
gamma-BHC (Lindane)	55.1	---	1.11	ug/kg dry	1	55.7	ND	99	49-135%	---	---	Q-41
cis-Chlordane	48.4	---	1.11	ug/kg dry	1	55.7	ND	87	54-133%	---	---	
trans-Chlordane	51.3	---	1.11	ug/kg dry	1	55.7	ND	92	53-135%	---	---	
4,4'-DDD	63.8	---	1.11	ug/kg dry	1	55.7	ND	114	56-139%	---	---	Q-41
4,4'-DDE	58.2	---	1.11	ug/kg dry	1	55.7	ND	104	56-134%	---	---	
4,4'-DDT	60.1	---	1.11	ug/kg dry	1	55.7	ND	108	50-141%	---	---	B
Dieldrin	52.1	---	1.11	ug/kg dry	1	55.7	ND	93	56-136%	---	---	
Endosulfan I	48.1	---	1.11	ug/kg dry	1	55.7	ND	86	52-132%	---	---	
Endosulfan II	50.9	---	1.11	ug/kg dry	1	55.7	ND	91	53-134%	---	---	B-02
Endosulfan sulfate	49.0	---	1.11	ug/kg dry	1	55.7	ND	88	55-136%	---	---	
Endrin	55.3	---	1.11	ug/kg dry	1	55.7	ND	99	56-140%	---	---	B-02
Endrin Aldehyde	45.3	---	1.11	ug/kg dry	1	55.7	ND	81	35-137%	---	---	
Endrin ketone	53.9	---	1.11	ug/kg dry	1	55.7	ND	97	55-136%	---	---	
Heptachlor	56.7	---	1.11	ug/kg dry	1	55.7	ND	102	47-136%	---	---	Q-41
Heptachlor epoxide	50.4	---	1.11	ug/kg dry	1	55.7	ND	90	52-136%	---	---	
Methoxychlor	62.7	---	3.34	ug/kg dry	1	55.7	ND	113	52-143%	---	---	

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**Apex Laboratories, LLC**

12232 S.W. Garden Place  
 Tigard, OR 97223  
 503-718-2323  
EPA ID: OR01039

<b>Anderson Geological</b>	Project: <b>Northstar</b>	
PO Box 649	Project Number: <b>1503.20</b>	<b>Report ID:</b>
Wilsonville, OR 97070	Project Manager: <b>Erik Anderson</b>	<b>A8J0456 - 10 22 18 1124</b>

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8101108 - EPA 3546</b>						<b>Soil</b>						
<b>Matrix Spike (8101108-MS1)</b>			Prepared: 10/17/18 15:10 Analyzed: 10/18/18 17:36									
<b>QC Source Sample: 2B-NCOMP(4) (A8J0456-02)</b>												
Surr: 2,4,5,6-TCMX (Surr)		Recovery: 72 %		Limits: 42-129 %		Dilution: 1x						
Decachlorobiphenyl (Surr)		76 %		65-151 %		"						

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Darrell Auvil For Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0456 - 10 22 18 1124</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8101079 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (8101079-DUP1)</b>			Prepared: 10/17/18 08:59 Analyzed: 10/18/18 08:40									
<u>QC Source Sample: Non-SDG (A8J0340-02)</u>												
% Solids	98.2	---	1.00	% by Weight	1	---	98.3	---	---	0.04	10%	
<b>Duplicate (8101079-DUP2)</b>			Prepared: 10/17/18 08:59 Analyzed: 10/18/18 08:40									
<u>QC Source Sample: Non-SDG (A8J0340-28)</u>												
% Solids	99.1	---	1.00	% by Weight	1	---	99.2	---	---	0.06	10%	
<b>Duplicate (8101079-DUP3)</b>			Prepared: 10/17/18 08:59 Analyzed: 10/18/18 08:40									
<u>QC Source Sample: Non-SDG (A8J0452-01)</u>												
% Solids	90.3	---	1.00	% by Weight	1	---	89.3	---	---	1	10%	
<b>Duplicate (8101079-DUP4)</b>			Prepared: 10/17/18 08:59 Analyzed: 10/18/18 08:40									
<u>QC Source Sample: Non-SDG (A8J0463-05)</u>												
% Solids	85.7	---	1.00	% by Weight	1	---	84.9	---	---	0.9	10%	
<b>Duplicate (8101079-DUP5)</b>			Prepared: 10/17/18 18:00 Analyzed: 10/18/18 08:40									
<u>QC Source Sample: Non-SDG (A8J0513-01)</u>												
% Solids	87.6	---	1.00	% by Weight	1	---	87.6	---	---	0.09	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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<b>Anderson Geological</b>	Project: <b>Northstar</b>	
<b>PO Box 649</b>	Project Number: <b>1503.20</b>	<b>Report ID:</b>
<b>Wilsonville, OR 97070</b>	Project Manager: <b>Erik Anderson</b>	<b>A8J0456 - 10 22 18 1124</b>

**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8101108</u>							
A8J0456-01	Soil	EPA 8081B	10/16/18 12:33	10/17/18 15:10	10.75g/5mL	10g/5mL	0.93
A8J0456-02	Soil	EPA 8081B	10/16/18 12:36	10/17/18 15:10	10.62g/5mL	10g/5mL	0.94

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8101079</u>							
A8J0456-01	Soil	EPA 8000C	10/16/18 12:33	10/17/18 08:59			NA
A8J0456-02	Soil	EPA 8000C	10/16/18 12:36	10/17/18 08:59			NA



**Apex Laboratories, LLC**

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503-718-2323  
EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8J0456 - 10 22 18 1124**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**Apex Laboratories**

- B** Analyte detected in an associated blank at a level above the MRL. (See Notes and Conventions below.)
- B-02** Analyte detected in an associated blank at a level between one-half the MRL and the MRL. (See Notes and Conventions below.)
- Q-41** Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high.
- S-03** Reextraction and analysis, or analysis of laboratory duplicate, confirms surrogate failure due to sample matrix effect.

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Darrell Auvil For Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8J0456 - 10 22 18 1124**

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
- "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.  
  
Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0456 - 10 22 18 1124</b>
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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
**EPA ID: OR01039**

<b><u>Anderson Geological</u></b> PO Box 649 Wilsonville, OR 97070	Project: <b><u>Northstar</u></b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0456 - 10 22 18 1124</b>
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**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Darrell Auvil For Darwin Thomas, Business Development Director





Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8J0456 - 10 22 18 1124

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geo Element WO#: A8 J0456

Project/Project #: Northstar / 1503-20

**Delivery Info:**

Date/time received: 10/16/18 @ 13:37 By: KS

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Date/time inspected: 10/16/18 @ 13:37 By: KS

Chain of Custody included? Yes  No  Custody seals? Yes  No

Signed/dated by client? Yes  No

Signed/dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	<u>3.5</u>						
Received on ice? (Y/N)	<u>Y</u>						
Temp. blanks? (Y/N)	<u>N</u>						
Ice type: (Gel/Real/Other)	<u>Gel</u>						
Condition:	<u>Good</u>						

Cooler out of temp? (Y/N) N Possible reason why: \_\_\_\_\_

If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/NA NA

Out of temperature samples form initiated? Yes/No/NA NA

**Samples Inspection:** Date/time inspected: 10/16/18 @ 13:43 By: KS

All samples intact? Yes  No  Comments: \_\_\_\_\_

Bottle labels/COCs agree? Yes  No  Comments: \_\_\_\_\_

COC/container discrepancies form initiated? Yes  No  NA

Containers/volumes received appropriate for analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA vials have visible headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water samples: pH checked: Yes  No  NA  pH appropriate? Yes  No  NA

Comments: \_\_\_\_\_

Additional information: \_\_\_\_\_

Labeled by: KS Witness: AM Cooler Inspected by: Client See Project Contact Form: Y



Monday, November 12, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8J0331 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8J0331, which was received by the laboratory on 10/10/2018 at 3:35:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

---

Cooler Receipt Info (See Cooler Receipt Form for Details)

Default Cooler      5.9 degC

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

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Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8J0331 - 11 12 18 0926**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
2B-NCOMP(3)	A8J0331-01	Soil	10/10/18 13:02	10/10/18 15:35
2A-NCOMP(3)	A8J0331-02	Soil	10/10/18 13:12	10/10/18 15:35
2A-SD(3)	A8J0331-03	Soil	10/10/18 13:16	10/10/18 15:35
2D-NA(3)	A8J0331-04	Soil	10/10/18 13:19	10/10/18 15:35
2D-NC(3)	A8J0331-05	Soil	10/10/18 13:22	10/10/18 15:35

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0331 - 11 12 18 0926</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>2B-NCOMP(3) (A8J0331-01)</b>				<b>Matrix: Soil</b>		<b>Batch: 8100878</b>		
<b>Dieldrin</b>	<b>0.0112</b>	---	0.00108	mg/kg dry	1	10/11/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 67 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/11/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>76 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/11/18</i>	<i>EPA 8081B</i>
<b>2A-NCOMP(3) (A8J0331-02)</b>				<b>Matrix: Soil</b>		<b>Batch: 8100878</b>		
<b>Dieldrin</b>	<b>0.0374</b>	---	0.00112	mg/kg dry	1	10/11/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 70 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/11/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>78 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/11/18</i>	<i>EPA 8081B</i>
<b>2A-SD(3) (A8J0331-03)</b>				<b>Matrix: Soil</b>		<b>Batch: 8100878</b>		
Dieldrin	ND	---	0.00113	mg/kg dry	1	10/11/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 67 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/11/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>77 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/11/18</i>	<i>EPA 8081B</i>
<b>2D-NA(3) (A8J0331-04)</b>				<b>Matrix: Soil</b>		<b>Batch: 8100878</b>		
Dieldrin	ND	---	0.00105	mg/kg dry	1	10/11/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 64 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/11/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>73 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/11/18</i>	<i>EPA 8081B</i>
<b>2D-NC(3) (A8J0331-05)</b>				<b>Matrix: Soil</b>		<b>Batch: 8100878</b>		
Dieldrin	ND	---	0.00114	mg/kg dry	1	10/11/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 66 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/11/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>78 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/11/18</i>	<i>EPA 8081B</i>

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0331 - 11 12 18 0926</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>2B-NCOMP(3) (A8J0331-01)</b>				<b>Matrix: Soil</b>			<b>Batch: 8100883</b>	
% Solids	86.2	---	1.00	% by Weight	1	10/12/18	EPA 8000C	
<b>2A-NCOMP(3) (A8J0331-02)</b>				<b>Matrix: Soil</b>			<b>Batch: 8100883</b>	
% Solids	86.5	---	1.00	% by Weight	1	10/12/18	EPA 8000C	
<b>2A-SD(3) (A8J0331-03)</b>				<b>Matrix: Soil</b>			<b>Batch: 8100883</b>	
% Solids	85.7	---	1.00	% by Weight	1	10/12/18	EPA 8000C	
<b>2D-NA(3) (A8J0331-04)</b>				<b>Matrix: Soil</b>			<b>Batch: 8100883</b>	
% Solids	88.0	---	1.00	% by Weight	1	10/12/18	EPA 8000C	
<b>2D-NC(3) (A8J0331-05)</b>				<b>Matrix: Soil</b>			<b>Batch: 8100883</b>	
% Solids	83.6	---	1.00	% by Weight	1	10/12/18	EPA 8000C	

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0331 - 11 12 18 0926</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8100878 - EPA 3546</b>						<b>Soil</b>						
<b>Blank (8100878-BLK1)</b>			Prepared: 10/11/18 07:28 Analyzed: 10/11/18 14:29									
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.000625	mg/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 74 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>82 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>LCS (8100878-BS1)</b>						Prepared: 10/11/18 07:28 Analyzed: 10/11/18 14:46						
<u>EPA 8081B</u>												
Dieldrin	0.0496	---	0.00100	mg/kg wet	1	0.0500	---	99	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 76 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>89 %</i>		<i>65-151 %</i>		<i>"</i>						

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**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8J0331 - 11 12 18 0926**

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8100883 - Total Solids (Dry Weight)</b>							<b>Soil</b>					
<b>Duplicate (8100883-DUP1)</b>			Prepared: 10/11/18 08:53 Analyzed: 10/12/18 08:19									
<u>QC Source Sample: Non-SDG (A8J0314-01)</u>												
% Solids	92.4	---	1.00	% by Weight	1	---	92.5	---	---	0.06	10%	
<b>Duplicate (8100883-DUP2)</b>			Prepared: 10/11/18 08:53 Analyzed: 10/12/18 08:19									
<u>QC Source Sample: 2D-NC(3) (A8J0331-05)</u>												
<u>EPA 8000C</u>												
% Solids	83.5	---	1.00	% by Weight	1	---	83.6	---	---	0.1	10%	
<b>Duplicate (8100883-DUP3)</b>			Prepared: 10/11/18 19:48 Analyzed: 10/12/18 08:19									
<u>QC Source Sample: Non-SDG (A8J0375-02)</u>												
% Solids	82.1	---	1.00	% by Weight	1	---	82.2	---	---	0.1	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8J0331 - 11 12 18 0926

SAMPLE PREPARATION INFORMATION

Organochlorine Pesticides by EPA 8081B

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8100878							
A8J0331-01	Soil	EPA 8081B	10/10/18 13:02	10/11/18 07:28	10.77g/5mL	10g/5mL	0.93
A8J0331-02	Soil	EPA 8081B	10/10/18 13:12	10/11/18 07:28	10.35g/5mL	10g/5mL	0.97
A8J0331-03	Soil	EPA 8081B	10/10/18 13:16	10/11/18 07:28	10.3g/5mL	10g/5mL	0.97
A8J0331-04	Soil	EPA 8081B	10/10/18 13:19	10/11/18 07:28	10.84g/5mL	10g/5mL	0.92
A8J0331-05	Soil	EPA 8081B	10/10/18 13:22	10/11/18 07:28	10.45g/5mL	10g/5mL	0.96

Percent Dry Weight

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8100883							
A8J0331-01	Soil	EPA 8000C	10/10/18 13:02	10/11/18 08:53			NA
A8J0331-02	Soil	EPA 8000C	10/10/18 13:12	10/11/18 08:53			NA
A8J0331-03	Soil	EPA 8000C	10/10/18 13:16	10/11/18 08:53			NA
A8J0331-04	Soil	EPA 8000C	10/10/18 13:19	10/11/18 08:53			NA
A8J0331-05	Soil	EPA 8000C	10/10/18 13:22	10/11/18 08:53			NA

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12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

Report ID:  
**A8J0331 - 11 12 18 0926**

**QUALIFIER DEFINITIONS**

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

There are No Qualifiers on Sample or QC Data for this report

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PO Box 649  
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Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8J0331 - 11 12 18 0926**

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
- "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

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Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8J0331 - 11 12 18 0926**

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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503-718-2323  
EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8J0331 - 11 12 18 0926**

**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8J0331 - 11 12 18 0926

COC 1 of 1

**CHAIN OF CUSTODY**

Lab # A8J0331 PO# 1503.20

Company: Anderson Geological Project Name: Northstar Project # 1503.20  
 Address: 12232 S.W. Garden Place, Tigard, OR 97223 Project Mgr: Erik Anderson Email: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Sampled by: Erik Anderson

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS		ANALYSIS REQUEST
					YES	NO	
2B-NAL-01(3)		10/10/18	13:02	S	1		TOTAL DISS TCFP As, Sb, As, Ba, Be, Cd, Cr, Cu, Ni, Pb, Se, Ag, Na, TL, V, Zn
2A-NG-01(3)		13:12	S	S	1		600 TTO RCRA Metals (8) TCLP Metals (8)
2A-SD(3)		13:16	S	S	1		8082 PCBs 8270 SIM PAHs 8270 SVOC 8260 BTEX VOCs 8260 HVOCS 8260 RBDN VOCs 8260 VOCs Full List
2J-NAL(3)		13:14	S	S	1		NWTFH-CX NWTFH-DX NWTFH-HCID
2J-NG(3)		13:22	S	S	1		

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

SPECIAL INSTRUCTIONS: \_\_\_\_\_

RECEIVED BY: \_\_\_\_\_ RECEIVED BY: \_\_\_\_\_  
 Signature: Erik Anderson Date: 10/10/18 Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Printed Name: Erik Anderson Time: 15:35 Printed Name: \_\_\_\_\_ Time: \_\_\_\_\_  
 Company: Apex Company: \_\_\_\_\_

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8J0331 - 11 12 18 0926

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geological Element WO#: A8J0331  
Project/Project #: Northstar / 1503.20

**Delivery info:**

Date/Time Received: 10-10-18 @ 15:35 By: TAB  
Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: TAB : 10-10-18 @ 15:35

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>5.9</u>						
Received on Ice? (Y/N)	<u>Y</u>						
Temp. Blanks? (Y/N)	<u>N</u>						
Ice Type: (Gel/Real/Other)	<u>Gel</u>						
Condition:	<u>Good</u>						

Cooler out of temp? (Y/N) Possible reason why:

If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA

**Samples Inspection:** Inspected by: TAB : 10/10/18 @ 1400

All Samples Intact? Yes  No  Comments:

Bottle Labels/COCs agree? Yes  No  Comments: 2B(N) 2B-NCOMP(3) container reads T of 1312, 2A-NCOMP(3) container reads T of 1302

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments:

Do VOA Vials have Visible Headspace? Yes  No  NA   
Comments:

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA   
Comments:

**Additional Information:**

Labeled by: TAB Witness: AM Cooler Inspected by: Client See Project Contact Form: Y



Wednesday, October 17, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8J0039 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8J0039, which was received by the laboratory on 10/2/2018 at 9:50:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

---

Cooler Receipt Info

(See Cooler Receipt Form for Details)

Default Cooler      1.3 degC

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8J0039 - 10 17 18 1329

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
4D-NA(2)	A8J0039-01	Soil	10/02/18 08:54	10/02/18 09:50
4D-NB(2)	A8J0039-02	Soil	10/02/18 08:56	10/02/18 09:50
4D-NC(2)	A8J0039-03	Soil	10/02/18 08:58	10/02/18 09:50
4D-ND(2)	A8J0039-04	Soil	10/02/18 09:00	10/02/18 09:50

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0039 - 10 17 18 1329</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>4D-NA(2) (A8J0039-01)</b>				<b>Matrix: Soil</b>		<b>Batch: 8100532</b>		
Dieldrin	ND	---	0.00109	mg/kg dry	1	10/04/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 70 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/04/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>77 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/04/18</i>	<i>EPA 8081B</i>
<b>4D-NB(2) (A8J0039-02)</b>				<b>Matrix: Soil</b>		<b>Batch: 8100532</b>		
Dieldrin	<b>0.00438</b>	---	0.00114	mg/kg dry	1	10/04/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 74 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/04/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>82 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/04/18</i>	<i>EPA 8081B</i>
<b>4D-NC(2) (A8J0039-03)</b>				<b>Matrix: Soil</b>		<b>Batch: 8100532</b>		
Dieldrin	ND	---	0.00112	mg/kg dry	1	10/04/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 75 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/04/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>82 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/04/18</i>	<i>EPA 8081B</i>
<b>4D-ND(2) (A8J0039-04)</b>				<b>Matrix: Soil</b>		<b>Batch: 8100532</b>		
Dieldrin	ND	---	0.00106	mg/kg dry	1	10/04/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 77 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/04/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>86 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/04/18</i>	<i>EPA 8081B</i>

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0039 - 10 17 18 1329</b>
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**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>4D-NA(2) (A8J0039-01)</b>				<b>Matrix: Soil</b>			<b>Batch: 8100557</b>	
% Solids	87.2	---	1.00	% by Weight	1	10/04/18	EPA 8000C	
<b>4D-NB(2) (A8J0039-02)</b>				<b>Matrix: Soil</b>			<b>Batch: 8100557</b>	
% Solids	85.6	---	1.00	% by Weight	1	10/04/18	EPA 8000C	
<b>4D-NC(2) (A8J0039-03)</b>				<b>Matrix: Soil</b>			<b>Batch: 8100557</b>	
% Solids	85.2	---	1.00	% by Weight	1	10/04/18	EPA 8000C	
<b>4D-ND(2) (A8J0039-04)</b>				<b>Matrix: Soil</b>			<b>Batch: 8100557</b>	
% Solids	85.1	---	1.00	% by Weight	1	10/04/18	EPA 8000C	

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0039 - 10 17 18 1329</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8100532 - EPA 3546</b>						<b>Soil</b>						
<b>Blank (8100532-BLK1)</b>			Prepared: 10/02/18 15:02 Analyzed: 10/04/18 12:25									
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 73 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>86 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>LCS (8100532-BS1)</b>						Prepared: 10/02/18 15:02 Analyzed: 10/04/18 12:42						<b>A-01</b>
<u>EPA 8081B</u>												
Dieldrin	0.0495	---	0.00100	mg/kg wet	1	0.0500	---	99	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 75 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>84 %</i>		<i>65-151 %</i>		<i>"</i>						

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0039 - 10 17 18 1329</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8100557 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (8100557-DUP1)</b>			Prepared: 10/03/18 09:52 Analyzed: 10/04/18 08:42									
<u>QC Source Sample: 4D-NA(2) (A8J0039-01)</u>												
<u>EPA 8000C</u>												
% Solids	86.9	---	1.00	% by Weight	1	---	87.2	---	---	0.4	10%	
<b>Duplicate (8100557-DUP2)</b>			Prepared: 10/03/18 09:52 Analyzed: 10/04/18 08:42									
<u>QC Source Sample: Non-SDG (A8J0047-08)</u>												
% Solids	80.8	---	1.00	% by Weight	1	---	77.7	---	---	4	10%	
<b>Duplicate (8100557-DUP3)</b>			Prepared: 10/03/18 09:52 Analyzed: 10/04/18 08:42									
<u>QC Source Sample: Non-SDG (A8J0047-20)</u>												
% Solids	90.0	---	1.00	% by Weight	1	---	90.2	---	---	0.2	10%	
<b>Duplicate (8100557-DUP4)</b>			Prepared: 10/03/18 09:52 Analyzed: 10/04/18 08:42									
<u>QC Source Sample: Non-SDG (A8J0047-31)</u>												
% Solids	92.7	---	1.00	% by Weight	1	---	93.0	---	---	0.3	10%	
<b>Duplicate (8100557-DUP5)</b>			Prepared: 10/03/18 09:52 Analyzed: 10/04/18 08:42									
<u>QC Source Sample: Non-SDG (A8J0070-02)</u>												
% Solids	81.3	---	1.00	% by Weight	1	---	81.7	---	---	0.5	10%	
<b>Duplicate (8100557-DUP6)</b>			Prepared: 10/03/18 20:04 Analyzed: 10/04/18 08:42									
<u>QC Source Sample: Non-SDG (A8J0107-01)</u>												
% Solids	80.8	---	1.00	% by Weight	1	---	81.2	---	---	0.4	10%	
<b>Duplicate (8100557-DUP7)</b>			Prepared: 10/03/18 20:04 Analyzed: 10/04/18 08:42									
<u>QC Source Sample: Non-SDG (A8J0111-01)</u>												
% Solids	85.2	---	1.00	% by Weight	1	---	86.2	---	---	1	10%	
<b>Duplicate (8100557-DUP8)</b>			Prepared: 10/03/18 20:04 Analyzed: 10/04/18 08:42									
<u>QC Source Sample: Non-SDG (A8J0112-08)</u>												
% Solids	88.4	---	1.00	% by Weight	1	---	86.5	---	---	2	10%	

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503-718-2323  
EPA ID: OR01039

<b><u>Anderson Geological</u></b> PO Box 649 Wilsonville, OR 97070	Project: <b><u>Northstar</u></b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0039 - 10 17 18 1329</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8100557 - Total Solids (Dry Weight)</b>							<b>Soil</b>					

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0039 - 10 17 18 1329</b>
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**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8100532</u>							
A8J0039-01	Soil	EPA 8081B	10/02/18 08:54	10/02/18 15:02	10.55g/5mL	10g/5mL	0.95
A8J0039-02	Soil	EPA 8081B	10/02/18 08:56	10/02/18 15:02	10.29g/5mL	10g/5mL	0.97
A8J0039-03	Soil	EPA 8081B	10/02/18 08:58	10/02/18 15:02	10.48g/5mL	10g/5mL	0.95
A8J0039-04	Soil	EPA 8081B	10/02/18 09:00	10/02/18 15:02	11.03g/5mL	10g/5mL	0.91

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8100557</u>							
A8J0039-01	Soil	EPA 8000C	10/02/18 08:54	10/03/18 09:52			NA
A8J0039-02	Soil	EPA 8000C	10/02/18 08:56	10/03/18 09:52			NA
A8J0039-03	Soil	EPA 8000C	10/02/18 08:58	10/03/18 09:52			NA
A8J0039-04	Soil	EPA 8000C	10/02/18 09:00	10/03/18 09:52			NA

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EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

Report ID:  
**A8J0039 - 10 17 18 1329**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**Apex Laboratories**

**A-01** Matrix Spike not reported due to clean up required for analysis. Batch accepted based on Lab Control Standard results.

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**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8J0039 - 10 17 18 1329**

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
- "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

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Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8J0039 - 10 17 18 1329**

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

**Mixed Matrix Samples:**

**Water Samples:**

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

**Soil and Sediment Samples:**

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

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**Apex Laboratories, LLC**

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EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8J0039 - 10 17 18 1329**

**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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Darwin Thomas, Business Development Director





Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8J0039 - 10 17 18 1329

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geological Element WO#: A8 J0039

Project/Project #: Northstar / 1503.20

**Delivery info:**

Date/Time Received: 10/2/18 @ 9:50 By: km

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: km : 10/2/18 @ 9:50

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>1.3</u>						
Received on Ice? (Y/N)	<u>Y</u>						
Temp. Blanks? (Y/N)	<u>N</u>						
Ice Type: (Gel/Real/Other)	<u>Gel</u>						
Condition:	<u>Good</u>						

Cooler out of temp? (Y/N) Possible reason why: \_\_\_\_\_  
If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No

**Samples Inspection:** Inspected by: km : 10/2/18 @ 9:54

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: \_\_\_\_\_

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

**Additional Information:** \_\_\_\_\_

Labeled by: km Witness: [Signature] Cooler Inspected by: [Signature] See Project Contact Form: Y  
Client 10/2/18



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Friday, October 5, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8J0010 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8J0010, which was received by the laboratory on 10/1/2018 at 11:13:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [DAuvil@apex-labs.com](mailto:DAuvil@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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Cooler Receipt Info

(See Cooler Receipt Form for Details)

Default Cooler      0.8 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Darrell Auvil For Darwin Thomas, Business Development Director



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503-718-2323  
EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8J0010 - 10 05 18 1545**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
20D-NCOMP(2)	A8J0010-01	Soil	10/01/18 09:55	10/01/18 11:13

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Darrell Auvil For Darwin Thomas, Business Development Director



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EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0010 - 10 05 18 1545</b>
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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>20D-NCOMP(2) (A8J0010-01)</b>				<b>Matrix: Soil</b>		<b>Batch: 8100487</b>		
Dieldrin	ND	---	1.09	ug/kg dry	1	10/03/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 65 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/03/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>70 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/03/18</i>	<i>EPA 8081B</i>

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Darrell Auvil For Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0010 - 10 05 18 1545</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>20D-NCOMP(2) (A8J0010-01)</b>				<b>Matrix: Soil</b>		<b>Batch: 8100507</b>		
% Solids	84.6	---	1.00	% by Weight	1	10/03/18	EPA 8000C	

Apex Laboratories

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0010 - 10 05 18 1545</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8100487 - EPA 3546</b>						<b>Soil</b>						
<b>Blank (8100487-BLK1)</b>			Prepared: 10/01/18 17:06 Analyzed: 10/03/18 11:31									
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 74 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>84 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>LCS (8100487-BS1)</b>			Prepared: 10/01/18 17:06 Analyzed: 10/03/18 11:48									
<u>EPA 8081B</u>												
Dieldrin	45.2	---	1.00	ug/kg wet	1	50.0	---	90	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 75 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>82 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Duplicate (8100487-DUP1)</b>			Prepared: 10/01/18 17:06 Analyzed: 10/03/18 12:23									
<u>QC Source Sample: 20D-NCOMP(2) (A8J0010-01)</u>												
<u>EPA 8081B</u>												
Dieldrin	ND	---	1.10	ug/kg dry	1	---	0.734	---	---	***	30%	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 67 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>70 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Matrix Spike (8100487-MS1)</b>			Prepared: 10/01/18 17:06 Analyzed: 10/03/18 12:41									
<u>QC Source Sample: 20D-NCOMP(2) (A8J0010-01)</u>												
<u>EPA 8081B</u>												
Dieldrin	39.4	---	1.10	ug/kg dry	1	54.8	0.734	71	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 67 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>68 %</i>		<i>65-151 %</i>		<i>"</i>						



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0010 - 10 05 18 1545</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8100507 - Total Solids (Dry Weight)</b>							<b>Soil</b>					
<b>Duplicate (8100507-DUP1)</b>			Prepared: 10/02/18 09:41 Analyzed: 10/03/18 09:24									
<u>QC Source Sample: Non-SDG (A8J0001-01)</u>												
% Solids	75.7	---	1.00	% by Weight	1	---	75.7	---	---	0.08	10%	
<b>Duplicate (8100507-DUP2)</b>			Prepared: 10/02/18 09:41 Analyzed: 10/03/18 09:24									
<u>QC Source Sample: Non-SDG (A8J0019-15)</u>												
% Solids	75.4	---	1.00	% by Weight	1	---	75.8	---	---	0.6	10%	
<b>Duplicate (8100507-DUP3)</b>			Prepared: 10/02/18 09:41 Analyzed: 10/03/18 09:24									
<u>QC Source Sample: Non-SDG (A8J0019-30)</u>												
% Solids	92.7	---	1.00	% by Weight	1	---	92.6	---	---	0.1	10%	
<b>Duplicate (8100507-DUP4)</b>			Prepared: 10/02/18 09:41 Analyzed: 10/03/18 09:24									
<u>QC Source Sample: Non-SDG (A8J0020-03)</u>												
% Solids	61.8	---	1.00	% by Weight	1	---	64.4	---	---	4	10%	
<b>Duplicate (8100507-DUP5)</b>			Prepared: 10/02/18 09:41 Analyzed: 10/03/18 09:24									
<u>QC Source Sample: Non-SDG (A8J0020-13)</u>												
% Solids	62.8	---	1.00	% by Weight	1	---	62.4	---	---	0.7	10%	
<b>Duplicate (8100507-DUP6)</b>			Prepared: 10/02/18 19:56 Analyzed: 10/03/18 09:24									
<u>QC Source Sample: Non-SDG (A8J0058-02)</u>												
% Solids	90.9	---	1.00	% by Weight	1	---	90.8	---	---	0.1	10%	
<b>Duplicate (8100507-DUP7)</b>			Prepared: 10/02/18 19:56 Analyzed: 10/03/18 09:24									
<u>QC Source Sample: Non-SDG (A8J0059-15)</u>												
% Solids	70.0	---	1.00	% by Weight	1	---	69.6	---	---	0.6	10%	

No Client related Batch OC samples analyzed for this batch. See notes page for more information.

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Darrell Auvil For Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0010 - 10 05 18 1545</b>
---	--	---

**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
Batch: 8100487							
A8J0010-01	Soil	EPA 8081B	10/01/18 09:55	10/01/18 17:06	10.81g/5mL	10g/5mL	0.93

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
Batch: 8100507							
A8J0010-01	Soil	EPA 8000C	10/01/18 09:55	10/02/18 09:41			NA

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503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

Report ID:  
**A8J0010 - 10 05 18 1545**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**There are No Qualifiers on Sample or QC Data for this report**

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**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8J0010 - 10 05 18 1545**

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

Basis: Results for soil samples are generally reported on a 100% dry weight basis.

The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.

"dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.

"wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).

-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.

-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.

For further details, please request a copy of this document.



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0010 - 10 05 18 1545</b>
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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.



**Apex Laboratories, LLC**

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0010 - 10 05 18 1545</b>
---	--	---

**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Darrell Auvil For Darwin Thomas, Business Development Director



Anderson Geological Project: **Northstar**  
 PO Box 649 Project Number: **1503.20**  
 Wilsonville, OR 97070 Project Manager: **Erik Anderson** Report ID: **A8J0010 - 10 05 18 1545**

COC 1 of 1

**CHAIN OF CUSTODY** Lab # **A8J0010** POF Project # **1503.20**

Company: **Anderson Geological** Project Mgr: **Erik Anderson** Project Name: **Northstar**

Address: **12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333**

Sampled by: **E. Anderson** Email: \_\_\_\_\_

Site Location: **(08) WA**

Other: \_\_\_\_\_

SAMPLE ID: **200-NCOMP/2**

LAB ID # \_\_\_\_\_

DATE: **White Pass 5/1**

TIME: \_\_\_\_\_

MATRIX: \_\_\_\_\_

# OF CONTAINERS: \_\_\_\_\_

NWTPH-CID \_\_\_\_\_

NWTPH-DX \_\_\_\_\_

NWTPH-CX \_\_\_\_\_

8160 VOCs Full List \_\_\_\_\_

8160 RBDM VOCs \_\_\_\_\_

8160 HVOCs \_\_\_\_\_

8160 BTEX VOCs \_\_\_\_\_

8170 SVOC \_\_\_\_\_

8170 SIM PAHs \_\_\_\_\_

8081 PCBs \_\_\_\_\_

600 TTO \_\_\_\_\_

RCCA Metals (8) \_\_\_\_\_

TCLP Metals (8) \_\_\_\_\_

AL, SR, AN, BA, BE, CA, CR, CU, CN, CO, FE, NI, PB, Hg, ME, Mn, Mo, Ni, NO, Zn, Se, Ag, As, TL, V, Zn

TOTAL DISS TCLP \_\_\_\_\_

1200-COLS \_\_\_\_\_

1200-Z \_\_\_\_\_

SPECIAL INSTRUCTIONS: \_\_\_\_\_

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): **1 Day** 2 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: **E.A.** Date: **05/11/18** Signature: **[Signature]** Date: **05/11/18**

RECEIVED BY: \_\_\_\_\_ Date: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name: **Erik Anderson** Time: **11:13** Printed Name: **[Signature]** Time: \_\_\_\_\_

Company: **AG** Company: **Apex**

Apex Laboratories

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8J0010 - 10 05 18 1545</b>
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**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geo<sup>SCIENTIST</sup> Geological Element WO#: A8 J00180  
 Project/Project #: Northstar / #1503.20 doc # 10/11/18

**Delivery info:**  
 Date/Time Received: 10/01/18 @ 113 By: [Signature]  
 Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: [Signature] : 10/01/18 @ 113  
 Chain of Custody Included? Yes  No  Custody Seals? Yes  No   
 Signed/Dated by Client? Yes  No   
 Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>0.8</u>						
Received on Ice? (Y/N)	<u>Y</u>						
Temp. Blanks? (Y/N)	<u>N</u>						
Ice Type: (Gel/Real/Other)	<u>Gel</u>						
Condition:	<u>good</u>						

Cooler out of temp? (Y/N) Possible reason why: [Signature]  
 If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA NA

**Samples Inspection:** Inspected by: [Signature] : 10/01/18 @ 114

All Samples Intact? Yes  No  Comments: \_\_\_\_\_  
 Bottle Labels/COCs agree? Yes  No  Comments: \_\_\_\_\_  
 Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_  
 Do VOA Vials have Visible Headspace? Yes  No  NA   
 Comments: \_\_\_\_\_  
 Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA   
 Comments: \_\_\_\_\_

**Additional Information:** \_\_\_\_\_  
 \_\_\_\_\_

Labeled by: [Signature] Witness: [Signature] Cooler Inspected by: Client unloaded See Project Contact Form: Y

*[Handwritten Signature]*



Friday, October 12, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8I0755 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8I0755, which was received by the laboratory on 9/27/2018 at 3:15:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

---

Cooler Receipt Info

(See Cooler Receipt Form for Details)

Default Cooler      6.0 degC

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

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---

Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810755 - 10 12 18 0501**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
2A-SA(2)	A810755-01	Soil	09/19/18 10:44	09/27/18 15:15
2A-SB(2)	A810755-02	Soil	09/19/18 10:46	09/27/18 15:15
2A-SC(2)	A810755-03	Soil	09/19/18 10:48	09/27/18 15:15
2A-SD(2)	A810755-04	Soil	09/19/18 10:50	09/27/18 15:15
2B-SA(2)	A810755-05	Soil	09/19/18 11:06	09/27/18 15:15
2B-SB(2)	A810755-06	Soil	09/19/18 11:08	09/27/18 15:15
2B-SC(2)	A810755-07	Soil	09/19/18 11:10	09/27/18 15:15
2B-SD(2)	A810755-08	Soil	09/19/18 11:12	09/27/18 15:15
2D-NA(2)	A810755-09	Soil	09/19/18 12:02	09/27/18 15:15
2D-NB(2)	A810755-10	Soil	09/19/18 12:04	09/27/18 15:15
2D-NC(2)	A810755-11	Soil	09/19/18 12:06	09/27/18 15:15
2D-ND(2)	A810755-12	Soil	09/19/18 12:08	09/27/18 15:15

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810755 - 10 12 18 0501</b>
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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>2A-SA(2) (A810755-01)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091261</b>		
Dieldrin	0.00341	---	0.00110	mg/kg dry	1	10/02/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 66 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>71 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<b>2A-SB(2) (A810755-02)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091261</b>		
Dieldrin	ND	---	0.00100	mg/kg dry	1	10/02/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 71 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>72 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<b>2A-SC(2) (A810755-03)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091261</b>		
Dieldrin	ND	---	0.00115	mg/kg dry	1	10/02/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 73 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>74 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<b>2A-SD(2) (A810755-04)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091261</b>		
Dieldrin	0.0782	---	0.00106	mg/kg dry	1	10/02/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 77 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>87 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<b>2B-SA(2) (A810755-05)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091261</b>		
Dieldrin	ND	---	0.00115	mg/kg dry	1	10/02/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 75 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>85 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<b>2B-SB(2) (A810755-06)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091261</b>		
Dieldrin	0.0340	---	0.00107	mg/kg dry	1	10/02/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 83 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>92 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<b>2B-SC(2) (A810755-07)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091261</b>		
Dieldrin	0.0107	---	0.00107	mg/kg dry	1	10/02/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 79 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>80 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<b>2B-SD(2) (A810755-08)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091261</b>		

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810755 - 10 12 18 0501</b>
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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>2B-SD(2) (A810755-08)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091261</b>		
Dieldrin	ND	---	0.00108	mg/kg dry	1	10/02/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 75 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>77 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<b>2D-NA(2) (A810755-09)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091261</b>		
Dieldrin	<b>0.0453</b>	---	0.00104	mg/kg dry	1	10/02/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 71 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>70 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<b>2D-NB(2) (A810755-10)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091261</b>		
Dieldrin	<b>0.0131</b>	---	0.00108	mg/kg dry	1	10/02/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 78 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>80 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<b>2D-NC(2) (A810755-11RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091261</b>		
Dieldrin	<b>0.130</b>	---	0.00576	mg/kg dry	5	10/02/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 78 %</i>		<i>Limits: 42-129 %</i>		<i>5</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>81 %</i>		<i>65-151 %</i>		<i>5</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<b>2D-ND(2) (A810755-12)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091261</b>		
Dieldrin	ND	---	0.00105	mg/kg dry	1	10/02/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 80 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>80 %</i>		<i>65-151 %</i>		<i>1</i>	<i>10/02/18</i>	<i>EPA 8081B</i>

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**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810755 - 10 12 18 0501**

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>2A-SA(2) (A810755-01)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091262</b>	
% Solids	85.8	---	1.00	% by Weight	1	10/01/18	EPA 8000C	
<b>2A-SB(2) (A810755-02)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091262</b>	
% Solids	91.0	---	1.00	% by Weight	1	10/01/18	EPA 8000C	
<b>2A-SC(2) (A810755-03)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091262</b>	
% Solids	84.6	---	1.00	% by Weight	1	10/01/18	EPA 8000C	
<b>2A-SD(2) (A810755-04)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091262</b>	
% Solids	89.0	---	1.00	% by Weight	1	10/01/18	EPA 8000C	
<b>2B-SA(2) (A810755-05)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091262</b>	
% Solids	84.4	---	1.00	% by Weight	1	10/01/18	EPA 8000C	
<b>2B-SB(2) (A810755-06)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091262</b>	
% Solids	88.0	---	1.00	% by Weight	1	10/01/18	EPA 8000C	
<b>2B-SC(2) (A810755-07)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091262</b>	
% Solids	86.9	---	1.00	% by Weight	1	10/01/18	EPA 8000C	
<b>2B-SD(2) (A810755-08)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091262</b>	
% Solids	86.7	---	1.00	% by Weight	1	10/01/18	EPA 8000C	
<b>2D-NA(2) (A810755-09)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091262</b>	
% Solids	90.3	---	1.00	% by Weight	1	10/01/18	EPA 8000C	
<b>2D-NB(2) (A810755-10)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091262</b>	
% Solids	86.6	---	1.00	% by Weight	1	10/01/18	EPA 8000C	
<b>2D-NC(2) (A810755-11)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091262</b>	
% Solids	83.4	---	1.00	% by Weight	1	10/01/18	EPA 8000C	
<b>2D-ND(2) (A810755-12)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091262</b>	
% Solids	91.3	---	1.00	% by Weight	1	10/01/18	EPA 8000C	

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Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810755 - 10 12 18 0501**

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8091261 - EPA 3546</b>						<b>Soil</b>						
<b>Blank (8091261-BLK1)</b>			Prepared: 09/28/18 10:00 Analyzed: 10/02/18 10:50									
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.000909	mg/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 71 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>84 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>LCS (8091261-BS1)</b>						Prepared: 09/28/18 10:00 Analyzed: 10/02/18 11:07						
<u>EPA 8081B</u>												
Dieldrin	0.0488	---	0.00100	mg/kg wet	1	0.0500	---	98	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 81 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>86 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Matrix Spike (8091261-MS1)</b>						Prepared: 09/28/18 10:00 Analyzed: 10/02/18 14:59						
<u>QC Source Sample: 2D-ND(2) (A810755-12)</u>												
<u>EPA 8081B</u>												
Dieldrin	0.0419	---	0.00104	mg/kg dry	1	0.0522	ND	80	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 74 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>78 %</i>		<i>65-151 %</i>		<i>"</i>						

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810755 - 10 12 18 0501</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8091262 - Total Solids (Dry Weight)</b>							<b>Soil</b>					
<b>Duplicate (8091262-DUP1)</b>			Prepared: 09/28/18 10:14 Analyzed: 10/01/18 08:20									
<u>QC Source Sample: Non-SDG (A810406-01)</u>												
% Solids	89.9	---	1.00	% by Weight	1	---	90.1	---	---	0.2	10%	
<b>Duplicate (8091262-DUP2)</b>			Prepared: 09/28/18 10:14 Analyzed: 10/01/18 08:20									
<u>QC Source Sample: Non-SDG (A810711-01)</u>												
% Solids	22.5	---	1.00	% by Weight	1	---	20.4	---	---	10	10%	
<b>Duplicate (8091262-DUP3)</b>			Prepared: 09/28/18 10:14 Analyzed: 10/01/18 08:20									
<u>QC Source Sample: 2B-SA(2) (A810755-05)</u>												
<u>EPA 8000C</u>												
% Solids	83.8	---	1.00	% by Weight	1	---	84.4	---	---	0.7	10%	
<b>Duplicate (8091262-DUP4)</b>			Prepared: 09/28/18 10:14 Analyzed: 10/01/18 08:20									
<u>QC Source Sample: Non-SDG (A810756-10)</u>												
% Solids	86.0	---	1.00	% by Weight	1	---	87.1	---	---	1	10%	
<b>Duplicate (8091262-DUP5)</b>			Prepared: 09/28/18 10:14 Analyzed: 10/01/18 08:20									
<u>QC Source Sample: Non-SDG (A810785-05)</u>												
% Solids	80.8	---	1.00	% by Weight	1	---	80.8	---	---	0.07	10%	
<b>Duplicate (8091262-DUP6)</b>			Prepared: 09/28/18 19:25 Analyzed: 10/01/18 08:20									
<u>QC Source Sample: Non-SDG (A810824-02)</u>												
% Solids	92.6	---	1.00	% by Weight	1	---	93.0	---	---	0.4	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810755 - 10 12 18 0501</b>
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**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8091261</u>							
A8I0755-01	Soil	EPA 8081B	09/19/18 10:44	09/28/18 10:00	10.57g/5mL	10g/5mL	0.95
A8I0755-02	Soil	EPA 8081B	09/19/18 10:46	09/28/18 10:00	10.94g/5mL	10g/5mL	0.91
A8I0755-03	Soil	EPA 8081B	09/19/18 10:48	09/28/18 10:00	10.29g/5mL	10g/5mL	0.97
A8I0755-04	Soil	EPA 8081B	09/19/18 10:50	09/28/18 10:00	10.62g/5mL	10g/5mL	0.94
A8I0755-05	Soil	EPA 8081B	09/19/18 11:06	09/28/18 10:00	10.33g/5mL	10g/5mL	0.97
A8I0755-06	Soil	EPA 8081B	09/19/18 11:08	09/28/18 10:00	10.63g/5mL	10g/5mL	0.94
A8I0755-07	Soil	EPA 8081B	09/19/18 11:10	09/28/18 10:00	10.73g/5mL	10g/5mL	0.93
A8I0755-08	Soil	EPA 8081B	09/19/18 11:12	09/28/18 10:00	10.72g/5mL	10g/5mL	0.93
A8I0755-09	Soil	EPA 8081B	09/19/18 12:02	09/28/18 10:00	10.66g/5mL	10g/5mL	0.94
A8I0755-10	Soil	EPA 8081B	09/19/18 12:04	09/28/18 10:00	10.68g/5mL	10g/5mL	0.94
A8I0755-11RE1	Soil	EPA 8081B	09/19/18 12:06	09/28/18 10:00	10.41g/5mL	10g/5mL	0.96
A8I0755-12	Soil	EPA 8081B	09/19/18 12:08	09/28/18 10:00	10.44g/5mL	10g/5mL	0.96

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8091262</u>							
A8I0755-01	Soil	EPA 8000C	09/19/18 10:44	09/28/18 10:14			NA
A8I0755-02	Soil	EPA 8000C	09/19/18 10:46	09/28/18 10:14			NA
A8I0755-03	Soil	EPA 8000C	09/19/18 10:48	09/28/18 10:14			NA
A8I0755-04	Soil	EPA 8000C	09/19/18 10:50	09/28/18 10:14			NA
A8I0755-05	Soil	EPA 8000C	09/19/18 11:06	09/28/18 10:14			NA
A8I0755-06	Soil	EPA 8000C	09/19/18 11:08	09/28/18 10:14			NA
A8I0755-07	Soil	EPA 8000C	09/19/18 11:10	09/28/18 10:14			NA
A8I0755-08	Soil	EPA 8000C	09/19/18 11:12	09/28/18 10:14			NA
A8I0755-09	Soil	EPA 8000C	09/19/18 12:02	09/28/18 10:14			NA
A8I0755-10	Soil	EPA 8000C	09/19/18 12:04	09/28/18 10:14			NA
A8I0755-11	Soil	EPA 8000C	09/19/18 12:06	09/28/18 10:14			NA
A8I0755-12	Soil	EPA 8000C	09/19/18 12:08	09/28/18 10:14			NA

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EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810755 - 10 12 18 0501**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**There are No Qualifiers on Sample or QC Data for this report**

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PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810755 - 10 12 18 0501**

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
- "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

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**Report ID:**  
**A810755 - 10 12 18 0501**

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
**EPA ID: OR01039**

<b><u>Anderson Geological</u></b> PO Box 649 Wilsonville, OR 97070	Project: <b><u>Northstar</u></b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810755 - 10 12 18 0501</b>
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**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Darwin Thomas, Business Development Director



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A810755 - 10 12 18 0501

**CHAIN OF CUSTODY**

Lab # A810755 PO# 1503.20  
COC 1 of 2

Company: Anderson Geological Project Mgr: Erik Anderson Project Name: Northstar Email: \_\_\_\_\_  
Address: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Sampled by: E. Anderson

Site Location: WA  
Other: \_\_\_\_\_

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST	
						YES	NO
2A-SA(2)	9/11/18 10:44			S	1		
2A-SB(4)	10:46						
2A-SC(2)	10:48						
2A-SD(2)	10:50						
2B-SA(2)	11:06						
2B-SB(2)	11:08						
2B-SC(2)	11:10						
2B-SD(2)	11:12						
2D-NA(2)	12:02						
2D-NB(6)	12:04						

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day, 2 Day, 3 Day, 4 DAY, 5 DAY, Other: \_\_\_\_\_

SPECIAL INSTRUCTIONS: \_\_\_\_\_

RELINQUISHED BY: Erik Anderson Date: 9-27-18 Signature: [Signature] Time: 15:15  
Printed Name: Erik Anderson Printed Name: [Signature] Time: 15:15  
Company: AGI Company: \_\_\_\_\_

RECEIVED BY: \_\_\_\_\_ Date: \_\_\_\_\_ Signature: \_\_\_\_\_ Time: \_\_\_\_\_  
Printed Name: \_\_\_\_\_ Printed Name: \_\_\_\_\_ Time: \_\_\_\_\_  
Company: \_\_\_\_\_ Company: \_\_\_\_\_

ANALYSIS REQUEST (Right side of table):  
 1200-Z  
 1200-COLS  
 TOTAL DISS TCEP  
 He, Ag, As, Ba, Be, Bi, Br, Ca, Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Se, Si, Sr, Tl, V, Zn  
 AL, Sb, As, Ba, Be, Bi, Br, Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Se, Si, Sr, Tl, V, Zn  
 TCLP Metals (8)  
 RCRA Metals (8)  
 600 TTO  
 8082 PCBs  
 8270 SIM PAHs  
 8270 SVOC  
 8260 BTEX VOCs  
 8260 HVOCs  
 8260 RBDM VOCs  
 8260 VOCs Full List  
 NWTRH-GX  
 NWTRH-DX  
 NWTRH-HCID

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[Signature]





Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A810755 - 10 12 18 0501

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geo Element WO#: A8 10755

Project/Project #: Northstar / 1503.20

**Delivery info:**

Date/Time Received: 9/27/18 @ 15:15 By: WJ

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: WJ : 9/27/18 @ 15:15

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>6.0</u>						
Received on Ice? (Y/N)	<u>Y</u>						
Temp. Blanks? (Y/N)	<u>N</u>						
Ice Type: (Gel/Real/Other)	<u>Gel</u>						
Condition:	<u>Good</u>						

Cooler out of temp? (Y/N) Possible reason why: (D)  
If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA (A)

**Samples Inspection:** Inspected by: WJ : 9/27/18 @ 16:16

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: No T on Conts

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA   
Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA   
Comments: \_\_\_\_\_

Additional Information: \_\_\_\_\_  
\_\_\_\_\_

Labeled by: WJ Witness: ET Cooler Inspected by: Client See Project Contact Form: Y



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Tuesday, October 2, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A810654 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A810654, which was received by the laboratory on 9/25/2018 at 2:06:00PM.

Cooler Temperatures:  
Default Cooler 1.0 degC

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

A handwritten signature in black ink, appearing to read "Darwin Thomas".

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---

Darwin Thomas, Business Development Director



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

Report ID:  
**A8I0654 - 10 02 18 0647**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
4A-NCOMP(2)	A8I0654-01	Soil	09/25/18 10:51	09/25/18 14:06
4A-SCOMP(2)	A8I0654-02	Soil	09/25/18 10:55	09/25/18 14:06
4D-NCOMP(2)	A8I0654-03	Soil	09/25/18 11:21	09/25/18 14:06
4D-SCOMP(2)	A8I0654-04	Soil	09/25/18 11:24	09/25/18 14:06
19A-NCOMP(2)	A8I0654-05	Soil	09/25/18 11:49	09/25/18 14:06
19A-SCOMP(2)	A8I0654-06	Soil	09/25/18 11:52	09/25/18 14:06
4B-NWCOMP(3)	A8I0654-07	Soil	09/25/18 12:26	09/25/18 14:06

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810654 - 10 02 18 0647</b>
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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>4A-NCOMP(2) (A810654-01)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091116</b>		
<b>Dieldrin</b>	<b>0.00452</b>	---	0.00104	mg/kg dry	1	09/27/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 76 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/27/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>81 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/27/18</i>	<i>EPA 8081B</i>
<b>4A-SCOMP(2) (A810654-02)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091116</b>		
<b>Dieldrin</b>	<b>0.00182</b>	---	0.00108	mg/kg dry	1	09/27/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 70 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/27/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>76 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/27/18</i>	<i>EPA 8081B</i>
<b>4D-NCOMP(2) (A810654-03)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091116</b>		
<b>Dieldrin</b>	<b>0.00880</b>	---	0.00112	mg/kg dry	1	09/27/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 81 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/27/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>87 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/27/18</i>	<i>EPA 8081B</i>
<b>4D-SCOMP(2) (A810654-04)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091116</b>		
<b>Dieldrin</b>	<b>ND</b>	---	0.00105	mg/kg dry	1	09/27/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 66 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/27/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>72 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/27/18</i>	<i>EPA 8081B</i>
<b>19A-NCOMP(2) (A810654-05)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091116</b>		
<b>Dieldrin</b>	<b>ND</b>	---	0.00105	mg/kg dry	1	09/27/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 65 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/27/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>71 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/27/18</i>	<i>EPA 8081B</i>
<b>19A-SCOMP(2) (A810654-06)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091116</b>		
<b>Dieldrin</b>	<b>0.0741</b>	---	0.00111	mg/kg dry	1	09/27/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 74 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/27/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>81 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/27/18</i>	<i>EPA 8081B</i>
<b>4B-NWCOMP(3) (A810654-07)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091116</b>		
<b>Dieldrin</b>	<b>0.00140</b>	---	0.00112	mg/kg dry	1	09/27/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 71 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/27/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>77 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/27/18</i>	<i>EPA 8081B</i>

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810654 - 10 02 18 0647</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>4A-NCOMP(2) (A810654-01)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091185</b>	
% Solids	88.2	---	1.00	% by Weight	1	09/28/18	EPA 8000C	
<b>4A-SCOMP(2) (A810654-02)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091185</b>	
% Solids	85.9	---	1.00	% by Weight	1	09/28/18	EPA 8000C	
<b>4D-NCOMP(2) (A810654-03)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091185</b>	
% Solids	85.0	---	1.00	% by Weight	1	09/28/18	EPA 8000C	
<b>4D-SCOMP(2) (A810654-04)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091185</b>	
% Solids	87.8	---	1.00	% by Weight	1	09/28/18	EPA 8000C	
<b>19A-NCOMP(2) (A810654-05)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091185</b>	
% Solids	88.6	---	1.00	% by Weight	1	09/28/18	EPA 8000C	
<b>19A-SCOMP(2) (A810654-06)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091185</b>	
% Solids	88.8	---	1.00	% by Weight	1	09/28/18	EPA 8000C	
<b>4B-NWCOMP(3) (A810654-07)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091185</b>	
% Solids	87.1	---	1.00	% by Weight	1	09/28/18	EPA 8000C	

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**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810654 - 10 02 18 0647**

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8091116 - EPA 3546</b>												
<b>Soil</b>												
<b>Blank (8091116-BLK1)</b>												
Prepared: 09/25/18 15:41 Analyzed: 09/27/18 12:01												
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.000909	mg/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>												
<i>Recovery: 78 % Limits: 42-129 % Dilution: 1x</i>												
<i>Decachlorobiphenyl (Surr)</i>												
<i>87 % 65-151 % "</i>												
<b>LCS (8091116-BS1)</b>												
Prepared: 09/25/18 15:41 Analyzed: 09/27/18 12:19												
<u>EPA 8081B</u>												
Dieldrin	0.0533	---	0.00100	mg/kg wet	1	0.0500	---	107	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>												
<i>Recovery: 82 % Limits: 42-129 % Dilution: 1x</i>												
<i>Decachlorobiphenyl (Surr)</i>												
<i>94 % 65-151 % "</i>												
<b>Duplicate (8091116-DUP1)</b>												
Prepared: 09/25/18 15:41 Analyzed: 09/27/18 12:54												
<u>QC Source Sample: 4A-NCOMP(2) (A810654-01)</u>												
<u>EPA 8081B</u>												
Dieldrin	0.00354	---	0.00104	mg/kg dry	1	---	0.00452	---	---	24	30%	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>												
<i>Recovery: 69 % Limits: 42-129 % Dilution: 1x</i>												
<i>Decachlorobiphenyl (Surr)</i>												
<i>76 % 65-151 % "</i>												
<b>Matrix Spike (8091116-MS1)</b>												
Prepared: 09/25/18 15:41 Analyzed: 09/27/18 15:30												
<u>QC Source Sample: 4B-NWCOMP(3) (A810654-07)</u>												
<u>EPA 8081B</u>												
Dieldrin	0.0361	---	0.00112	mg/kg dry	1	0.0559	0.00140	62	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>												
<i>Recovery: 71 % Limits: 42-129 % Dilution: 1x</i>												
<i>Decachlorobiphenyl (Surr)</i>												
<i>72 % 65-151 % "</i>												

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810654 - 10 02 18 0647</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8091185 - Total Solids (Dry Weight)</b>							<b>Soil</b>					
<b>Duplicate (8091185-DUP1)</b>			Prepared: 09/27/18 09:10 Analyzed: 09/28/18 08:54									
<u>QC Source Sample: Non-SDG (A810649-01)</u>												
% Solids	55.0	---	1.00	% by Weight	1	---	55.6	---	---	1	10%	
<b>Duplicate (8091185-DUP2)</b>			Prepared: 09/27/18 09:10 Analyzed: 09/28/18 08:54									
<u>QC Source Sample: Non-SDG (A810656-02)</u>												
% Solids	87.6	---	1.00	% by Weight	1	---	86.5	---	---	1	10%	
<b>Duplicate (8091185-DUP3)</b>			Prepared: 09/27/18 09:10 Analyzed: 09/28/18 08:54									
<u>QC Source Sample: Non-SDG (A810662-06)</u>												
% Solids	80.0	---	1.00	% by Weight	1	---	79.9	---	---	0.1	10%	
<b>Duplicate (8091185-DUP4)</b>			Prepared: 09/27/18 09:10 Analyzed: 09/28/18 08:54									
<u>QC Source Sample: Non-SDG (A810690-01)</u>												
% Solids	77.5	---	1.00	% by Weight	1	---	78.0	---	---	0.7	10%	
<b>Duplicate (8091185-DUP5)</b>			Prepared: 09/27/18 09:10 Analyzed: 09/28/18 08:54									
<u>QC Source Sample: Non-SDG (A810726-24)</u>												
% Solids	90.0	---	1.00	% by Weight	1	---	90.4	---	---	0.4	10%	
<b>Duplicate (8091185-DUP6)</b>			Prepared: 09/27/18 20:00 Analyzed: 09/28/18 08:54									
<u>QC Source Sample: Non-SDG (A810772-01)</u>												
% Solids	88.1	---	1.00	% by Weight	1	---	89.4	---	---	2	10%	
<b>Duplicate (8091185-DUP7)</b>			Prepared: 09/27/18 20:00 Analyzed: 09/28/18 08:54									
<u>QC Source Sample: Non-SDG (A810777-01)</u>												
% Solids	80.9	---	1.00	% by Weight	1	---	81.1	---	---	0.2	10%	
<b>Duplicate (8091185-DUP8)</b>			Prepared: 09/27/18 20:00 Analyzed: 09/28/18 08:54									
<u>QC Source Sample: Non-SDG (A810784-02)</u>												
% Solids	70.4	---	1.00	% by Weight	1	---	71.7	---	---	2	10%	

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**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
**EPA ID: OR01039**

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810654 - 10 02 18 0647**

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-----------------	-------	----------	--------------	---------------	-------	--------------	-----	-----------	-------

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810654 - 10 02 18 0647</b>
---	--	---

**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8091116</u>							
A8I0654-01	Soil	EPA 8081B	09/25/18 10:51	09/25/18 15:41	10.94g/5mL	10g/5mL	0.91
A8I0654-02	Soil	EPA 8081B	09/25/18 10:55	09/25/18 15:41	10.74g/5mL	10g/5mL	0.93
A8I0654-03	Soil	EPA 8081B	09/25/18 11:21	09/25/18 15:41	10.55g/5mL	10g/5mL	0.95
A8I0654-04	Soil	EPA 8081B	09/25/18 11:24	09/25/18 15:41	10.82g/5mL	10g/5mL	0.92
A8I0654-05	Soil	EPA 8081B	09/25/18 11:49	09/25/18 15:41	10.74g/5mL	10g/5mL	0.93
A8I0654-06	Soil	EPA 8081B	09/25/18 11:52	09/25/18 15:41	10.19g/5mL	10g/5mL	0.98
A8I0654-07	Soil	EPA 8081B	09/25/18 12:26	09/25/18 15:41	10.25g/5mL	10g/5mL	0.98

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8091185</u>							
A8I0654-01	Soil	EPA 8000C	09/25/18 10:51	09/27/18 09:10			NA
A8I0654-02	Soil	EPA 8000C	09/25/18 10:55	09/27/18 09:10			NA
A8I0654-03	Soil	EPA 8000C	09/25/18 11:21	09/27/18 09:10			NA
A8I0654-04	Soil	EPA 8000C	09/25/18 11:24	09/27/18 09:10			NA
A8I0654-05	Soil	EPA 8000C	09/25/18 11:49	09/27/18 09:10			NA
A8I0654-06	Soil	EPA 8000C	09/25/18 11:52	09/27/18 09:10			NA
A8I0654-07	Soil	EPA 8000C	09/25/18 12:26	09/27/18 09:10			NA

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Project Number: **1503.20**  
Project Manager: **Erik Anderson**

Report ID:  
**A810654 - 10 02 18 0647**

**QUALIFIER DEFINITIONS**

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

There are No Qualifiers on Sample or QC Data for this report

---

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---

Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
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Project Manager: **Erik Anderson**

**Report ID:**  
**A810654 - 10 02 18 0647**

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
- "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

Apex Laboratories

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Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810654 - 10 02 18 0647**

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories

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**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810654 - 10 02 18 0647**

**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Darwin Thomas, Business Development Director



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A810654 - 10 02 18 0647

**CHAIN OF CUSTODY**

Lab # A810654      Project # 1503.20

Company: Anderson Geological      Project Mgr: Erik Anderson      Project Name: Northstar

Address: \_\_\_\_\_      Phone: \_\_\_\_\_      Fax: \_\_\_\_\_      Email: \_\_\_\_\_

Sampled by: E. Anderson

Site Location: OR      WA  
Other: \_\_\_\_\_

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST	
						YES	NO
4A - NCOMP (2)	912518	10-21	10:51	S	1		
4A - SCOMP (2)		"	10:55	S	1		
4D - NCOMP (2)		"	11:21	S	1		
4D - SCOMP (2)		"	11:24	S	1		
19A - NCOMP (2)		"	11:44	S	1		
19A - SCOMP (2)		"	11:52	S	1		
4B - NCOMP (3)		"	12:26	S	1		

TOTAL DSS TCLP: \_\_\_\_\_  
TCRF Metals (8): \_\_\_\_\_  
RCRA Metals (8): \_\_\_\_\_  
600 TTO \_\_\_\_\_  
8082 PCBs \_\_\_\_\_  
8170 SIM PAHs \_\_\_\_\_  
8170 SVOC \_\_\_\_\_  
8160 BTEX VOCs \_\_\_\_\_  
8160 HVOCS \_\_\_\_\_  
8160 RBDN VOCs \_\_\_\_\_  
8160 VOCs Full List \_\_\_\_\_  
NTPH-GX \_\_\_\_\_  
NTPH-DX \_\_\_\_\_  
NTPH-HCID \_\_\_\_\_

1200-COLS \_\_\_\_\_  
1200-Z \_\_\_\_\_

Fg. Pb. Cd. Cr. Ni. Mn. Cu. Fe. Zn. Ag. Hg. As. Se. Tl. P. B. C. A. S. B. Ba. Bi. Br. Ca. Cl. Co. Cs. K. Li. Mg. Mo. Na. Ni. Pb. Pt. Rb. Sb. Sn. Sr. Ta. Te. Th. U. V. W. Y. Zn. Zr.

FACILITY: Delkin

SPECIAL INSTRUCTIONS:

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day      2 Day      3 Day      4 DAY      5 DAY      Other: \_\_\_\_\_

RECEIVED BY: \_\_\_\_\_      RECEIVED BY: \_\_\_\_\_

Signature: Erik Anderson      Date: 9/25/18      Signature: \_\_\_\_\_      Date: \_\_\_\_\_

Printed Name: Erik Anderson      Time: 11:06      Printed Name: \_\_\_\_\_      Time: \_\_\_\_\_

Company: AGI      Company: Apex Labs

Apex Laboratories

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*Darwin Thomas*



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A810654 - 10 02 18 0647

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geological Element WO#: A810654

Project/Project #: Northstar / #1503.20

**Delivery info:**

Date/Time Received: 9/25/18 @ 1400 By: AKC  
Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: AKC : 9/25/18 @ 1400

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>1.0</u>						
Received on Ice? (Y/N)	<u>Y</u>						
Temp. Blanks? (Y/N)	<u>N</u>						
Ice Type: (Gel/Real/Other)	<u>Gel</u>						
Condition:	<u>Good</u>						

Cooler out of temp? (Y/N)  Possible reason why: \_\_\_\_\_  
If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA

**Samples Inspection:** Inspected by: AKC : 9/25/18 @ 1412

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: \_\_\_\_\_

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA   
Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA   
Comments: \_\_\_\_\_

**Additional Information:** \_\_\_\_\_  
\_\_\_\_\_

Labeled by: (Signature) Witness: JS Cooler Inspected by: Client See Project Contact Form: Y

*(Signature)*



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Thursday, September 27, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8I0581 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8I0581, which was received by the laboratory on 9/21/2018 at 8:45:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

A handwritten signature in black ink, appearing to read "Darwin Thomas".

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---

Darwin Thomas, Business Development Director



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503-718-2323  
EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810581 - 09 27 18 1422**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
5B-NCOMP(2)	A810581-01	Soil	09/20/18 13:29	09/21/18 08:45
5B-SCOMP(2)	A810581-02	Soil	09/20/18 13:32	09/21/18 08:45
5C-NCOMP(2)	A810581-03	Soil	09/20/18 13:46	09/21/18 08:45
5C-SCOMP(2)	A810581-04	Soil	09/20/18 13:49	09/21/18 08:45
18B-NCOMP(2)	A810581-05	Soil	09/20/18 14:00	09/21/18 08:45
18B-SCOMP(2)	A810581-06	Soil	09/20/18 14:04	09/21/18 08:45

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810581 - 09 27 18 1422</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>5B-NCOMP(2) (A810581-01)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091039</b>		
<b>Dieldrin</b>	<b>0.00110</b>	---	0.000999	mg/kg dry	1	09/25/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 66 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/25/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>74 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/25/18</i>	<i>EPA 8081B</i>
<b>5B-SCOMP(2) (A810581-02)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091039</b>		
<b>Dieldrin</b>	<b>0.00149</b>	---	0.00108	mg/kg dry	1	09/25/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 79 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/25/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>88 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/25/18</i>	<i>EPA 8081B</i>
<b>5C-NCOMP(2) (A810581-03)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091039</b>		
<b>Dieldrin</b>	<b>0.00119</b>	---	0.00106	mg/kg dry	1	09/25/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 78 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/25/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>86 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/25/18</i>	<i>EPA 8081B</i>
<b>5C-SCOMP(2) (A810581-04)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091039</b>		
<b>Dieldrin</b>	<b>0.00132</b>	---	0.00109	mg/kg dry	1	09/25/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 65 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/25/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>82 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/25/18</i>	<i>EPA 8081B</i>
<b>18B-NCOMP(2) (A810581-05)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091039</b>		
<b>Dieldrin</b>	<b>ND</b>	---	0.00108	mg/kg dry	1	09/25/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 66 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/25/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>79 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/25/18</i>	<i>EPA 8081B</i>
<b>18B-SCOMP(2) (A810581-06)</b>				<b>Matrix: Soil</b>		<b>Batch: 8091039</b>		
<b>Dieldrin</b>	<b>0.00144</b>	---	0.00114	mg/kg dry	1	09/25/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 73 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/25/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>90 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/25/18</i>	<i>EPA 8081B</i>

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810581 - 09 27 18 1422</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

<b>Percent Dry Weight</b>									
Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes	
<b>5B-NCOMP(2) (A810581-01)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091009</b>		
% Solids	86.4	---	1.00	% by Weight	1	09/24/18	EPA 8000C		
<b>5B-SCOMP(2) (A810581-02)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091009</b>		
% Solids	87.0	---	1.00	% by Weight	1	09/24/18	EPA 8000C		
<b>5C-NCOMP(2) (A810581-03)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091009</b>		
% Solids	87.4	---	1.00	% by Weight	1	09/24/18	EPA 8000C		
<b>5C-SCOMP(2) (A810581-04)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091009</b>		
% Solids	87.3	---	1.00	% by Weight	1	09/24/18	EPA 8000C		
<b>18B-NCOMP(2) (A810581-05)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091009</b>		
% Solids	85.8	---	1.00	% by Weight	1	09/24/18	EPA 8000C		
<b>18B-SCOMP(2) (A810581-06)</b>				<b>Matrix: Soil</b>			<b>Batch: 8091009</b>		
% Solids	85.5	---	1.00	% by Weight	1	09/24/18	EPA 8000C		

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810581 - 09 27 18 1422</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8091039 - EPA 3546</b>						<b>Soil</b>						
<b>Blank (8091039-BLK1)</b>			Prepared: 09/21/18 15:40 Analyzed: 09/25/18 12:57									
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 75 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>81 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>LCS (8091039-BS1)</b>			Prepared: 09/21/18 15:40 Analyzed: 09/25/18 13:15									
<u>EPA 8081B</u>												
Dieldrin	0.0454	---	0.00100	mg/kg wet	1	0.0500	---	91	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 83 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>93 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Duplicate (8091039-DUP1)</b>			Prepared: 09/21/18 15:40 Analyzed: 09/25/18 13:50									
<u>QC Source Sample: 5B-NCOMP(2) (A810581-01)</u>												
<u>EPA 8081B</u>												
Dieldrin	0.00126	---	0.000993	mg/kg dry	1	---	0.00110	---	---	14	30%	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 76 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>86 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Matrix Spike (8091039-MS1)</b>			Prepared: 09/21/18 15:40 Analyzed: 09/25/18 15:39									
<u>QC Source Sample: 18B-SCOMP(2) (A810581-06)</u>												
<u>EPA 8081B</u>												
Dieldrin	0.0462	---	0.00113	mg/kg dry	1	0.0567	0.00144	79	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 72 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>84 %</i>		<i>65-151 %</i>		<i>"</i>						

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810581 - 09 27 18 1422</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8091009 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (8091009-DUP1)</b>			Prepared: 09/21/18 09:07 Analyzed: 09/24/18 09:03									
<u>QC Source Sample: Non-SDG (A810495-01)</u>												
% Solids	33.5	---	1.00	% by Weight	1	---	34.0	---	---	1	10%	
<b>Duplicate (8091009-DUP2)</b>			Prepared: 09/21/18 09:07 Analyzed: 09/24/18 09:03									
<u>QC Source Sample: Non-SDG (A810542-04)</u>												
% Solids	73.2	---	1.00	% by Weight	1	---	74.7	---	---	2	10%	
<b>Duplicate (8091009-DUP3)</b>			Prepared: 09/21/18 09:07 Analyzed: 09/24/18 09:03									
<u>QC Source Sample: Non-SDG (A810544-01)</u>												
% Solids	88.8	---	1.00	% by Weight	1	---	87.7	---	---	1	10%	
<b>Duplicate (8091009-DUP4)</b>			Prepared: 09/21/18 09:07 Analyzed: 09/24/18 09:03									
<u>QC Source Sample: Non-SDG (A810548-05)</u>												
% Solids	77.9	---	1.00	% by Weight	1	---	78.3	---	---	0.5	10%	
<b>Duplicate (8091009-DUP5)</b>			Prepared: 09/21/18 09:07 Analyzed: 09/24/18 09:03									
<u>QC Source Sample: Non-SDG (A810567-19)</u>												
% Solids	77.3	---	1.00	% by Weight	1	---	77.2	---	---	0.1	10%	
<b>Duplicate (8091009-DUP6)</b>			Prepared: 09/21/18 13:44 Analyzed: 09/24/18 09:03									
<u>QC Source Sample: Non-SDG (A810570-01)</u>												
% Solids	95.9	---	1.00	% by Weight	1	---	95.4	---	---	0.5	10%	
<b>Duplicate (8091009-DUP7)</b>			Prepared: 09/21/18 13:44 Analyzed: 09/24/18 09:03									
<u>QC Source Sample: 5B-NCOMP(2) (A810581-01)</u>												
<u>EPA 8000C</u>												
% Solids	86.3	---	1.00	% by Weight	1	---	86.4	---	---	0.1	10%	
<b>Duplicate (8091009-DUP8)</b>			Prepared: 09/21/18 18:45 Analyzed: 09/24/18 09:03									
<u>QC Source Sample: Non-SDG (A810592-02)</u>												
% Solids	83.5	---	1.00	% by Weight	1	---	83.4	---	---	0.2	10%	

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**Apex Laboratories, LLC**

12232 S.W. Garden Place  
 Tigard, OR 97223  
 503-718-2323  
EPA ID: OR01039

<b>Anderson Geological</b>	Project: <b>Northstar</b>	
PO Box 649	Project Number: <b>1503.20</b>	<b>Report ID:</b>
Wilsonville, OR 97070	Project Manager: <b>Erik Anderson</b>	<b>A810581 - 09 27 18 1422</b>

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8091009 - Total Solids (Dry Weight)</b>							<b>Soil</b>					
<b>Duplicate (8091009-DUP9)</b>			Prepared: 09/21/18 18:45 Analyzed: 09/24/18 09:03									
<b>QC Source Sample: Non-SDG (A810614-05)</b>												
% Solids	85.6	---	1.00	% by Weight	1	---	85.8	---	---	0.2	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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Darwin Thomas, Business Development Director



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810581 - 09 27 18 1422**

**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8091039</u>							
A8I0581-01	Soil	EPA 8081B	09/20/18 13:29	09/21/18 15:40	11.59g/5mL	10g/5mL	0.86
A8I0581-02	Soil	EPA 8081B	09/20/18 13:32	09/21/18 15:40	10.63g/5mL	10g/5mL	0.94
A8I0581-03	Soil	EPA 8081B	09/20/18 13:46	09/21/18 15:40	10.77g/5mL	10g/5mL	0.93
A8I0581-04	Soil	EPA 8081B	09/20/18 13:49	09/21/18 15:40	10.46g/5mL	10g/5mL	0.96
A8I0581-05	Soil	EPA 8081B	09/20/18 14:00	09/21/18 15:40	10.74g/5mL	10g/5mL	0.93
A8I0581-06	Soil	EPA 8081B	09/20/18 14:04	09/21/18 15:40	10.25g/5mL	10g/5mL	0.98

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8091009</u>							
A8I0581-01	Soil	EPA 8000C	09/20/18 13:29	09/21/18 13:44			NA
A8I0581-02	Soil	EPA 8000C	09/20/18 13:32	09/21/18 13:44			NA
A8I0581-03	Soil	EPA 8000C	09/20/18 13:46	09/21/18 13:44			NA
A8I0581-04	Soil	EPA 8000C	09/20/18 13:49	09/21/18 13:44			NA
A8I0581-05	Soil	EPA 8000C	09/20/18 14:00	09/21/18 13:44			NA
A8I0581-06	Soil	EPA 8000C	09/20/18 14:04	09/21/18 13:44			NA

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

Report ID:  
**A810581 - 09 27 18 1422**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**There are No Qualifiers on Sample or QC Data for this report**

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Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810581 - 09 27 18 1422**

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

DET Analyte DETECTED at or above the detection or reporting limit.  
ND Analyte NOT DETECTED at or above the detection or reporting limit.  
NR Result Not Reported  
RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

Basis: Results for soil samples are generally reported on a 100% dry weight basis.

The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.

"dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.

"wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).

-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.

-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.

For further details, please request a copy of this document.

Apex Laboratories

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PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810581 - 09 27 18 1422**

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories

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Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
**EPA ID: OR01039**

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810581 - 09 27 18 1422</b>
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**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Darwin Thomas, Business Development Director



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A810581 - 09 27 18 1422

**CHAIN OF CUSTODY**

Lab # A810581      PO# 1503.20

Project Name: Northstar      Project # 1503.20

Project Mgr: Erik Anderson      Project # 1503.20

Company: Anderson Geological      Project Mgr: Erik Anderson

Address: Anderson Geological      Project Mgr: Erik Anderson

Sampled by: E Anderson

Site Location: OR WA  
Other: \_\_\_\_\_

LAB ID #	DATE	TIME	# OF CONTAINERS	ANALYSIS REQUEST	
				YES	NO
5B-NCOMP(2)	9/20/18	13:29	5	1	
5B-SCOMP(2)	"	13:32	5	1	
5C-NCOMP(2)	"	13:46	5	1	
5C-SCOMP(2)	"	13:44	5	1	
10B-NCOMP(2)	"	14:00	5	1	
10B-SCOMP(2)	"	14:04	5	1	

TOTAL DISS TCFP  
86. Ag, Na, TL, V, Zn  
Hg, Me, Mn, Ni, Pb, Cu  
Cd, Cr, Co, Fe, Ni, K, N  
TCFP Metals (8)  
RCRA Metals (8)  
609 TTO  
8082 PCBs  
8270 SIM PAHS  
8270 SVOC  
8260 BTEX VOCs  
8260 HWCS  
8260 RBDN VOCs  
8260 VOCs Full List  
NWTPH-Gx  
NWTPH-Dx  
NWTPH-ICID

AL, Sb, As, Ba, Be, Bi, Br, Ca, Cd, Cr, Co, Cu, Fe, Ni, K, N, Hg, Me, Mn, Ni, Pb, Cu, Zn, Ag, Na, TL, V, Zn

1200-Z  
1200-COLS

Dielein

SPECIAL INSTRUCTIONS:

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

SAMPLES ARE HELD FOR 30 DAYS

RECEIVED BY: Erik Anderson Date: 9-21-18 Signature: [Signature] Date: 9-21-18  
Printed Name: Erik Anderson Time: 09:45 Printed Name: [Signature] Time: 09:45

Company: Apex Labs

Apex Laboratories

*Darwin Thomas*

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A810581 - 09 27 18 1422

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geological Element WO#: A810581

Project/Project #: Northstar / 1503.20

**Delivery info:**

Date/Time Received: 9-21-18 @ 0845 By: DPardue

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: DPardue : 9/21/18 @ 1009

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	3.9						
Received on Ice? (Y/N)	Y						
Temp. Blanks? (Y/N)	Y						
Ice Type: (Gel/Real/Other)	gel						
Condition:	good						

Cooler out of temp? (Y/N) Possible reason why:  No  Yes  
If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA

**Samples Inspection:** Inspected by:  : 9/21/18 @ 1030

All Samples Intact? Yes  No  Comments:

Bottle Labels/COCs agree? Yes  No  Comments:

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments:

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments:

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments:

**Additional Information:**

Labeled by: Witness: Cooler Inspected by: See Project Contact Form: Y



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Wednesday, September 26, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A810508 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A810508, which was received by the laboratory on 9/19/2018 at 1:25:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810508 - 09 26 18 1359</b>
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**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
25B-NCOMP(2)	A8I0508-01	Soil	09/18/18 13:44	09/19/18 13:25
25B-SCOMP(2)	A8I0508-02	Soil	09/18/18 13:49	09/19/18 13:25
2A-NCOMP(2)	A8I0508-03	Soil	09/19/18 10:39	09/19/18 13:25
2A-SCOMP(2)	A8I0508-04	Soil	09/19/18 10:43	09/19/18 13:25
2B-NCOMP(2)	A8I0508-05	Soil	09/19/18 11:00	09/19/18 13:25
2B-SCOMP(2)	A8I0508-06	Soil	09/19/18 11:04	09/19/18 13:25
2C-NCOMP(2)	A8I0508-07	Soil	09/19/18 11:40	09/19/18 13:25
2C-SCOMP(2)	A8I0508-08	Soil	09/19/18 11:43	09/19/18 13:25
2D-NCOMP(2)	A8I0508-09	Soil	09/19/18 11:57	09/19/18 13:25
2D-SCOMP(2)	A8I0508-10	Soil	09/19/18 12:00	09/19/18 13:25
3C-NCOMP(2)	A8I0508-11	Soil	09/19/18 12:13	09/19/18 13:25

Apex Laboratories

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810508 - 09 26 18 1359</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>25B-NCOMP(2) (A810508-01)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090938</b>		
Dieldrin	ND	---	0.00118	mg/kg dry	1	09/21/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 69 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/21/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>81 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/21/18</i>	<i>EPA 8081B</i>
<b>25B-SCOMP(2) (A810508-02)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090938</b>		
Dieldrin	ND	---	0.00112	mg/kg dry	1	09/21/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 75 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/21/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>87 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/21/18</i>	<i>EPA 8081B</i>
<b>2A-NCOMP(2) (A810508-03)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090938</b>		
Dieldrin	<b>0.0486</b>	---	0.00103	mg/kg dry	1	09/21/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 72 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/21/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>82 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/21/18</i>	<i>EPA 8081B</i>
<b>2A-SCOMP(2) (A810508-04)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090938</b>		
Dieldrin	<b>0.0164</b>	---	0.00113	mg/kg dry	1	09/21/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 69 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/21/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>89 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/21/18</i>	<i>EPA 8081B</i>
<b>2B-NCOMP(2) (A810508-05)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090938</b>		
Dieldrin	<b>0.0614</b>	---	0.00103	mg/kg dry	1	09/21/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 76 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/21/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>92 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/21/18</i>	<i>EPA 8081B</i>
<b>2B-SCOMP(2) (A810508-06)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090938</b>		
Dieldrin	<b>0.0113</b>	---	0.00113	mg/kg dry	1	09/21/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 81 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/21/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>93 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/21/18</i>	<i>EPA 8081B</i>
<b>2C-NCOMP(2) (A810508-07RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090938</b>		
Dieldrin	ND	---	0.00101	mg/kg dry	1	09/24/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 84 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/24/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>89 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/24/18</i>	<i>EPA 8081B</i>
<b>2C-SCOMP(2) (A810508-08)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090938</b>		

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810508 - 09 26 18 1359</b>
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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>2C-SCOMP(2) (A810508-08)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090938</b>		
Dieldrin	ND	---	0.00110	mg/kg dry	1	09/21/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 87 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/21/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>107 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/21/18</i>	<i>EPA 8081B</i>
<b>2D-NCOMP(2) (A810508-09RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090938</b>		
Dieldrin	<b>0.0145</b>	---	0.00104	mg/kg dry	1	09/24/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 73 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/24/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>81 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/24/18</i>	<i>EPA 8081B</i>
<b>2D-SCOMP(2) (A810508-10RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090938</b>		
Dieldrin	<b>0.00138</b>	---	0.000995	mg/kg dry	1	09/24/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 82 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/24/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>91 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/24/18</i>	<i>EPA 8081B</i>
<b>3C-NCOMP(2) (A810508-11RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090938</b>		
Dieldrin	ND	---	0.000966	mg/kg dry	1	09/24/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 78 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/24/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>84 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/24/18</i>	<i>EPA 8081B</i>

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**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>25B-NCOMP(2) (A810508-01)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090944</b>	
% Solids	82.0	---	1.00	% by Weight	1	09/21/18	EPA 8000C	
<b>25B-SCOMP(2) (A810508-02)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090944</b>	
% Solids	83.2	---	1.00	% by Weight	1	09/21/18	EPA 8000C	
<b>2A-NCOMP(2) (A810508-03)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090944</b>	
% Solids	88.7	---	1.00	% by Weight	1	09/21/18	EPA 8000C	
<b>2A-SCOMP(2) (A810508-04)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090944</b>	
% Solids	87.5	---	1.00	% by Weight	1	09/21/18	EPA 8000C	
<b>2B-NCOMP(2) (A810508-05)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090944</b>	
% Solids	88.4	---	1.00	% by Weight	1	09/21/18	EPA 8000C	
<b>2B-SCOMP(2) (A810508-06)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090944</b>	
% Solids	86.2	---	1.00	% by Weight	1	09/21/18	EPA 8000C	
<b>2C-NCOMP(2) (A810508-07)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090944</b>	
% Solids	85.5	---	1.00	% by Weight	1	09/21/18	EPA 8000C	
<b>2C-SCOMP(2) (A810508-08)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090944</b>	
% Solids	86.0	---	1.00	% by Weight	1	09/21/18	EPA 8000C	
<b>2D-NCOMP(2) (A810508-09)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090944</b>	
% Solids	87.8	---	1.00	% by Weight	1	09/21/18	EPA 8000C	
<b>2D-SCOMP(2) (A810508-10)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090944</b>	
% Solids	86.2	---	1.00	% by Weight	1	09/21/18	EPA 8000C	
<b>3C-NCOMP(2) (A810508-11)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090944</b>	
% Solids	86.6	---	1.00	% by Weight	1	09/21/18	EPA 8000C	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8090938 - EPA 3546</b>												
<b>Soil</b>												
<b>Blank (8090938-BLK1)</b> Prepared: 09/20/18 06:41 Analyzed: 09/21/18 16:34												
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.000909	mg/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 76 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>91 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>LCS (8090938-BS1)</b> Prepared: 09/20/18 06:41 Analyzed: 09/21/18 16:52												
<u>EPA 8081B</u>												
Dieldrin	0.0473	---	0.00100	mg/kg wet	1	0.0500	---	95	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 75 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>88 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Duplicate (8090938-DUP1)</b> Prepared: 09/20/18 06:41 Analyzed: 09/21/18 17:27												
<u>QC Source Sample: 25B-NCOMP(2) (A810508-01)</u>												
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.00118	mg/kg dry	1	---	ND	---	---	---	30%	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 79 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>91 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Matrix Spike (8090938-MS2)</b> Prepared: 09/20/18 06:41 Analyzed: 09/24/18 17:20												
<u>QC Source Sample: 3C-NCOMP(2) (A810508-11RE1)</u>												
<u>EPA 8081B</u>												
Dieldrin	0.0445	---	0.000969	mg/kg dry	1	0.0485	0.000664	90	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 85 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>94 %</i>		<i>65-151 %</i>		<i>"</i>						

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8090944 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (8090944-DUP1)</b>			Prepared: 09/20/18 09:03 Analyzed: 09/21/18 08:13									
<u>QC Source Sample: Non-SDG (A810410-01)</u>												
% Solids	90.7	---	1.00	% by Weight	1	---	90.8	---	---	0.1	10%	
<b>Duplicate (8090944-DUP2)</b>			Prepared: 09/20/18 09:03 Analyzed: 09/21/18 08:13									
<u>QC Source Sample: Non-SDG (A810514-02)</u>												
% Solids	78.1	---	1.00	% by Weight	1	---	78.8	---	---	0.9	10%	
<b>Duplicate (8090944-DUP3)</b>			Prepared: 09/20/18 18:49 Analyzed: 09/21/18 08:13									
<u>QC Source Sample: Non-SDG (A810557-01)</u>												
% Solids	86.8	---	1.00	% by Weight	1	---	86.7	---	---	0.1	10%	
<b>Duplicate (8090944-DUP4)</b>			Prepared: 09/20/18 18:49 Analyzed: 09/21/18 08:13									
<u>QC Source Sample: Non-SDG (A810563-02)</u>												
% Solids	78.8	---	1.00	% by Weight	1	---	79.0	---	---	0.2	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810508 - 09 26 18 1359**

**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8090938							
A8I0508-01	Soil	EPA 8081B	09/18/18 13:44	09/20/18 06:41	10.37g/5mL	10g/5mL	0.96
A8I0508-02	Soil	EPA 8081B	09/18/18 13:49	09/20/18 06:41	10.74g/5mL	10g/5mL	0.93
A8I0508-03	Soil	EPA 8081B	09/19/18 10:39	09/20/18 06:41	10.97g/5mL	10g/5mL	0.91
A8I0508-04	Soil	EPA 8081B	09/19/18 10:43	09/20/18 06:41	10.12g/5mL	10g/5mL	0.99
A8I0508-05	Soil	EPA 8081B	09/19/18 11:00	09/20/18 06:41	10.94g/5mL	10g/5mL	0.91
A8I0508-06	Soil	EPA 8081B	09/19/18 11:04	09/20/18 06:41	10.27g/5mL	10g/5mL	0.97
A8I0508-07RE1	Soil	EPA 8081B	09/19/18 11:40	09/20/18 06:41	11.62g/5mL	10g/5mL	0.86
A8I0508-08	Soil	EPA 8081B	09/19/18 11:43	09/20/18 06:41	10.55g/5mL	10g/5mL	0.95
A8I0508-09RE1	Soil	EPA 8081B	09/19/18 11:57	09/20/18 06:41	11g/5mL	10g/5mL	0.91
A8I0508-10RE1	Soil	EPA 8081B	09/19/18 12:00	09/20/18 06:41	11.66g/5mL	10g/5mL	0.86
A8I0508-11RE1	Soil	EPA 8081B	09/19/18 12:13	09/20/18 06:41	11.96g/5mL	10g/5mL	0.84

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8090944							
A8I0508-01	Soil	EPA 8000C	09/18/18 13:44	09/20/18 09:03			NA
A8I0508-02	Soil	EPA 8000C	09/18/18 13:49	09/20/18 09:03			NA
A8I0508-03	Soil	EPA 8000C	09/19/18 10:39	09/20/18 09:03			NA
A8I0508-04	Soil	EPA 8000C	09/19/18 10:43	09/20/18 09:03			NA
A8I0508-05	Soil	EPA 8000C	09/19/18 11:00	09/20/18 09:03			NA
A8I0508-06	Soil	EPA 8000C	09/19/18 11:04	09/20/18 09:03			NA
A8I0508-07	Soil	EPA 8000C	09/19/18 11:40	09/20/18 09:03			NA
A8I0508-08	Soil	EPA 8000C	09/19/18 11:43	09/20/18 09:03			NA
A8I0508-09	Soil	EPA 8000C	09/19/18 11:57	09/20/18 09:03			NA
A8I0508-10	Soil	EPA 8000C	09/19/18 12:00	09/20/18 09:03			NA
A8I0508-11	Soil	EPA 8000C	09/19/18 12:13	09/20/18 09:03			NA

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Darwin Thomas, Business Development Director



Apex Laboratories, LLC

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

Report ID:  
**A810508 - 09 26 18 1359**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**Apex Laboratories**

**Q-41** Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high.

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PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810508 - 09 26 18 1359**

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
- "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810508 - 09 26 18 1359</b>
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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories

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**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810508 - 09 26 18 1359</b>
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**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Darwin Thomas, Business Development Director



Anderson Geological Project: **Northstar**  
 PO Box 649 Project Number: **1503.20**  
 Wilsonville, OR 97070 Project Manager: **Erik Anderson** Report ID: **A810508 - 09 26 18 1359**

**CHAIN OF CUSTODY**

Lab # ABL 0508 PO# 1503.20  
 coc 1 of 2

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Anderson Geological Project Mgr: Erik Anderson Project Name: Northstar Project # 1503.20  
 Address: \_\_\_\_\_ Phone: \_\_\_\_\_ Email: \_\_\_\_\_  
 Sampled by: E. Anderson Fax: \_\_\_\_\_

Site Location:  OR  WA  
 Other: \_\_\_\_\_

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST	
						YES	NO
20B-NCOMP(2)		9/19/18	13:44	S	1		
20B-SCOMP(2)		9/19/18	13:44	S	1		
24-NCOMP(2)		9/19/18	10:39	S	1		
24-SCOMP(2)		9/19/18	10:43	S	1		
28-NCOMP(2)		9/19/18	11:00	S	1		
28-SCOMP(2)		9/19/18	11:04	S	1		
22-NCOMP(2)		9/19/18	11:40	S	1		
26-SCOMP(2)		9/19/18	11:43	S	1		
20-NCOMP(2)		9/19/18	11:57	S	1		
20-SCOMP(2)		9/19/18	12:00	S	1		

ANALYSIS REQUEST

600 TIO

8082 PCBs

8270 SIM PAHs

8270 SVOC

8260 BTEX VOCs

8260 HVOCS

8260 RBDN VOCs

8260 VOCs Full List

NWTR-GX

NWTR-DX

NWTR-HCID

TCLP Metals (8)

RCRA Metals (8)

AL, Sb, As, Ba, Be, Bi, Cd, Cr, Cu, Ni, Mn, Pb, Se, Zn

HE, Hg, Me, Ni, Mn, Ni, Zn

TOTAL DISS TCLP

1200-Z

Diels Alder

SPECIAL INSTRUCTIONS:

TAT Requested (circle) 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

SAMPLES ARE HELD FOR 30 DAYS

RECEIVED BY: Erik Anderson Date: 9/19/18 Signature: [Signature] Date: 9/19/18  
 Printed Name: Erik Anderson Printed Name: Jim Anderson  
 Company: AGI Company: Apex

Apex Laboratories

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*Darwin Thomas*



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A810508 - 09 26 18 1359

**CHAIN OF CUSTODY**

Lab # A810508      Project # 1503.20  
COC 2 of 2

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Anderson Geological      Project Mgr: Erik Anderson      Project Name: Northstar      PO#

Address: \_\_\_\_\_      Phone: \_\_\_\_\_      Fax: \_\_\_\_\_      Email: \_\_\_\_\_

Sampled by: E. Anderson

Site Location: OR WA  
Other: \_\_\_\_\_

SAMPLE ID  
5C-HCO-047(2)

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS		ANALYSIS REQUEST
				YES	NO	
1	4/19/18	12:13	S	1		
2						
3						
4						
5						
6						
7						
8						
9						
10						

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day, 2 Day, 3 Day, 4 DAY, 5 DAY, Other: \_\_\_\_\_

SPECIAL INSTRUCTIONS:

RECEIVED BY: \_\_\_\_\_  
Signature: Erik Anderson      Date: 9/19/18  
Printed Name: Erik Anderson      Time: 13:25  
Company: AGI

RECEIVED BY: \_\_\_\_\_  
Signature: \_\_\_\_\_      Date: \_\_\_\_\_  
Printed Name: \_\_\_\_\_      Time: \_\_\_\_\_  
Company: \_\_\_\_\_

SAMPLES ARE HELD FOR 30 DAYS

Apex Laboratories

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Darwin Thomas, Business Development Director



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A810508 - 09 26 18 1359

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geological Element WO#: A8 10508

Project/Project #: Northstar / 1503.20

**Delivery info:**

Date/Time Received: 9/19/18 @ 1325 By: OB

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: OB : 9/19/18 @ 1325

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

Temperature (deg. C) 

Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
<u>3.8</u>						
<u>Y</u>						
<u>N</u>						
<u>Gel</u>						

Received on Ice? (Y/N) Y

Temp. Blanks? (Y/N) N

Ice Type: (Gel/Real/Other) Gel

Condition: \_\_\_\_\_

Cooler out of temp? (Y/N) N Possible reason why: \_\_\_\_\_

If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No NA

**Samples Inspection:** Inspected by: OB : 9/19/18 @ 13:44

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: D on labels used 8/14/18, on

2D-NLOMP(2), 2D-SLOMP(2), 3C-NLOMP(2)

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

\_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

**Additional Information:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Labeled by: OB Witness: OB Cooler Inspected by: client See Project Contact Form: Y



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Tuesday, September 18, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A810238 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A810238, which was received by the laboratory on 9/11/2018 at 1:09:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

A handwritten signature in black ink, appearing to read "Darwin Thomas".

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---

Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810238 - 09 18 18 0847**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
5A-NCOMP	A810238-01	Soil	09/11/18 10:49	09/11/18 13:09
5A-SCOMP	A810238-02	Soil	09/11/18 10:52	09/11/18 13:09
38C-ECOMP	A810238-03	Soil	09/11/18 11:26	09/11/18 13:09
38C-WCOMP	A810238-04	Soil	09/11/18 11:34	09/11/18 13:09

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810238 - 09 18 18 0847</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>5A-NCOMP (A810238-01)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090629</b>		
Dieldrin	ND	---	0.00102	mg/kg dry	1	09/14/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 63 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/14/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>69 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/14/18</i>	<i>EPA 8081B</i>
<b>5A-SCOMP (A810238-02)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090629</b>		
Dieldrin	ND	---	0.00100	mg/kg dry	1	09/14/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 72 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/14/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>82 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/14/18</i>	<i>EPA 8081B</i>
<b>38C-ECOMP (A810238-03)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090629</b>		
Dieldrin	ND	---	0.00110	mg/kg dry	1	09/14/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 73 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/14/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>80 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/14/18</i>	<i>EPA 8081B</i>
<b>38C-WCOMP (A810238-04)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090629</b>		
Dieldrin	ND	---	0.00108	mg/kg dry	1	09/14/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 76 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/14/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>80 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/14/18</i>	<i>EPA 8081B</i>

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810238 - 09 18 18 0847</b>
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**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>5A-NCOMP (A810238-01)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090652</b>	
% Solids	90.2	---	1.00	% by Weight	1	09/13/18	EPA 8000C	
<b>5A-SCOMP (A810238-02)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090652</b>	
% Solids	89.6	---	1.00	% by Weight	1	09/13/18	EPA 8000C	
<b>38C-ECOMP (A810238-03)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090652</b>	
% Solids	85.3	---	1.00	% by Weight	1	09/13/18	EPA 8000C	
<b>38C-WCOMP (A810238-04)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090652</b>	
% Solids	86.1	---	1.00	% by Weight	1	09/13/18	EPA 8000C	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8090629 - EPA 3546</b>												
<b>Soil</b>												
<b>Blank (8090629-BLK1)</b> Prepared: 09/11/18 14:51 Analyzed: 09/14/18 09:59												
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr) Recovery: 82 % Limits: 42-129 % Dilution: 1x</i>												
<i>Decachlorobiphenyl (Surr) 92 % 65-151 % "</i>												
<b>LCS (8090629-BS1)</b> Prepared: 09/11/18 14:51 Analyzed: 09/14/18 10:16												
<u>EPA 8081B</u>												
Dieldrin	0.0475	---	0.00100	mg/kg wet	1	0.0500	---	95	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr) Recovery: 83 % Limits: 42-129 % Dilution: 1x</i>												
<i>Decachlorobiphenyl (Surr) 93 % 65-151 % "</i>												
<b>Duplicate (8090629-DUP1)</b> Prepared: 09/11/18 14:51 Analyzed: 09/14/18 10:51												
<u>QC Source Sample: 5A-NCOMP (A810238-01)</u>												
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.00102	mg/kg dry	1	---	0.000842	---	---	***	30%	
<i>Surr: 2,4,5,6-TCMX (Surr) Recovery: 70 % Limits: 42-129 % Dilution: 1x</i>												
<i>Decachlorobiphenyl (Surr) 81 % 65-151 % "</i>												
<b>Matrix Spike (8090629-MS1)</b> Prepared: 09/11/18 14:51 Analyzed: 09/14/18 12:01												
<u>QC Source Sample: 38C-WCOMP (A810238-04)</u>												
<u>EPA 8081B</u>												
Dieldrin	0.0480	---	0.00108	mg/kg dry	1	0.0541	0.000755	87	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr) Recovery: 81 % Limits: 42-129 % Dilution: 1x</i>												
<i>Decachlorobiphenyl (Surr) 87 % 65-151 % "</i>												

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8090652 - Total Solids (Dry Weight)</b>							<b>Soil</b>					
<b>Duplicate (8090652-DUP1)</b>			Prepared: 09/12/18 09:53 Analyzed: 09/13/18 08:30									
<u>QC Source Sample: Non-SDG (A8H0499-10)</u>												
% Solids	90.3	---	1.00	% by Weight	1	---	90.3	---	---	0.07	10%	
<b>Duplicate (8090652-DUP2)</b>			Prepared: 09/12/18 09:53 Analyzed: 09/13/18 08:30									
<u>QC Source Sample: 5A-NCOMP (A8I0238-01)</u>												
<u>EPA 8000C</u>												
% Solids	90.0	---	1.00	% by Weight	1	---	90.2	---	---	0.2	10%	
<b>Duplicate (8090652-DUP3)</b>			Prepared: 09/12/18 09:53 Analyzed: 09/13/18 08:30									
<u>QC Source Sample: Non-SDG (A8I0259-04)</u>												
% Solids	73.8	---	1.00	% by Weight	1	---	74.1	---	---	0.4	10%	
<b>Duplicate (8090652-DUP4)</b>			Prepared: 09/12/18 17:49 Analyzed: 09/13/18 08:30									
<u>QC Source Sample: Non-SDG (A8I0306-03)</u>												
% Solids	89.8	---	1.00	% by Weight	1	---	88.5	---	---	1	10%	
<b>Duplicate (8090652-DUP5)</b>			Prepared: 09/12/18 17:49 Analyzed: 09/13/18 08:30									
<u>QC Source Sample: Non-SDG (A8I0307-04)</u>												
% Solids	78.2	---	1.00	% by Weight	1	---	79.0	---	---	1	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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---	--	---

**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8090629</u>							
A8I0238-01	Soil	EPA 8081B	09/11/18 10:49	09/11/18 14:51	10.91g/5mL	10g/5mL	0.92
A8I0238-02	Soil	EPA 8081B	09/11/18 10:52	09/11/18 14:51	11.15g/5mL	10g/5mL	0.90
A8I0238-03	Soil	EPA 8081B	09/11/18 11:26	09/11/18 14:51	10.63g/5mL	10g/5mL	0.94
A8I0238-04	Soil	EPA 8081B	09/11/18 11:34	09/11/18 14:51	10.78g/5mL	10g/5mL	0.93

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8090652</u>							
A8I0238-01	Soil	EPA 8000C	09/11/18 10:49	09/12/18 09:53			NA
A8I0238-02	Soil	EPA 8000C	09/11/18 10:52	09/12/18 09:53			NA
A8I0238-03	Soil	EPA 8000C	09/11/18 11:26	09/12/18 09:53			NA
A8I0238-04	Soil	EPA 8000C	09/11/18 11:34	09/12/18 09:53			NA

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810238 - 09 18 18 0847**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**There are No Qualifiers on Sample or QC Data for this report**

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---

Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
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Project: **Northstar**  
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**Report ID:**  
**A810238 - 09 18 18 0847**

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
- "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

Apex Laboratories

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Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810238 - 09 18 18 0847**

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

**Mixed Matrix Samples:**

**Water Samples:**

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

**Soil and Sediment Samples:**

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

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Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810238 - 09 18 18 0847**

**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Darwin Thomas, Business Development Director





Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A810238 - 09 18 18 0847

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geological Element WO#: A8 10238

Project/Project #: Northstar / 1503-20

**Delivery info:**

Date/Time Received: 9/11/18 @ 1309 By: OB

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: OB : 9/11/18 @ 1310

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

Cooler #1 Cooler #2 Cooler #3 Cooler #4 Cooler #5 Cooler #6 Cooler #7

Temperature (deg. C) 1.3

Received on Ice? (Y/N) Y

Temp. Blanks? (Y/N) N

Ice Type: (Gel/Real/Other) Gel

Condition: \_\_\_\_\_

Cooler out of temp? (Y/N) Possible reason why: \_\_\_\_\_

If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA NA

**Samples Inspection:** Inspected by: OB : 9/11/18 @ 1310

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: \_\_\_\_\_

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

**Additional Information:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Labeled by: OB Witness: AKK Cooler Inspected by: Client See Project Contact Form: Y



Monday, November 12, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8I0126 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8I0126, which was received by the laboratory on 9/6/2018 at 2:10:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

---

Cooler Receipt Info (See Cooler Receipt Form for Details)

Default Cooler      4.6 degC

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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503-718-2323  
EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8I0126 - 11 12 18 0918**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
5B-NComp	A8I0126-01	Soil	09/06/18 11:09	09/06/18 14:10
5B-SComp	A8I0126-02	Soil	09/06/18 11:25	09/06/18 14:10
5C-NComp	A8I0126-03	Soil	09/06/18 10:45	09/06/18 14:10
5C-SComp	A8I0126-04	Soil	09/06/18 10:58	09/06/18 14:10
18B-NComp	A8I0126-05	Soil	09/06/18 11:36	09/06/18 14:10
18B-SComp	A8I0126-06	Soil	09/06/18 11:50	09/06/18 14:10

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810126 - 11 12 18 0918</b>
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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>5B-NComp (A810126-01)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090525</b>	
<b>Dieldrin</b>	<b>0.0103</b>	---	0.00101	mg/kg dry	1	09/11/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 64 %</i>		<i>Limits: 42-129 %</i>	<i>1</i>	<i>09/11/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>		<i>68 %</i>		<i>65-151 %</i>	<i>1</i>	<i>09/11/18</i>	<i>EPA 8081B</i>	
<b>5B-SComp (A810126-02)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090525</b>	
<b>Dieldrin</b>	<b>0.0114</b>	---	0.00111	mg/kg dry	1	09/11/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 73 %</i>		<i>Limits: 42-129 %</i>	<i>1</i>	<i>09/11/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>		<i>78 %</i>		<i>65-151 %</i>	<i>1</i>	<i>09/11/18</i>	<i>EPA 8081B</i>	
<b>5C-NComp (A810126-03)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090525</b>	
<b>Dieldrin</b>	<b>0.0411</b>	---	0.00105	mg/kg dry	1	09/11/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 76 %</i>		<i>Limits: 42-129 %</i>	<i>1</i>	<i>09/11/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>		<i>81 %</i>		<i>65-151 %</i>	<i>1</i>	<i>09/11/18</i>	<i>EPA 8081B</i>	
<b>5C-SComp (A810126-04)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090525</b>	
<b>Dieldrin</b>	<b>0.0378</b>	---	0.00108	mg/kg dry	1	09/11/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 70 %</i>		<i>Limits: 42-129 %</i>	<i>1</i>	<i>09/11/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>		<i>74 %</i>		<i>65-151 %</i>	<i>1</i>	<i>09/11/18</i>	<i>EPA 8081B</i>	
<b>18B-NComp (A810126-05)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090525</b>	
<b>Dieldrin</b>	<b>0.0367</b>	---	0.000991	mg/kg dry	1	09/11/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 80 %</i>		<i>Limits: 42-129 %</i>	<i>1</i>	<i>09/11/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>		<i>85 %</i>		<i>65-151 %</i>	<i>1</i>	<i>09/11/18</i>	<i>EPA 8081B</i>	
<b>18B-SComp (A810126-06)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090525</b>	
<b>Dieldrin</b>	<b>0.0377</b>	---	0.000976	mg/kg dry	1	09/11/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 77 %</i>		<i>Limits: 42-129 %</i>	<i>1</i>	<i>09/11/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>		<i>82 %</i>		<i>65-151 %</i>	<i>1</i>	<i>09/11/18</i>	<i>EPA 8081B</i>	

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810126 - 11 12 18 0918</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>5B-NComp (A810126-01)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090524</b>	
% Solids	89.0	---	1.00	% by Weight	1	09/10/18	EPA 8000C	
<b>5B-SComp (A810126-02)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090524</b>	
% Solids	87.5	---	1.00	% by Weight	1	09/10/18	EPA 8000C	
<b>5C-NComp (A810126-03)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090524</b>	
% Solids	89.5	---	1.00	% by Weight	1	09/10/18	EPA 8000C	
<b>5C-SComp (A810126-04)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090524</b>	
% Solids	89.4	---	1.00	% by Weight	1	09/10/18	EPA 8000C	
<b>18B-NComp (A810126-05)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090524</b>	
% Solids	89.6	---	1.00	% by Weight	1	09/10/18	EPA 8000C	
<b>18B-SComp (A810126-06)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090524</b>	
% Solids	87.8	---	1.00	% by Weight	1	09/10/18	EPA 8000C	

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810126 - 11 12 18 0918</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8090525 - EPA 3546</b>												
<b>Soil</b>												
<b>Blank (8090525-BLK1)</b>												
Prepared: 09/07/18 10:09 Analyzed: 09/11/18 13:21												
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Surr: 2,4,5,6-TCMX (Surr) Recovery: 83 % Limits: 42-129 % Dilution: 1x												
Decachlorobiphenyl (Surr) 92 % 65-151 % "												
<b>LCS (8090525-BS1)</b>												
Prepared: 09/07/18 10:09 Analyzed: 09/11/18 13:38												
<u>EPA 8081B</u>												
Dieldrin	0.0472	---	0.00100	mg/kg wet	1	0.0500	---	94	56-136%	---	---	
Surr: 2,4,5,6-TCMX (Surr) Recovery: 81 % Limits: 42-129 % Dilution: 1x												
Decachlorobiphenyl (Surr) 92 % 65-151 % "												
<b>Duplicate (8090525-DUP1)</b>												
Prepared: 09/07/18 10:09 Analyzed: 09/11/18 14:13												
<u>QC Source Sample: 5B-NComp (A810126-01)</u>												
<u>EPA 8081B</u>												
Dieldrin	0.0104	---	0.00100	mg/kg dry	1	---	0.0103	---	---	1	30%	
Surr: 2,4,5,6-TCMX (Surr) Recovery: 71 % Limits: 42-129 % Dilution: 1x												
Decachlorobiphenyl (Surr) 73 % 65-151 % "												
<b>Matrix Spike (8090525-MS1)</b>												
Prepared: 09/07/18 10:09 Analyzed: 09/11/18 15:58												
<u>QC Source Sample: 18B-SComp (A810126-06)</u>												
<u>EPA 8081B</u>												
Dieldrin	0.0871	---	0.000976	mg/kg dry	1	0.0488	0.0377	101	56-136%	---	---	
Surr: 2,4,5,6-TCMX (Surr) Recovery: 81 % Limits: 42-129 % Dilution: 1x												
Decachlorobiphenyl (Surr) 84 % 65-151 % "												

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A810126 - 11 12 18 0918</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8090524 - Total Solids (Dry Weight)</b>							<b>Soil</b>					
<b>Duplicate (8090524-DUP1)</b>			Prepared: 09/07/18 09:56 Analyzed: 09/10/18 08:12									
<u>QC Source Sample: Non-SDG (A810097-01)</u>												
% Solids	94.0	---	1.00	% by Weight	1	---	94.2	---	---	0.2	10%	
<b>Duplicate (8090524-DUP2)</b>			Prepared: 09/07/18 09:56 Analyzed: 09/10/18 08:12									
<u>QC Source Sample: 18B-SComp (A810126-06)</u>												
<u>EPA 8000C</u>												
% Solids	87.2	---	1.00	% by Weight	1	---	87.8	---	---	0.7	10%	
<b>Duplicate (8090524-DUP3)</b>			Prepared: 09/07/18 18:25 Analyzed: 09/10/18 08:12									
<u>QC Source Sample: Non-SDG (A810184-02)</u>												
% Solids	92.0	---	1.00	% by Weight	1	---	92.2	---	---	0.2	10%	
<b>Duplicate (8090524-DUP4)</b>			Prepared: 09/07/18 18:25 Analyzed: 09/10/18 08:12									
<u>QC Source Sample: Non-SDG (A810189-02)</u>												
% Solids	89.9	---	1.00	% by Weight	1	---	90.0	---	---	0.07	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8I0126 - 11 12 18 0918**

**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8090525							
A8I0126-01	Soil	EPA 8081B	09/06/18 11:09	09/07/18 10:09	11.12g/5mL	10g/5mL	0.90
A8I0126-02	Soil	EPA 8081B	09/06/18 11:25	09/07/18 10:09	10.29g/5mL	10g/5mL	0.97
A8I0126-03	Soil	EPA 8081B	09/06/18 10:45	09/07/18 10:09	10.64g/5mL	10g/5mL	0.94
A8I0126-04	Soil	EPA 8081B	09/06/18 10:58	09/07/18 10:09	10.32g/5mL	10g/5mL	0.97
A8I0126-05	Soil	EPA 8081B	09/06/18 11:36	09/07/18 10:09	11.26g/5mL	10g/5mL	0.89
A8I0126-06	Soil	EPA 8081B	09/06/18 11:50	09/07/18 10:09	11.67g/5mL	10g/5mL	0.86

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8090524							
A8I0126-01	Soil	EPA 8000C	09/06/18 11:09	09/07/18 09:56			NA
A8I0126-02	Soil	EPA 8000C	09/06/18 11:25	09/07/18 09:56			NA
A8I0126-03	Soil	EPA 8000C	09/06/18 10:45	09/07/18 09:56			NA
A8I0126-04	Soil	EPA 8000C	09/06/18 10:58	09/07/18 09:56			NA
A8I0126-05	Soil	EPA 8000C	09/06/18 11:36	09/07/18 09:56			NA
A8I0126-06	Soil	EPA 8000C	09/06/18 11:50	09/07/18 09:56			NA

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Darwin Thomas, Business Development Director



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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810126 - 11 12 18 0918**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**There are No Qualifiers on Sample or QC Data for this report**

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Apex Laboratories

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---

Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810126 - 11 12 18 0918**

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
- "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

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Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810126 - 11 12 18 0918**

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A810126 - 11 12 18 0918**

**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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Darwin Thomas, Business Development Director





Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A810126 - 11 12 18 0918

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geological Element WO#: A810126

Project/Project #: Northstar 1503.20

**Delivery info:**

Date/Time Received: 9/6/18 @ 1410 By: OB

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: OB : 9/6/18 @ 1410

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>4.6</u>						
Received on Ice? (Y/N)	<u>Y</u>						
Temp. Blanks? (Y/N)	<u>N</u>						
Ice Type: (Gel/Real/Other)	<u>Gel</u>						
Condition:							

Cooler out of temp? (Y/N) Possible reason why: NA

If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA NA

**Samples Inspection:** Inspected by: OB : 9/6/18 @ 1410

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: \_\_\_\_\_

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

**Additional Information:** \_\_\_\_\_

Labeled by: OB Witness: AKK Cooler Inspected by: Client See Project Contact Form: Y



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Saturday, September 8, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8H0917 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8H0917, which was received by the laboratory on 8/31/2018 at 3:33:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

A handwritten signature in black ink, appearing to read "Darwin Thomas".

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---

Darwin Thomas, Business Development Director



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**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0917 - 09 08 18 0841**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
4A-NCOMP	A8H0917-01	Soil	08/31/18 10:27	08/31/18 15:33
4A-SCOMP	A8H0917-02	Soil	08/31/18 10:41	08/31/18 15:33
4D-NCOMP	A8H0917-03	Soil	08/31/18 11:13	08/31/18 15:33
4D-SCOMP	A8H0917-04	Soil	08/31/18 11:17	08/31/18 15:33
19A-NCOMP	A8H0917-05	Soil	08/31/18 11:45	08/31/18 15:33
19A-SCOMP	A8H0917-06	Soil	08/31/18 11:58	08/31/18 15:33
20D-NCOMP	A8H0917-07	Soil	08/31/18 12:07	08/31/18 15:33
20D-SCOMP	A8H0917-08	Soil	08/31/18 12:25	08/31/18 15:33

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0917 - 09 08 18 0841</b>
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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>4A-NCOMP (A8H0917-01)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090406</b>		
<b>Dieldrin</b>	<b>0.0798</b>	---	0.00101	mg/kg dry	1	09/05/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 74 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/05/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>80 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/05/18</i>	<i>EPA 8081B</i>
<b>4A-SCOMP (A8H0917-02)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090406</b>		
<b>Dieldrin</b>	<b>0.0215</b>	---	0.00108	mg/kg dry	1	09/05/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 67 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/05/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>91 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/05/18</i>	<i>EPA 8081B</i>
<b>4D-NCOMP (A8H0917-03)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090406</b>		
<b>Dieldrin</b>	<b>0.0550</b>	---	0.00113	mg/kg dry	1	09/05/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 78 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/05/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>81 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/05/18</i>	<i>EPA 8081B</i>
<b>4D-SCOMP (A8H0917-04)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090406</b>		
<b>Dieldrin</b>	<b>0.0318</b>	---	0.00105	mg/kg dry	1	09/05/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 67 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/05/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>78 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/05/18</i>	<i>EPA 8081B</i>
<b>19A-NCOMP (A8H0917-05)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090406</b>		
<b>Dieldrin</b>	<b>0.0510</b>	---	0.00107	mg/kg dry	1	09/05/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 72 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/05/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>88 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/05/18</i>	<i>EPA 8081B</i>
<b>19A-SCOMP (A8H0917-06)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090406</b>		
<b>Dieldrin</b>	<b>0.0426</b>	---	0.00106	mg/kg dry	1	09/05/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 69 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/05/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>81 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/05/18</i>	<i>EPA 8081B</i>
<b>20D-NCOMP (A8H0917-07)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090406</b>		
<b>Dieldrin</b>	<b>0.0341</b>	---	0.00108	mg/kg dry	1	09/05/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 59 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>09/05/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>83 %</i>		<i>65-151 %</i>		<i>1</i>	<i>09/05/18</i>	<i>EPA 8081B</i>
<b>20D-SCOMP (A8H0917-08)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090406</b>		

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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>20D-SCOMP (A8H0917-08)</b>				<b>Matrix: Soil</b>		<b>Batch: 8090406</b>		
<b>Dieldrin</b>	<b>0.00367</b>	---	0.00109	mg/kg dry	1	09/05/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 67 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>09/05/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>78 %</i>	<i>65-151 %</i>	<i>1</i>	<i>09/05/18</i>	<i>EPA 8081B</i>	

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---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>4A-NCOMP (A8H0917-01)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090386</b>	
% Solids	89.7	---	1.00	% by Weight	1	09/05/18	EPA 8000C	
<b>4A-SCOMP (A8H0917-02)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090386</b>	
% Solids	86.8	---	1.00	% by Weight	1	09/05/18	EPA 8000C	
<b>4D-NCOMP (A8H0917-03)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090386</b>	
% Solids	84.6	---	1.00	% by Weight	1	09/05/18	EPA 8000C	
<b>4D-SCOMP (A8H0917-04)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090386</b>	
% Solids	90.3	---	1.00	% by Weight	1	09/05/18	EPA 8000C	
<b>19A-NCOMP (A8H0917-05)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090386</b>	
% Solids	90.3	---	1.00	% by Weight	1	09/05/18	EPA 8000C	
<b>19A-SCOMP (A8H0917-06)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090386</b>	
% Solids	90.7	---	1.00	% by Weight	1	09/05/18	EPA 8000C	
<b>20D-NCOMP (A8H0917-07)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090386</b>	
% Solids	88.9	---	1.00	% by Weight	1	09/05/18	EPA 8000C	
<b>20D-SCOMP (A8H0917-08)</b>				<b>Matrix: Soil</b>			<b>Batch: 8090386</b>	
% Solids	89.2	---	1.00	% by Weight	1	09/05/18	EPA 8000C	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8090406 - EPA 3546</b>						<b>Soil</b>						
<b>Blank (8090406-BLK1)</b>			Prepared: 09/04/18 14:37 Analyzed: 09/05/18 10:05									
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 85 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>96 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>LCS (8090406-BS1)</b>			Prepared: 09/04/18 14:37 Analyzed: 09/05/18 10:22									
<u>EPA 8081B</u>												
Dieldrin	0.0498	---	0.00100	mg/kg wet	1	0.0500	---	100	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 87 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>98 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Duplicate (8090406-DUP1)</b>			Prepared: 09/04/18 14:37 Analyzed: 09/05/18 10:59									
<u>QC Source Sample: 4A-NCOMP (A8H0917-01)</u>												
<u>EPA 8081B</u>												
Dieldrin	0.0700	---	0.00100	mg/kg dry	1	---	0.0798	---	---	13	30%	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 81 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>91 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Matrix Spike (8090406-MS1)</b>			Prepared: 09/04/18 14:37 Analyzed: 09/05/18 14:11									
<u>QC Source Sample: 20D-SCOMP (A8H0917-08)</u>												
<u>EPA 8081B</u>												
Dieldrin	0.0485	---	0.00109	mg/kg dry	1	0.0543	0.00367	83	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 71 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>83 %</i>		<i>65-151 %</i>		<i>"</i>						

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Project: **Northstar**  
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**Report ID:**  
**A8H0917 - 09 08 18 0841**

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8090386 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (8090386-DUP1)</b>			Prepared: 09/04/18 09:45 Analyzed: 09/05/18 08:16									
<b>QC Source Sample: Non-SDG (A8H0781-02)</b>												
% Solids	97.7	---	1.00	% by Weight	1	---	97.7	---	---	0.04	10%	
<b>Duplicate (8090386-DUP2)</b>			Prepared: 09/04/18 09:45 Analyzed: 09/05/18 08:16									
<b>QC Source Sample: Non-SDG (A8H0918-01)</b>												
% Solids	91.2	---	1.00	% by Weight	1	---	89.6	---	---	2	10%	
<b>Duplicate (8090386-DUP3)</b>			Prepared: 09/04/18 09:45 Analyzed: 09/05/18 08:16									
<b>QC Source Sample: Non-SDG (A8H0925-03)</b>												
% Solids	64.3	---	1.00	% by Weight	1	---	64.5	---	---	0.3	10%	
<b>Duplicate (8090386-DUP4)</b>			Prepared: 09/04/18 18:37 Analyzed: 09/05/18 08:16									
<b>QC Source Sample: Non-SDG (A8I0034-02)</b>												
% Solids	77.0	---	1.00	% by Weight	1	---	77.0	---	---	0.07	10%	
<b>Duplicate (8090386-DUP5)</b>			Prepared: 09/04/18 18:37 Analyzed: 09/05/18 08:16									
<b>QC Source Sample: Non-SDG (A8I0046-01)</b>												
% Solids	97.5	---	1.00	% by Weight	1	---	97.3	---	---	0.2	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0917 - 09 08 18 0841**

**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8090406							
A8H0917-01	Soil	EPA 8081B	08/31/18 10:27	09/04/18 14:37	11.05g/5mL	10g/5mL	0.91
A8H0917-02	Soil	EPA 8081B	08/31/18 10:41	09/04/18 14:37	10.62g/5mL	10g/5mL	0.94
A8H0917-03	Soil	EPA 8081B	08/31/18 11:13	09/04/18 14:37	10.48g/5mL	10g/5mL	0.95
A8H0917-04	Soil	EPA 8081B	08/31/18 11:17	09/04/18 14:37	10.5g/5mL	10g/5mL	0.95
A8H0917-05	Soil	EPA 8081B	08/31/18 11:45	09/04/18 14:37	10.36g/5mL	10g/5mL	0.97
A8H0917-06	Soil	EPA 8081B	08/31/18 11:58	09/04/18 14:37	10.45g/5mL	10g/5mL	0.96
A8H0917-07	Soil	EPA 8081B	08/31/18 12:07	09/04/18 14:37	10.4g/5mL	10g/5mL	0.96
A8H0917-08	Soil	EPA 8081B	08/31/18 12:25	09/04/18 14:37	10.32g/5mL	10g/5mL	0.97

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8090386							
A8H0917-01	Soil	EPA 8000C	08/31/18 10:27	09/04/18 09:45			NA
A8H0917-02	Soil	EPA 8000C	08/31/18 10:41	09/04/18 09:45			NA
A8H0917-03	Soil	EPA 8000C	08/31/18 11:13	09/04/18 09:45			NA
A8H0917-04	Soil	EPA 8000C	08/31/18 11:17	09/04/18 09:45			NA
A8H0917-05	Soil	EPA 8000C	08/31/18 11:45	09/04/18 09:45			NA
A8H0917-06	Soil	EPA 8000C	08/31/18 11:58	09/04/18 09:45			NA
A8H0917-07	Soil	EPA 8000C	08/31/18 12:07	09/04/18 09:45			NA
A8H0917-08	Soil	EPA 8000C	08/31/18 12:25	09/04/18 09:45			NA

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Darwin Thomas, Business Development Director



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0917 - 09 08 18 0841**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**There are No Qualifiers on Sample or QC Data for this report**

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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
- "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

Apex Laboratories

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PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0917 - 09 08 18 0841**

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories

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Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

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503-718-2323  
EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0917 - 09 08 18 0841**

**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Darwin Thomas, Business Development Director





Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8H0917 - 09 08 18 0841

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geological Element WO#: A8 H0917  
Project/Project #: Northstar 1503.20

**Delivery info:**

Date/Time Received: 8/31/18 @ 1533 By: [Signature]  
Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: [Signature] : 8/31/18 @ 1535

Chain of Custody Included? Yes  No  Custody Seals? Yes  No   
Signed/Dated by Client? Yes  No   
Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>1.8</u>						
Received on Ice? (Y/N)	<u>Y</u>						
Temp. Blanks? (Y/N)	<u>N</u>						
Ice Type: (Gel/Real/Other)	<u>Gel</u>						
Condition:							

Cooler out of temp? (Y/N)  Possible reason why: \_\_\_\_\_  
If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA

**Samples Inspection:** Inspected by: [Signature] : 8/31/18 @ 1535

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: \_\_\_\_\_

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

**Additional Information:** \_\_\_\_\_

Labeled by: [Signature] Witness: [Signature] Cooler Inspected by: [Signature] See Project Contact Form:

[Signature]



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Thursday, September 6, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8H0788 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8H0788, which was received by the laboratory on 8/28/2018 at 3:13:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

A handwritten signature in black ink, appearing to read "Darwin Thomas".

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---

Darwin Thomas, Business Development Director



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12232 S.W. Garden Place  
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503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8H0788 - 09 06 18 0659

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
4B-NWCOMP(2)	A8H0788-01	Soil	08/28/18 11:51	08/28/18 15:13
4B-SCOMP(2)	A8H0788-02	Soil	08/28/18 11:54	08/28/18 15:13
4C-NCOMP(2)	A8H0788-03	Soil	08/28/18 12:08	08/28/18 15:13
4C-SCOMP(2)	A8H0788-04	Soil	08/28/18 12:12	08/28/18 15:13
19B-NCOMP(2)	A8H0788-05	Soil	08/28/18 12:48	08/28/18 15:13
19B-NSCOMP(2)	A8H0788-06	Soil	08/28/18 12:52	08/28/18 15:13
3D-NCOMP(2)	A8H0788-07	Soil	08/28/18 13:51	08/28/18 15:13
3D-SCOMP(2)	A8H0788-08	Soil	08/28/18 13:54	08/28/18 15:13
20A-NCOMP(2)	A8H0788-09	Soil	08/28/18 14:09	08/28/18 15:13
20A-SCOMP(2)	A8H0788-10	Soil	08/28/18 14:14	08/28/18 15:13

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0788 - 09 06 18 0659</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>4B-NWCOMP(2) (A8H0788-01RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081227</b>		
<b>Dieldrin</b>	<b>0.156</b>	---	0.00516	mg/kg dry	5	08/31/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 67 %</i>		<i>Limits: 42-129 %</i>		<i>5</i>	<i>08/31/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>78 %</i>		<i>65-151 %</i>		<i>5</i>	<i>08/31/18</i>	<i>EPA 8081B</i>
<b>4B-SCOMP(2) (A8H0788-02)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081227</b>		
<b>Dieldrin</b>	<b>0.00246</b>	---	0.00104	mg/kg dry	1	08/30/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 68 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/30/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>89 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/30/18</i>	<i>EPA 8081B</i>
<b>4C-NCOMP(2) (A8H0788-03)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081227</b>		
Dieldrin	ND	---	0.00102	mg/kg dry	1	08/30/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 63 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/30/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>80 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/30/18</i>	<i>EPA 8081B</i>
<b>4C-SCOMP(2) (A8H0788-04)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081227</b>		
<b>Dieldrin</b>	<b>0.00130</b>	---	0.00106	mg/kg dry	1	08/30/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 57 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/30/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>87 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/30/18</i>	<i>EPA 8081B</i>
<b>19B-NCOMP(2) (A8H0788-05)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081227</b>		
Dieldrin	ND	---	0.00106	mg/kg dry	1	08/30/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 78 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/30/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>92 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/30/18</i>	<i>EPA 8081B</i>
<b>19B-NSCOMP(2) (A8H0788-06)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081227</b>		
<b>Dieldrin</b>	<b>0.00123</b>	---	0.00111	mg/kg dry	1	08/30/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 70 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/30/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>89 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/30/18</i>	<i>EPA 8081B</i>
<b>3D-NCOMP(2) (A8H0788-07)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081227</b>		
Dieldrin	ND	---	0.00103	mg/kg dry	1	08/30/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 72 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/30/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>87 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/30/18</i>	<i>EPA 8081B</i>
<b>3D-SCOMP(2) (A8H0788-08)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081227</b>		

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0788 - 09 06 18 0659</b>
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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>3D-SCOMP(2) (A8H0788-08)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081227</b>		
<b>Dieldrin</b>	<b>0.00169</b>	---	0.00101	mg/kg dry	1	08/30/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 70 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/30/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>87 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/30/18</i>	<i>EPA 8081B</i>
<b>20A-NCOMP(2) (A8H0788-09)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081227</b>		
<b>Dieldrin</b>	<b>ND</b>	---	0.00104	mg/kg dry	1	08/30/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 68 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/30/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>87 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/30/18</i>	<i>EPA 8081B</i>
<b>20A-SCOMP(2) (A8H0788-10RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081227</b>		
<b>Dieldrin</b>	<b>0.00149</b>	---	0.00104	mg/kg dry	1	08/31/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 71 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/31/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>86 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/31/18</i>	<i>EPA 8081B</i>

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0788 - 09 06 18 0659</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

Percent Dry Weight									
Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes	
<b>4B-NWCOMP(2) (A8H0788-01)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081237</b>		
% Solids	87.4	---	1.00	% by Weight	1	08/30/18	EPA 8000C		
<b>4B-SCOMP(2) (A8H0788-02)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081237</b>		
% Solids	85.2	---	1.00	% by Weight	1	08/30/18	EPA 8000C		
<b>4C-NCOMP(2) (A8H0788-03)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081237</b>		
% Solids	86.3	---	1.00	% by Weight	1	08/30/18	EPA 8000C		
<b>4C-SCOMP(2) (A8H0788-04)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081237</b>		
% Solids	86.1	---	1.00	% by Weight	1	08/30/18	EPA 8000C		
<b>19B-NCOMP(2) (A8H0788-05)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081237</b>		
% Solids	87.2	---	1.00	% by Weight	1	08/30/18	EPA 8000C		
<b>19B-NSCOMP(2) (A8H0788-06)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081237</b>		
% Solids	85.1	---	1.00	% by Weight	1	08/30/18	EPA 8000C		
<b>3D-NCOMP(2) (A8H0788-07)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081237</b>		
% Solids	87.1	---	1.00	% by Weight	1	08/30/18	EPA 8000C		
<b>3D-SCOMP(2) (A8H0788-08)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081237</b>		
% Solids	89.0	---	1.00	% by Weight	1	08/30/18	EPA 8000C		
<b>20A-NCOMP(2) (A8H0788-09)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081237</b>		
% Solids	84.7	---	1.00	% by Weight	1	08/30/18	EPA 8000C		
<b>20A-SCOMP(2) (A8H0788-10)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081237</b>		
% Solids	87.9	---	1.00	% by Weight	1	08/30/18	EPA 8000C		

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0788 - 09 06 18 0659</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8081227 - EPA 3546</b>												
<b>Soil</b>												
<b>Blank (8081227-BLK1)</b>												
Prepared: 08/29/18 07:17 Analyzed: 08/30/18 17:03												
<u>EPA 8081B</u>												
4,4'-DDD	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
4,4'-DDE	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
4,4'-DDT	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Dieldrin	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Surr: 2,4,5,6-TCMX (Surr) Recovery: 78 % Limits: 42-129 % Dilution: 1x												
Decachlorobiphenyl (Surr) 83 % 65-151 % "												

<b>LCS (8081227-BS1)</b>												
Prepared: 08/29/18 07:17 Analyzed: 08/30/18 17:20												
<u>EPA 8081B</u>												
4,4'-DDD	0.0476	---	0.00100	mg/kg wet	1	0.0500	---	95	56-139%	---	---	
4,4'-DDE	0.0479	---	0.00100	mg/kg wet	1	0.0500	---	96	56-134%	---	---	
4,4'-DDT	0.0529	---	0.00100	mg/kg wet	1	0.0500	---	106	50-141%	---	---	
Dieldrin	0.0506	---	0.00100	mg/kg wet	1	0.0500	---	101	56-136%	---	---	
Surr: 2,4,5,6-TCMX (Surr) Recovery: 65 % Limits: 42-129 % Dilution: 1x												
Decachlorobiphenyl (Surr) 88 % 65-151 % "												

<b>Duplicate (8081227-DUP1)</b>												
Prepared: 08/29/18 07:17 Analyzed: 08/30/18 17:53												
<u>QC Source Sample: Non-SDG (A8H0743-01)</u>												
4,4'-DDD	<b>0.00489</b>	---	0.000992	mg/kg dry	1	---	0.00548	---	---	11	30%	
4,4'-DDE	<b>0.0228</b>	---	0.000992	mg/kg dry	1	---	0.0316	---	---	<b>32</b>	<b>30%</b>	Q-17
4,4'-DDT	<b>0.0109</b>	---	0.000992	mg/kg dry	1	---	0.0124	---	---	13	30%	
Dieldrin	<b>0.0165</b>	---	0.000992	mg/kg dry	1	---	0.0200	---	---	19	30%	
Surr: 2,4,5,6-TCMX (Surr) Recovery: 61 % Limits: 42-129 % Dilution: 1x												
Decachlorobiphenyl (Surr) 67 % 65-151 % "												

<b>Matrix Spike (8081227-MS1)</b>												
Prepared: 08/29/18 07:17 Analyzed: 08/31/18 12:37												
<u>QC Source Sample: 20A-SCOMP(2) (A8H0788-10)</u>												
<u>EPA 8081B</u>												
4,4'-DDD	0.0502	---	0.00103	mg/kg dry	1	0.0515	ND	98	56-139%	---	---	
4,4'-DDE	0.0511	---	0.00103	mg/kg dry	1	0.0515	0.00247	94	56-134%	---	---	
4,4'-DDT	0.0539	---	0.00103	mg/kg dry	1	0.0515	0.00204	101	50-141%	---	---	
Dieldrin	0.0489	---	0.00103	mg/kg dry	1	0.0515	0.00143	92	56-136%	---	---	

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Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0788 - 09 06 18 0659**

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8081227 - EPA 3546</b>						<b>Soil</b>						
<b>Matrix Spike (8081227-MS1)</b>						Prepared: 08/29/18 07:17 Analyzed: 08/31/18 12:37						
<b>QC Source Sample: 20A-SCOMP(2) (A8H0788-10)</b>												
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 67 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>83 %</i>		<i>65-151 %</i>		<i>"</i>						

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PO Box 649  
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Project: **Northstar**  
Project Number: **1503.20**  
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**Report ID:**  
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8081237 - Total Solids (Dry Weight)</b>							<b>Soil</b>					
<b>Duplicate (8081237-DUP1)</b>			Prepared: 08/29/18 10:00 Analyzed: 08/30/18 08:13									
<u>QC Source Sample: Non-SDG (A8H0757-14)</u>												
% Solids	85.7	---	1.00	% by Weight	1	---	86.1	---	---	0.4	10%	
<b>Duplicate (8081237-DUP2)</b>			Prepared: 08/29/18 10:00 Analyzed: 08/30/18 08:13									
<u>QC Source Sample: 20A-SCOMP(2) (A8H0788-10)</u>												
<u>EPA 8000C</u>												
% Solids	87.9	---	1.00	% by Weight	1	---	87.9	---	---	0.02	10%	
<b>Duplicate (8081237-DUP3)</b>			Prepared: 08/29/18 19:11 Analyzed: 08/30/18 08:13									
<u>QC Source Sample: Non-SDG (A8H0840-03)</u>												
% Solids	92.4	---	1.00	% by Weight	1	---	92.6	---	---	0.2	10%	
<b>Duplicate (8081237-DUP4)</b>			Prepared: 08/29/18 19:11 Analyzed: 08/30/18 08:13									
<u>QC Source Sample: Non-SDG (A8H0843-03)</u>												
% Solids	91.3	---	1.00	% by Weight	1	---	91.8	---	---	0.5	10%	
<b>Duplicate (8081237-DUP5)</b>			Prepared: 08/29/18 19:11 Analyzed: 08/30/18 08:13									
<u>QC Source Sample: Non-SDG (A8H0849-02)</u>												
% Solids	86.9	---	1.00	% by Weight	1	---	87.8	---	---	1	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0788 - 09 06 18 0659</b>
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**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8081227</u>							
A8H0788-01RE1	Soil	EPA 8081B	08/28/18 11:51	08/29/18 07:17	11.09g/5mL	10g/5mL	0.90
A8H0788-02	Soil	EPA 8081B	08/28/18 11:54	08/29/18 07:17	11.3g/5mL	10g/5mL	0.89
A8H0788-03	Soil	EPA 8081B	08/28/18 12:08	08/29/18 07:17	11.41g/5mL	10g/5mL	0.88
A8H0788-04	Soil	EPA 8081B	08/28/18 12:12	08/29/18 07:17	10.99g/5mL	10g/5mL	0.91
A8H0788-05	Soil	EPA 8081B	08/28/18 12:48	08/29/18 07:17	10.79g/5mL	10g/5mL	0.93
A8H0788-06	Soil	EPA 8081B	08/28/18 12:52	08/29/18 07:17	10.59g/5mL	10g/5mL	0.94
A8H0788-07	Soil	EPA 8081B	08/28/18 13:51	08/29/18 07:17	11.16g/5mL	10g/5mL	0.90
A8H0788-08	Soil	EPA 8081B	08/28/18 13:54	08/29/18 07:17	11.14g/5mL	10g/5mL	0.90
A8H0788-09	Soil	EPA 8081B	08/28/18 14:09	08/29/18 07:17	11.31g/5mL	10g/5mL	0.88
A8H0788-10RE1	Soil	EPA 8081B	08/28/18 14:14	08/29/18 07:17	10.97g/5mL	10g/5mL	0.91

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8081237</u>							
A8H0788-01	Soil	EPA 8000C	08/28/18 11:51	08/29/18 10:00			NA
A8H0788-02	Soil	EPA 8000C	08/28/18 11:54	08/29/18 10:00			NA
A8H0788-03	Soil	EPA 8000C	08/28/18 12:08	08/29/18 10:00			NA
A8H0788-04	Soil	EPA 8000C	08/28/18 12:12	08/29/18 10:00			NA
A8H0788-05	Soil	EPA 8000C	08/28/18 12:48	08/29/18 10:00			NA
A8H0788-06	Soil	EPA 8000C	08/28/18 12:52	08/29/18 10:00			NA
A8H0788-07	Soil	EPA 8000C	08/28/18 13:51	08/29/18 10:00			NA
A8H0788-08	Soil	EPA 8000C	08/28/18 13:54	08/29/18 10:00			NA
A8H0788-09	Soil	EPA 8000C	08/28/18 14:09	08/29/18 10:00			NA
A8H0788-10	Soil	EPA 8000C	08/28/18 14:14	08/29/18 10:00			NA

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

Report ID:  
**A8H0788 - 09 06 18 0659**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**Apex Laboratories**

Q-17 RPD between original and duplicate sample is outside of established control limits.

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0788 - 09 06 18 0659</b>
---	--	---

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis. The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
  - "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
  - "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
  - " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.  
  
Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

Apex Laboratories

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Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0788 - 09 06 18 0659**

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

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Darwin Thomas, Business Development Director



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**EPA ID: OR01039**

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0788 - 09 06 18 0659**

**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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Darwin Thomas, Business Development Director





Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8H0788 - 09 06 18 0659

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geological Element WO#: A8 H0788  
Project/Project #: Northstar/1503.20

**Delivery info:**

Date/Time Received: 8/28/18 @ 15:13 By: TG  
Delivered by: Apex  Client  XESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: TG : 8/28/18 @ 15:13

Chain of Custody Included? Yes  No  Custody Seals? Yes  No   
Signed/Dated by Client? Yes  No   
Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>8.1</u>						
Received on Ice? (Y/N)	<u>Y</u>						
Temp. Blanks? (Y/N)	<u>N</u>						
Ice Type: (Gel/Real/Other)	<u>Real</u>						
Condition:	<u>good</u>						

Cooler out of temp? (Y/N)  Possible reason why: Recently sampled  
If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA

**Samples Inspection:** Inspected by: \_\_\_\_\_ : \_\_\_\_\_ @ \_\_\_\_\_

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

<sup>to check</sup> Bottle Labels/COCs agree? Yes  No  Comments: Cont. 19B - NSCOMP(2) reads  
to 19B - NSCOMP(2) + 19B/18

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

Additional Information: \_\_\_\_\_

Labeled by: \_\_\_\_\_ Witness: \_\_\_\_\_ Cooler Inspected by: \_\_\_\_\_ See Project Contact Form: Y

JB

TG

Client



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Thursday, August 30, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8H0676 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8H0676, which was received by the laboratory on 8/23/2018 at 3:25:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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A handwritten signature in black ink, appearing to read "Darwin Thomas".

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---

Darwin Thomas, Business Development Director



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8H0676 - 08 30 18 0644

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
3B-SCOMP(2)	A8H0676-01	Soil	08/23/18 10:32	08/23/18 15:25
3C-NCOMP(2)	A8H0676-02	Soil	08/23/18 10:53	08/23/18 15:25
3C-SCOMP(2)	A8H0676-03	Soil	08/23/18 11:06	08/23/18 15:25
20B-NCOMP(2)	A8H0676-04	Soil	08/23/18 11:28	08/23/18 15:25
20B-SCOMP(2)	A8H0676-05	Soil	08/23/18 11:43	08/23/18 15:25
20C-NCOMP(2)	A8H0676-06	Soil	08/23/18 13:05	08/23/18 15:25
20C-SCOMP(2)	A8H0676-07	Soil	08/23/18 13:08	08/23/18 15:25
21D-NCOMP(2)	A8H0676-08	Soil	08/23/18 13:15	08/23/18 15:25
21D-SCOMP(2)	A8H0676-09	Soil	08/23/18 13:09	08/23/18 15:25

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0676 - 08 30 18 0644</b>
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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>3B-SCOMP(2) (A8H0676-01)</b>			<b>Matrix: Soil</b>			<b>Batch: 8081136</b>		
Dieldrin	ND	---	0.000989	mg/kg dry	1	08/28/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 63 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/28/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>75 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/28/18</i>	<i>EPA 8081B</i>	
<b>3C-NCOMP(2) (A8H0676-02)</b>			<b>Matrix: Soil</b>			<b>Batch: 8081136</b>		
Dieldrin	<b>0.0511</b>	---	0.00105	mg/kg dry	1	08/28/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 72 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/28/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>93 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/28/18</i>	<i>EPA 8081B</i>	
<b>3C-SCOMP(2) (A8H0676-03)</b>			<b>Matrix: Soil</b>			<b>Batch: 8081136</b>		
Dieldrin	<b>0.00486</b>	---	0.00101	mg/kg dry	1	08/28/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 79 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/28/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>95 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/28/18</i>	<i>EPA 8081B</i>	
<b>20B-NCOMP(2) (A8H0676-04)</b>			<b>Matrix: Soil</b>			<b>Batch: 8081136</b>		
Dieldrin	<b>0.00218</b>	---	0.00100	mg/kg dry	1	08/28/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 78 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/28/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>99 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/28/18</i>	<i>EPA 8081B</i>	
<b>20B-SCOMP(2) (A8H0676-05)</b>			<b>Matrix: Soil</b>			<b>Batch: 8081136</b>		
Dieldrin	<b>0.00648</b>	---	0.000988	mg/kg dry	1	08/28/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 79 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/28/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>101 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/28/18</i>	<i>EPA 8081B</i>	
<b>20C-NCOMP(2) (A8H0676-06)</b>			<b>Matrix: Soil</b>			<b>Batch: 8081136</b>		
Dieldrin	<b>0.00450</b>	---	0.00100	mg/kg dry	1	08/28/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 74 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/28/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>101 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/28/18</i>	<i>EPA 8081B</i>	
<b>20C-SCOMP(2) (A8H0676-07)</b>			<b>Matrix: Soil</b>			<b>Batch: 8081136</b>		
Dieldrin	<b>0.00798</b>	---	0.00106	mg/kg dry	1	08/28/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 80 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/28/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>96 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/28/18</i>	<i>EPA 8081B</i>	

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0676 - 08 30 18 0644</b>
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ANALYTICAL SAMPLE RESULTS

Organochlorine Pesticides by EPA 8081B

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>21D-NCOMP(2) (A8H0676-08)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081136</b>		
Dieldrin	ND	---	0.00105	mg/kg dry	1	08/28/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 77 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/28/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>96 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/28/18</i>	<i>EPA 8081B</i>
<b>21D-SCOMP(2) (A8H0676-09)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081136</b>		
Dieldrin	<b>0.00636</b>	---	0.00105	mg/kg dry	1	08/28/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 79 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/28/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>102 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/28/18</i>	<i>EPA 8081B</i>

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0676 - 08 30 18 0644</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>3B-SCOMP(2) (A8H0676-01)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081107</b>	
% Solids	90.0	---	1.00	% by Weight	1	08/27/18	EPA 8000C	
<b>3C-NCOMP(2) (A8H0676-02)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081107</b>	
% Solids	87.8	---	1.00	% by Weight	1	08/27/18	EPA 8000C	
<b>3C-SCOMP(2) (A8H0676-03)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081107</b>	
% Solids	87.9	---	1.00	% by Weight	1	08/27/18	EPA 8000C	
<b>20B-NCOMP(2) (A8H0676-04)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081107</b>	
% Solids	89.1	---	1.00	% by Weight	1	08/27/18	EPA 8000C	
<b>20B-SCOMP(2) (A8H0676-05)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081107</b>	
% Solids	89.1	---	1.00	% by Weight	1	08/27/18	EPA 8000C	
<b>20C-NCOMP(2) (A8H0676-06)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081107</b>	
% Solids	88.2	---	1.00	% by Weight	1	08/27/18	EPA 8000C	
<b>20C-SCOMP(2) (A8H0676-07)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081107</b>	
% Solids	88.3	---	1.00	% by Weight	1	08/27/18	EPA 8000C	
<b>21D-NCOMP(2) (A8H0676-08)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081107</b>	
% Solids	88.5	---	1.00	% by Weight	1	08/27/18	EPA 8000C	
<b>21D-SCOMP(2) (A8H0676-09)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081107</b>	
% Solids	88.1	---	1.00	% by Weight	1	08/27/18	EPA 8000C	

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**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0676 - 08 30 18 0644**

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8081136 - EPA 3546</b>												
<b>Soil</b>												
<b>Blank (8081136-BLK1)</b>												
Prepared: 08/27/18 08:10 Analyzed: 08/28/18 12:38												
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>												
<i>Recovery: 78 % Limits: 42-129 % Dilution: 1x</i>												
<i>Decachlorobiphenyl (Surr)</i>												
<i>98 % 65-151 % "</i>												
<b>LCS (8081136-BS1)</b>												
Prepared: 08/27/18 08:10 Analyzed: 08/28/18 12:56												
<u>EPA 8081B</u>												
Dieldrin	0.0503	---	0.00100	mg/kg wet	1	0.0500	---	101	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>												
<i>Recovery: 83 % Limits: 42-129 % Dilution: 1x</i>												
<i>Decachlorobiphenyl (Surr)</i>												
<i>104 % 65-151 % "</i>												
<b>Duplicate (8081136-DUP1)</b>												
Prepared: 08/27/18 08:10 Analyzed: 08/28/18 13:31												
<u>QC Source Sample: 3B-SCOMP(2) (A8H0676-01)</u>												
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.000944	mg/kg dry	1	---	0.000500	---	---	***	30%	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>												
<i>Recovery: 68 % Limits: 42-129 % Dilution: 1x</i>												
<i>Decachlorobiphenyl (Surr)</i>												
<i>84 % 65-151 % "</i>												
<b>Matrix Spike (8081136-MS1)</b>												
Prepared: 08/27/18 08:10 Analyzed: 08/28/18 16:42												
<u>QC Source Sample: 21D-SCOMP(2) (A8H0676-09)</u>												
<u>EPA 8081B</u>												
Dieldrin	0.0539	---	0.00103	mg/kg dry	1	0.0514	0.00636	92	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>												
<i>Recovery: 82 % Limits: 42-129 % Dilution: 1x</i>												
<i>Decachlorobiphenyl (Surr)</i>												
<i>103 % 65-151 % "</i>												

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Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0676 - 08 30 18 0644**

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8081107 - Total Solids (Dry Weight)</b>							<b>Soil</b>					
<b>Duplicate (8081107-DUP1)</b>			Prepared: 08/24/18 10:36 Analyzed: 08/27/18 08:15									
<u>QC Source Sample: 3B-SCOMP(2) (A8H0676-01)</u>												
<u>EPA 8000C</u>												
% Solids	89.4	---	1.00	% by Weight	1	---	90.0	---	---	0.6	10%	
<b>Duplicate (8081107-DUP2)</b>			Prepared: 08/24/18 10:36 Analyzed: 08/27/18 08:15									
<u>QC Source Sample: Non-SDG (A8H0678-01)</u>												
% Solids	96.1	---	1.00	% by Weight	1	---	96.1	---	---	0.01	10%	
<b>Duplicate (8081107-DUP3)</b>			Prepared: 08/24/18 10:36 Analyzed: 08/27/18 08:15									
<u>QC Source Sample: Non-SDG (A8H0692-13)</u>												
% Solids	93.3	---	1.00	% by Weight	1	---	93.4	---	---	0.1	10%	
<b>Duplicate (8081107-DUP4)</b>			Prepared: 08/24/18 18:43 Analyzed: 08/27/18 08:15									
<u>QC Source Sample: Non-SDG (A8H0720-03)</u>												
% Solids	81.1	---	1.00	% by Weight	1	---	81.9	---	---	0.9	10%	
<b>Duplicate (8081107-DUP5)</b>			Prepared: 08/24/18 18:43 Analyzed: 08/27/18 08:15									
<u>QC Source Sample: Non-SDG (A8H0725-05)</u>												
% Solids	93.6	---	1.00	% by Weight	1	---	93.8	---	---	0.2	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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Darwin Thomas, Business Development Director



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0676 - 08 30 18 0644**

**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8081136							
A8H0676-01	Soil	EPA 8081B	08/23/18 10:32	08/27/18 08:10	11.24g/5mL	10g/5mL	0.89
A8H0676-02	Soil	EPA 8081B	08/23/18 10:53	08/27/18 08:10	10.84g/5mL	10g/5mL	0.92
A8H0676-03	Soil	EPA 8081B	08/23/18 11:06	08/27/18 08:10	11.23g/5mL	10g/5mL	0.89
A8H0676-04	Soil	EPA 8081B	08/23/18 11:28	08/27/18 08:10	11.17g/5mL	10g/5mL	0.90
A8H0676-05	Soil	EPA 8081B	08/23/18 11:43	08/27/18 08:10	11.35g/5mL	10g/5mL	0.88
A8H0676-06	Soil	EPA 8081B	08/23/18 13:05	08/27/18 08:10	11.34g/5mL	10g/5mL	0.88
A8H0676-07	Soil	EPA 8081B	08/23/18 13:08	08/27/18 08:10	10.69g/5mL	10g/5mL	0.94
A8H0676-08	Soil	EPA 8081B	08/23/18 13:15	08/27/18 08:10	10.75g/5mL	10g/5mL	0.93
A8H0676-09	Soil	EPA 8081B	08/23/18 13:09	08/27/18 08:10	10.84g/5mL	10g/5mL	0.92

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8081107							
A8H0676-01	Soil	EPA 8000C	08/23/18 10:32	08/24/18 10:36			NA
A8H0676-02	Soil	EPA 8000C	08/23/18 10:53	08/24/18 10:36			NA
A8H0676-03	Soil	EPA 8000C	08/23/18 11:06	08/24/18 10:36			NA
A8H0676-04	Soil	EPA 8000C	08/23/18 11:28	08/24/18 10:36			NA
A8H0676-05	Soil	EPA 8000C	08/23/18 11:43	08/24/18 10:36			NA
A8H0676-06	Soil	EPA 8000C	08/23/18 13:05	08/24/18 10:36			NA
A8H0676-07	Soil	EPA 8000C	08/23/18 13:08	08/24/18 10:36			NA
A8H0676-08	Soil	EPA 8000C	08/23/18 13:15	08/24/18 10:36			NA
A8H0676-09	Soil	EPA 8000C	08/23/18 13:09	08/24/18 10:36			NA

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Darwin Thomas, Business Development Director



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12232 S.W. Garden Place  
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503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0676 - 08 30 18 0644**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**There are No Qualifiers on Sample or QC Data for this report**

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Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0676 - 08 30 18 0644**

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

DET Analyte DETECTED at or above the detection or reporting limit.  
ND Analyte NOT DETECTED at or above the detection or reporting limit.  
NR Result Not Reported  
RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.  
"dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.  
"wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.  
" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.  
" \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

Apex Laboratories

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0676 - 08 30 18 0644</b>
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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

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**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0676 - 08 30 18 0644**

**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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Darwin Thomas, Business Development Director





Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8H0676 - 08 30 18 0644

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geological Element WO#: A8 H0676  
Project/Project #: Northstar / 1503.20

**Delivery info:**

Date/Time Received: 8/23/18 @ 1525 By: OB  
Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: OB : 8/23/18 @ 1525

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>5.6</u>						
Received on Ice? (Y/N)	<u>Y</u>						
Temp. Blanks? (Y/N)	<u>N</u>						
Ice Type: (Gel/Real/Other)	<u>Gel</u>						
Condition:							

Cooler out of temp? (Y/N)  Possible reason why:  
If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA

**Samples Inspection:** Inspected by: OB : 8/23/18 @ 1525

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: 20C-NCOMP(2) time on cont. reads 13:29. 20C-SCOMP(2) time on cont. reads 13:15.

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

Additional Information: 21D-NCOMP(2) time on cont. reads 13:05.  
21D-SCOMP(2) time on cont. reads 13:08

Labeled by: OB Witness: B Cooler Inspected by: Client See Project Contact Form: Y



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Thursday, September 6, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8H0580 - Northstar - 1503.02

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8H0580, which was received by the laboratory on 8/21/2018 at 1:26:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Darwin Thomas, Business Development Director



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EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.02**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0580 - 09 06 18 1426**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
21A-NCOMP	A8H0580-01	Soil	08/21/18 10:39	08/21/18 13:26
21A-SCOMP	A8H0580-02	Soil	08/21/18 10:42	08/21/18 13:26
21B-NCOMP	A8H0580-03	Soil	08/21/18 11:00	08/21/18 13:26
21B-SCOMP	A8H0580-04	Soil	08/21/18 11:03	08/21/18 13:26
21C-NCOMP	A8H0580-05	Soil	08/21/18 11:59	08/21/18 13:26
21C-SCOMP	A8H0580-06	Soil	08/21/18 12:02	08/21/18 13:26
24B-NCOMP	A8H0580-07	Soil	08/21/18 12:16	08/21/18 13:26
24B-SCOMP	A8H0580-08	Soil	08/21/18 12:20	08/21/18 13:26

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.02</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0580 - 09 06 18 1426</b>
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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>21A-NCOMP (A8H0580-01)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081001</b>		
<b>Dieldrin</b>	<b>0.00788</b>	---	0.00102	mg/kg dry	1	08/27/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 81 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/27/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>103 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/27/18</i>	<i>EPA 8081B</i>
<b>21A-SCOMP (A8H0580-02)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081001</b>		
<b>Dieldrin</b>	<b>0.00493</b>	---	0.00103	mg/kg dry	1	08/27/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 84 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/27/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>122 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/27/18</i>	<i>EPA 8081B</i>
<b>21B-NCOMP (A8H0580-03)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081001</b>		
Dieldrin	ND	---	0.00103	mg/kg dry	1	08/27/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 81 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/27/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>103 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/27/18</i>	<i>EPA 8081B</i>
<b>21B-SCOMP (A8H0580-04)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081001</b>		
<b>Dieldrin</b>	<b>0.00398</b>	---	0.00101	mg/kg dry	1	08/27/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 83 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/27/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>102 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/27/18</i>	<i>EPA 8081B</i>
<b>21C-NCOMP (A8H0580-05)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081001</b>		
Dieldrin	ND	---	0.00106	mg/kg dry	1	08/27/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 87 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/27/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>111 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/27/18</i>	<i>EPA 8081B</i>
<b>21C-SCOMP (A8H0580-06)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081001</b>		
<b>Dieldrin</b>	<b>0.00167</b>	---	0.00100	mg/kg dry	1	08/27/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 84 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/27/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>100 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/27/18</i>	<i>EPA 8081B</i>
<b>24B-NCOMP (A8H0580-07)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081001</b>		
<b>Dieldrin</b>	<b>0.00559</b>	---	0.00105	mg/kg dry	1	08/27/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 93 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/27/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>105 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/27/18</i>	<i>EPA 8081B</i>
<b>24B-SCOMP (A8H0580-08)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081001</b>		

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Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
 Tigard, OR 97223  
 503-718-2323  
 EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.02</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0580 - 09 06 18 1426</b>
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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>24B-SCOMP (A8H0580-08)</b>				<b>Matrix: Soil</b>		<b>Batch: 8081001</b>		
<b>Dieldrin</b>	<b>0.00400</b>	---	0.00101	mg/kg dry	1	08/27/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 87 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/27/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>112 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/27/18</i>	<i>EPA 8081B</i>

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.02</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0580 - 09 06 18 1426</b>
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**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>21A-NCOMP (A8H0580-01)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081008</b>	
% Solids	91.8	---	1.00	% by Weight	1	08/23/18	EPA 8000C	
<b>21A-SCOMP (A8H0580-02)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081008</b>	
% Solids	88.8	---	1.00	% by Weight	1	08/23/18	EPA 8000C	
<b>21B-NCOMP (A8H0580-03)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081008</b>	
% Solids	90.9	---	1.00	% by Weight	1	08/23/18	EPA 8000C	
<b>21B-SCOMP (A8H0580-04)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081008</b>	
% Solids	88.4	---	1.00	% by Weight	1	08/23/18	EPA 8000C	
<b>21C-NCOMP (A8H0580-05)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081008</b>	
% Solids	87.2	---	1.00	% by Weight	1	08/23/18	EPA 8000C	
<b>21C-SCOMP (A8H0580-06)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081008</b>	
% Solids	88.9	---	1.00	% by Weight	1	08/23/18	EPA 8000C	
<b>24B-NCOMP (A8H0580-07)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081008</b>	
% Solids	88.6	---	1.00	% by Weight	1	08/23/18	EPA 8000C	
<b>24B-SCOMP (A8H0580-08)</b>				<b>Matrix: Soil</b>			<b>Batch: 8081008</b>	
% Solids	90.6	---	1.00	% by Weight	1	08/23/18	EPA 8000C	

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.02</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0580 - 09 06 18 1426</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8081001 - EPA 3546</b>						<b>Soil</b>						
<b>Blank (8081001-BLK1)</b>			Prepared: 08/22/18 07:23 Analyzed: 08/27/18 13:45									
<u>EPA 8081B</u>												
4,4'-DDT	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Dieldrin	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Surr: 2,4,5,6-TCMX (Surr)		Recovery: 93 %		Limits: 42-129 %		Dilution: 1x						
Decachlorobiphenyl (Surr)		106 %		65-151 %		"						
<b>LCS (8081001-BS1)</b>						Prepared: 08/22/18 07:23 Analyzed: 08/27/18 14:02						
<u>EPA 8081B</u>												
4,4'-DDT	0.0609	---	0.00100	mg/kg wet	1	0.0500	---	122	50-141%	---	---	
Dieldrin	0.0579	---	0.00100	mg/kg wet	1	0.0500	---	116	56-136%	---	---	
Surr: 2,4,5,6-TCMX (Surr)		Recovery: 87 %		Limits: 42-129 %		Dilution: 1x						
Decachlorobiphenyl (Surr)		111 %		65-151 %		"						

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**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.02**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0580 - 09 06 18 1426**

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8081008 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (8081008-DUP1)</b>			Prepared: 08/22/18 09:34 Analyzed: 08/23/18 08:42									
<u>QC Source Sample: Non-SDG (A8H0536-02)</u>												
% Solids	83.8	---	1.00	% by Weight	1	---	84.2	---	---	0.5	10%	
<b>Duplicate (8081008-DUP2)</b>			Prepared: 08/22/18 09:34 Analyzed: 08/23/18 08:42									
<u>QC Source Sample: Non-SDG (A8H0562-02)</u>												
% Solids	85.2	---	1.00	% by Weight	1	---	87.0	---	---	2	10%	
<b>Duplicate (8081008-DUP3)</b>			Prepared: 08/22/18 09:34 Analyzed: 08/23/18 08:42									
<u>QC Source Sample: 21C-SCOMP (A8H0580-06)</u>												
<u>EPA 8000C</u>												
% Solids	88.9	---	1.00	% by Weight	1	---	88.9	---	---	0.02	10%	
<b>Duplicate (8081008-DUP4)</b>			Prepared: 08/22/18 09:34 Analyzed: 08/23/18 08:42									
<u>QC Source Sample: Non-SDG (A8H0586-05)</u>												
% Solids	99.5	---	1.00	% by Weight	1	---	99.7	---	---	0.1	10%	
<b>Duplicate (8081008-DUP5)</b>			Prepared: 08/22/18 09:34 Analyzed: 08/23/18 08:42									
<u>QC Source Sample: Non-SDG (A8H0591-08)</u>												
% Solids	98.1	---	1.00	% by Weight	1	---	98.2	---	---	0.1	10%	
<b>Duplicate (8081008-DUP6)</b>			Prepared: 08/22/18 16:52 Analyzed: 08/23/18 08:42									
<u>QC Source Sample: Non-SDG (A8H0607-10)</u>												
% Solids	72.6	---	1.00	% by Weight	1	---	72.1	---	---	0.7	10%	
<b>Duplicate (8081008-DUP7)</b>			Prepared: 08/22/18 16:52 Analyzed: 08/23/18 08:42									
<u>QC Source Sample: Non-SDG (A8H0636-01)</u>												
% Solids	84.9	---	1.00	% by Weight	1	---	86.6	---	---	2	10%	
<b>Duplicate (8081008-DUP8)</b>			Prepared: 08/22/18 20:23 Analyzed: 08/23/18 08:42									
<u>QC Source Sample: Non-SDG (A8H0647-01)</u>												
% Solids	74.9	---	1.00	% by Weight	1	---	74.7	---	---	0.2	10%	

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**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.02**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0580 - 09 06 18 1426**

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8081008 - Total Solids (Dry Weight)</b>							<b>Soil</b>					
<b>Duplicate (8081008-DUP9)</b>			Prepared: 08/22/18 20:23 Analyzed: 08/23/18 08:42									
<b>QC Source Sample: Non-SDG (A8H0651-04)</b>												
% Solids	75.6	---	1.00	% by Weight	1	---	75.3	---	---	0.3	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.02</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0580 - 09 06 18 1426</b>
---	--	---

**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8081001</u>							
A8H0580-01	Soil	EPA 8081B	08/21/18 10:39	08/22/18 09:19	10.67g/5mL	10g/5mL	0.94
A8H0580-02	Soil	EPA 8081B	08/21/18 10:42	08/22/18 09:19	10.93g/5mL	10g/5mL	0.92
A8H0580-03	Soil	EPA 8081B	08/21/18 11:00	08/22/18 09:19	10.63g/5mL	10g/5mL	0.94
A8H0580-04	Soil	EPA 8081B	08/21/18 11:03	08/22/18 09:19	11.18g/5mL	10g/5mL	0.89
A8H0580-05	Soil	EPA 8081B	08/21/18 11:59	08/22/18 09:19	10.84g/5mL	10g/5mL	0.92
A8H0580-06	Soil	EPA 8081B	08/21/18 12:02	08/22/18 09:19	11.22g/5mL	10g/5mL	0.89
A8H0580-07	Soil	EPA 8081B	08/21/18 12:16	08/22/18 09:19	10.77g/5mL	10g/5mL	0.93
A8H0580-08	Soil	EPA 8081B	08/21/18 12:20	08/22/18 09:19	10.97g/5mL	10g/5mL	0.91

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8081008</u>							
A8H0580-01	Soil	EPA 8000C	08/21/18 10:39	08/22/18 09:34			NA
A8H0580-02	Soil	EPA 8000C	08/21/18 10:42	08/22/18 09:34			NA
A8H0580-03	Soil	EPA 8000C	08/21/18 11:00	08/22/18 09:34			NA
A8H0580-04	Soil	EPA 8000C	08/21/18 11:03	08/22/18 09:34			NA
A8H0580-05	Soil	EPA 8000C	08/21/18 11:59	08/22/18 09:34			NA
A8H0580-06	Soil	EPA 8000C	08/21/18 12:02	08/22/18 09:34			NA
A8H0580-07	Soil	EPA 8000C	08/21/18 12:16	08/22/18 09:34			NA
A8H0580-08	Soil	EPA 8000C	08/21/18 12:20	08/22/18 09:34			NA

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503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.02  
Project Manager: Erik Anderson

Report ID:  
A8H0580 - 09 06 18 1426

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**There are No Qualifiers on Sample or QC Data for this report**

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Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.02**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0580 - 09 06 18 1426**

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
- "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

Apex Laboratories

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Project Number: **1503.02**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0580 - 09 06 18 1426**

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

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PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.02**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0580 - 09 06 18 1426**

**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Darwin Thomas, Business Development Director



Anderson Geological Project: Northstar  
 PO Box 649 Project Number: 1503.02  
 Wilsonville, OR 97070 Project Manager: Erik Anderson Report ID: A8H0580 - 09 06 18 1426

Lab # A8H0580 COC 1 of 1

**CHAIN OF CUSTODY**

Company: Anderson Geological Lab # A8H0580 PO# 1503.02  
 Address: Wilsonville, OR Project Mgr: Erik Anderson Project Name: Northstar Email: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Sampled by: E. Anderson

Site Location:  WA  Other: \_\_\_\_\_

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST	
					YES	NO
21A-NComp	8/2/18	10:39	S	1		
21A-SComp		10:42				
21B-NComp		11:00				
21B-SComp		11:03				
21C-NComp		11:59				
21C-SComp		12:02				
24B-NComp		12:16				
24B-SComp		12:20				

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day  2 Day  3 Day  4 DAY  **5 DAY**  Other: \_\_\_\_\_

SPECIAL INSTRUCTIONS: \_\_\_\_\_

RECEIVED BY: \_\_\_\_\_ RECEIVED BY: \_\_\_\_\_  
 Signature: S. L. Date: 8/2/18 Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Printed Name: Erik Anderson Time: \_\_\_\_\_ Printed Name: Charles Heston Time: 13:26  
 Company: AGI Company: Apex Lab

Apex Laboratories

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.02  
Project Manager: Erik Anderson

Report ID:  
A8H0580 - 09 06 18 1426

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geo Element WO#: A8H0580

Project/Project #: Northstar 1503.02

**Delivery info:**

Date/Time Received: 8/21/18 @ 1326 By: CEH

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: CEH : 8/21/18 @ 1405

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>4.2</u>						
Received on Ice? (Y/N)	<u>Y</u>						
Temp. Blanks? (Y/N)	<u>Y</u>						
Ice Type: (Gel/Real/Other)	<u>Gel</u>						
Condition:	<u>Good</u>						

Cooler out of temp? (Y/N) Possible reason why:

If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA

**Samples Inspection:** Inspected by: CEH : 8/21/18 @ 1420

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: \_\_\_\_\_

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

Additional Information: \_\_\_\_\_

Labeled by: CEH Witness: OP Cooler Inspected by: CEH See Project Contact Form: Y



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Thursday, September 6, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8H0523 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8H0523, which was received by the laboratory on 8/17/2018 at 2:36:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

A handwritten signature in black ink, appearing to read "Darwin Thomas".

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---

Darwin Thomas, Business Development Director



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EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0523 - 09 06 18 0648**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
2A-NCOMP	A8H0523-01	Soil	08/17/18 10:38	08/17/18 14:36
2A-SCOMP	A8H0523-02	Soil	08/17/18 10:42	08/17/18 14:36
2B-NCOMP	A8H0523-03	Soil	08/17/18 10:57	08/17/18 14:36
2B-SCOMP	A8H0523-04	Soil	08/17/18 11:01	08/17/18 14:36
2C-NCOMP	A8H0523-05	Soil	08/17/18 12:28	08/17/18 14:36
2C-SCOMP	A8H0523-06	Soil	08/17/18 12:32	08/17/18 14:36
2D-NCOMP	A8H0523-07	Soil	08/17/18 12:46	08/17/18 14:36
2D-SCOMP	A8H0523-08	Soil	08/17/18 12:50	08/17/18 14:36

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0523 - 09 06 18 0648</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>2A-NCOMP (A8H0523-01RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080990</b>		<b>C-05</b>
<b>Dieldrin</b>	<b>0.0510</b>	---	0.00193	mg/kg dry	1	08/22/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 66 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/22/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>111 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/22/18</i>	<i>EPA 8081B</i>	
<b>2A-SCOMP (A8H0523-02RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080990</b>		<b>C-05</b>
<b>Dieldrin</b>	<b>0.0440</b>	---	0.00206	mg/kg dry	1	08/22/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 56 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/22/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>100 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/22/18</i>	<i>EPA 8081B</i>	
<b>2B-NCOMP (A8H0523-03RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080990</b>		<b>C-05</b>
<b>Dieldrin</b>	<b>0.0646</b>	---	0.00211	mg/kg dry	1	08/22/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 68 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/22/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>104 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/22/18</i>	<i>EPA 8081B</i>	
<b>2B-SCOMP (A8H0523-04RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080990</b>		<b>C-05</b>
<b>Dieldrin</b>	<b>0.0286</b>	---	0.00215	mg/kg dry	1	08/22/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 67 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/22/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>105 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/22/18</i>	<i>EPA 8081B</i>	
<b>2C-NCOMP (A8H0523-05RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080990</b>		<b>C-05</b>
<b>Dieldrin</b>	<b>0.0416</b>	---	0.00212	mg/kg dry	1	08/23/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 76 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/23/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>107 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/23/18</i>	<i>EPA 8081B</i>	
<b>2C-SCOMP (A8H0523-06RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080990</b>		<b>C-05</b>
<b>Dieldrin</b>	<b>0.0520</b>	---	0.00205	mg/kg dry	1	08/23/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 83 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/23/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>117 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/23/18</i>	<i>EPA 8081B</i>	
<b>2D-NCOMP (A8H0523-07RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080990</b>		<b>C-05</b>
<b>Dieldrin</b>	<b>0.0570</b>	---	0.00204	mg/kg dry	1	08/23/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 75 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/23/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>108 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/23/18</i>	<i>EPA 8081B</i>	
<b>2D-SCOMP (A8H0523-08RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080990</b>		<b>C-05</b>

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**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0523 - 09 06 18 0648**

**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>2D-SCOMP (A8H0523-08RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080990</b>		<b>C-05</b>
<b>Dieldrin</b>	<b>0.0254</b>	---	0.00193	mg/kg dry	1	08/23/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 83 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/23/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>123 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/23/18</i>	<i>EPA 8081B</i>

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0523 - 09 06 18 0648</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>2A-NCOMP (A8H0523-01)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080983</b>	
% Solids	91.6	---	1.00	% by Weight	1	08/22/18	EPA 8000C	
<b>2A-SCOMP (A8H0523-02)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080983</b>	
% Solids	90.2	---	1.00	% by Weight	1	08/22/18	EPA 8000C	
<b>2B-NCOMP (A8H0523-03)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080983</b>	
% Solids	89.7	---	1.00	% by Weight	1	08/22/18	EPA 8000C	
<b>2B-SCOMP (A8H0523-04)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080983</b>	
% Solids	86.7	---	1.00	% by Weight	1	08/22/18	EPA 8000C	
<b>2C-NCOMP (A8H0523-05)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080983</b>	
% Solids	89.3	---	1.00	% by Weight	1	08/22/18	EPA 8000C	
<b>2C-SCOMP (A8H0523-06)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080983</b>	
% Solids	88.6	---	1.00	% by Weight	1	08/22/18	EPA 8000C	
<b>2D-NCOMP (A8H0523-07)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080983</b>	
% Solids	89.2	---	1.00	% by Weight	1	08/22/18	EPA 8000C	
<b>2D-SCOMP (A8H0523-08)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080983</b>	
% Solids	90.0	---	1.00	% by Weight	1	08/22/18	EPA 8000C	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080911 - EPA 3546</b>						<b>Soil</b>						
<b>Blank (8080911-BLK1)</b>			Prepared: 08/20/18 07:21 Analyzed: 08/24/18 12:02									
<b>EPA 8081B</b>												
4,4'-DDT	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 84 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>100 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>LCS (8080911-BS1)</b>						Prepared: 08/20/18 07:21 Analyzed: 08/24/18 12:20						
<b>EPA 8081B</b>												
4,4'-DDT	0.0646	---	0.00100	mg/kg wet	1	0.0500	---	129	50-141%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 86 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>101 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Matrix Spike (8080911-MS1)</b>						Prepared: 08/20/18 07:21 Analyzed: 08/24/18 14:04						
<b>QC Source Sample: Non-SDG (A8H0506-05)</b>												
<b>EPA 8081B</b>												
4,4'-DDT	0.0852	---	0.00271	mg/kg dry	2	0.0676	0.00531	118	50-141%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 82 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 2x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>104 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Batch 8080990 - EPA 3546/3640A (GPC)</b>						<b>Soil</b>						
<b>Blank (8080990-BLK1)</b>			Prepared: 08/20/18 07:21 Analyzed: 08/22/18 13:11									<b>C-05</b>
<b>EPA 8081B</b>												
Aldrin	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
alpha-BHC	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
beta-BHC	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
delta-BHC	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
gamma-BHC (Lindane)	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
cis-Chlordane	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
trans-Chlordane	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
4,4'-DDD	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
4,4'-DDE	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
4,4'-DDT	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Dieldrin	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Endosulfan I	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080990 - EPA 3546/3640A (GPC)</b>												
<b>Soil</b>												
<b>Blank (8080990-BLK1)</b>			Prepared: 08/20/18 07:21 Analyzed: 08/22/18 13:11						<b>C-05</b>			
Endosulfan II	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Endosulfan sulfate	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Endrin	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Endrin Aldehyde	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Endrin ketone	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Heptachlor	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Heptachlor epoxide	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Methoxychlor	ND	---	0.00500	mg/kg wet	1	---	---	---	---	---	---	
Chlordane (Technical)	ND	---	0.0500	mg/kg wet	1	---	---	---	---	---	---	
Toxaphene (Total)	ND	---	0.0500	mg/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 76 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>108 %</i>		<i>65-151 %</i>		<i>"</i>						

<b>LCS (8080990-BS1)</b>			Prepared: 08/20/18 07:21 Analyzed: 08/22/18 13:28						<b>C-05</b>			
<b>EPA 8081B</b>												
Aldrin	0.0438	---	0.00200	mg/kg wet	1	0.0500	---	88	45-136%	---	---	
alpha-BHC	0.0440	---	0.00200	mg/kg wet	1	0.0500	---	88	45-137%	---	---	
beta-BHC	0.0482	---	0.00200	mg/kg wet	1	0.0500	---	96	50-136%	---	---	
delta-BHC	0.0482	---	0.00200	mg/kg wet	1	0.0500	---	96	47-139%	---	---	
gamma-BHC (Lindane)	0.0449	---	0.00200	mg/kg wet	1	0.0500	---	90	49-135%	---	---	
cis-Chlordane	0.0479	---	0.00200	mg/kg wet	1	0.0500	---	96	54-133%	---	---	
trans-Chlordane	0.0486	---	0.00200	mg/kg wet	1	0.0500	---	97	53-135%	---	---	
4,4'-DDD	0.0583	---	0.00200	mg/kg wet	1	0.0500	---	117	56-139%	---	---	
4,4'-DDE	0.0538	---	0.00200	mg/kg wet	1	0.0500	---	108	56-134%	---	---	
4,4'-DDT	0.0726	---	0.00200	mg/kg wet	1	0.0500	---	<b>145</b>	<b>50-141%</b>	---	---	Q-29
Dieldrin	0.0508	---	0.00200	mg/kg wet	1	0.0500	---	102	56-136%	---	---	
Endosulfan I	0.0469	---	0.00200	mg/kg wet	1	0.0500	---	94	52-132%	---	---	
Endosulfan II	0.0528	---	0.00200	mg/kg wet	1	0.0500	---	106	53-134%	---	---	
Endosulfan sulfate	0.0521	---	0.00200	mg/kg wet	1	0.0500	---	104	55-136%	---	---	
Endrin	0.0610	---	0.00200	mg/kg wet	1	0.0500	---	122	56-140%	---	---	
Endrin Aldehyde	0.0489	---	0.00200	mg/kg wet	1	0.0500	---	98	35-137%	---	---	
Endrin ketone	0.0545	---	0.00200	mg/kg wet	1	0.0500	---	109	55-136%	---	---	
Heptachlor	0.0529	---	0.00200	mg/kg wet	1	0.0500	---	106	47-136%	---	---	
Heptachlor epoxide	0.0469	---	0.00200	mg/kg wet	1	0.0500	---	94	52-136%	---	---	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes	
<b>Batch 8080990 - EPA 3546/3640A (GPC)</b>						<b>Soil</b>							
<b>LCS (8080990-BS1)</b>			Prepared: 08/20/18 07:21 Analyzed: 08/22/18 13:28										<b>C-05</b>
Methoxychlor	0.0782	---	0.00600	mg/kg wet	1	0.0500	---	<b>156</b>	<b>52-143%</b>	---	---	Q-29	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 82 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>							
<i>Decachlorobiphenyl (Surr)</i>		<i>102 %</i>		<i>65-151 %</i>		<i>"</i>							

<b>Duplicate (8080990-DUP1)</b>			Prepared: 08/20/18 07:21 Analyzed: 08/22/18 14:21										<b>C-05</b>
<b>QC Source Sample: Non-SDG (A8H0442-01RE1)</b>													
Aldrin	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
alpha-BHC	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
beta-BHC	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
delta-BHC	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
gamma-BHC (Lindane)	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
cis-Chlordane	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
trans-Chlordane	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
4,4'-DDD	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
4,4'-DDE	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
4,4'-DDT	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
Dieldrin	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
Endosulfan I	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
Endosulfan II	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
Endosulfan sulfate	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
Endrin	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
Endrin Aldehyde	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
Endrin ketone	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
Heptachlor	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
Heptachlor epoxide	ND	---	0.00211	mg/kg dry	1	---	ND	---	---	---	30%		
Methoxychlor	ND	---	0.00632	mg/kg dry	1	---	ND	---	---	---	30%		
Chlordane (Technical)	ND	---	0.0632	mg/kg dry	1	---	ND	---	---	---	30%		
Toxaphene (Total)	ND	---	0.0632	mg/kg dry	1	---	ND	---	---	---	30%		
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 84 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>							
<i>Decachlorobiphenyl (Surr)</i>		<i>103 %</i>		<i>65-151 %</i>		<i>"</i>							

<b>Matrix Spike (8080990-MS1)</b>			Prepared: 08/20/18 07:21 Analyzed: 08/22/18 18:08										<b>C-05</b>
<b>QC Source Sample: Non-SDG (A8H0506-05RE1)</b>													

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080990 - EPA 3546/3640A (GPC)</b>						<b>Soil</b>						
<b>Matrix Spike (8080990-MS1)</b>						Prepared: 08/20/18 07:21 Analyzed: 08/22/18 18:08						<b>C-05</b>
<b>QC Source Sample: Non-SDG (A8H0506-05RE1)</b>												
<b>EPA 8081B</b>												
Aldrin	0.0513	---	0.00271	mg/kg dry	1	0.0676	ND	76	45-136%	---	---	
alpha-BHC	0.0487	---	0.00271	mg/kg dry	1	0.0676	ND	72	45-137%	---	---	
beta-BHC	0.0647	---	0.00271	mg/kg dry	1	0.0676	0.00284	91	50-136%	---	---	
delta-BHC	0.0664	---	0.00271	mg/kg dry	1	0.0676	ND	98	47-139%	---	---	
gamma-BHC (Lindane)	0.0519	---	0.00271	mg/kg dry	1	0.0676	ND	77	49-135%	---	---	
cis-Chlordane	0.0560	---	0.00271	mg/kg dry	1	0.0676	ND	83	54-133%	---	---	
trans-Chlordane	0.0555	---	0.00271	mg/kg dry	1	0.0676	ND	82	53-135%	---	---	
4,4'-DDD	0.0797	---	0.00271	mg/kg dry	1	0.0676	0.00217	115	56-139%	---	---	
4,4'-DDE	0.0774	---	0.00271	mg/kg dry	1	0.0676	0.00859	102	56-134%	---	---	
Dieldrin	0.0584	---	0.00271	mg/kg dry	1	0.0676	ND	86	56-136%	---	---	
Endosulfan I	0.0570	---	0.00271	mg/kg dry	1	0.0676	ND	84	52-132%	---	---	
Endosulfan II	0.0615	---	0.00271	mg/kg dry	1	0.0676	ND	91	53-134%	---	---	
Endosulfan sulfate	0.0655	---	0.00271	mg/kg dry	1	0.0676	ND	97	55-136%	---	---	
Endrin	0.0694	---	0.00271	mg/kg dry	1	0.0676	ND	103	56-140%	---	---	
Endrin Aldehyde	0.0708	---	0.00271	mg/kg dry	1	0.0676	ND	105	35-137%	---	---	
Endrin ketone	0.0657	---	0.00271	mg/kg dry	1	0.0676	ND	97	55-136%	---	---	
Heptachlor	0.0566	---	0.00271	mg/kg dry	1	0.0676	ND	84	47-136%	---	---	
Heptachlor epoxide	0.0548	---	0.00271	mg/kg dry	1	0.0676	ND	81	52-136%	---	---	
Methoxychlor	0.0960	---	0.00812	mg/kg dry	1	0.0676	ND	142	52-143%	---	---	

Surr: 2,4,5,6-TCMX (Surr) Recovery: 65 % Limits: 42-129 % Dilution: 1x  
Decachlorobiphenyl (Surr) 102 % 65-151 % "

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080983 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (8080983-DUP1)</b>			Prepared: 08/21/18 13:48 Analyzed: 08/22/18 08:36									
<u>QC Source Sample: Non-SDG (A8H0508-05)</u>												
% Solids	76.6	---	1.00	% by Weight	1	---	76.7	---	---	0.1	10%	
<b>Duplicate (8080983-DUP2)</b>			Prepared: 08/21/18 13:48 Analyzed: 08/22/18 08:36									
<u>QC Source Sample: Non-SDG (A8H0521-03)</u>												
% Solids	89.5	---	1.00	% by Weight	1	---	89.5	---	---	0.04	10%	
<b>Duplicate (8080983-DUP3)</b>			Prepared: 08/21/18 13:48 Analyzed: 08/22/18 08:36									
<u>QC Source Sample: Non-SDG (A8H0573-01)</u>												
% Solids	86.1	---	1.00	% by Weight	1	---	86.7	---	---	0.7	10%	
<b>Duplicate (8080983-DUP4)</b>			Prepared: 08/21/18 20:07 Analyzed: 08/22/18 08:36									
<u>QC Source Sample: Non-SDG (A8H0495-01)</u>												
% Solids	90.4	---	1.00	% by Weight	1	---	89.7	---	---	0.8	10%	
<b>Duplicate (8080983-DUP5)</b>			Prepared: 08/21/18 20:07 Analyzed: 08/22/18 08:36									
<u>QC Source Sample: Non-SDG (A8H0496-06)</u>												
% Solids	81.6	---	1.00	% by Weight	1	---	81.1	---	---	0.5	10%	
<b>Duplicate (8080983-DUP6)</b>			Prepared: 08/21/18 20:07 Analyzed: 08/22/18 08:36									
<u>QC Source Sample: Non-SDG (A8H0497-08)</u>												
% Solids	85.0	---	1.00	% by Weight	1	---	85.6	---	---	0.8	10%	
<b>Duplicate (8080983-DUP7)</b>			Prepared: 08/21/18 20:07 Analyzed: 08/22/18 08:36									
<u>QC Source Sample: Non-SDG (A8H0504-10)</u>												
% Solids	75.9	---	1.00	% by Weight	1	---	76.3	---	---	0.6	10%	
<b>Duplicate (8080983-DUP8)</b>			Prepared: 08/21/18 20:07 Analyzed: 08/22/18 08:36									
<u>QC Source Sample: Non-SDG (A8H0558-15)</u>												
% Solids	55.7	---	1.00	% by Weight	1	---	54.5	---	---	2	10%	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080983 - Total Solids (Dry Weight)</b>							<b>Soil</b>					
<b>Duplicate (8080983-DUP9)</b>			Prepared: 08/21/18 20:07 Analyzed: 08/22/18 08:36									
<u>QC Source Sample: Non-SDG (A8H0596-01)</u>												
% Solids	93.5	---	1.00	% by Weight	1	---	93.8	---	---	0.4	10%	
<b>Duplicate (8080983-DUPA)</b>			Prepared: 08/21/18 20:07 Analyzed: 08/22/18 08:36									
<u>QC Source Sample: Non-SDG (A8H0603-02)</u>												
% Solids	84.8	---	1.00	% by Weight	1	---	85.6	---	---	1	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0523 - 09 06 18 0648</b>
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**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546/3640A (GPC)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8080990</u>							
A8H0523-01RE1	Soil	EPA 8081B	08/17/18 10:38	08/20/18 07:21	11.34g/10mL	10g/5mL	1.76
A8H0523-02RE1	Soil	EPA 8081B	08/17/18 10:42	08/20/18 07:21	10.78g/10mL	10g/5mL	1.86
A8H0523-03RE1	Soil	EPA 8081B	08/17/18 10:57	08/20/18 07:21	10.56g/10mL	10g/5mL	1.89
A8H0523-04RE1	Soil	EPA 8081B	08/17/18 11:01	08/20/18 07:21	10.74g/10mL	10g/5mL	1.86
A8H0523-05RE1	Soil	EPA 8081B	08/17/18 12:28	08/20/18 07:21	10.55g/10mL	10g/5mL	1.90
A8H0523-06RE1	Soil	EPA 8081B	08/17/18 12:32	08/20/18 07:21	11.02g/10mL	10g/5mL	1.81
A8H0523-07RE1	Soil	EPA 8081B	08/17/18 12:46	08/20/18 07:21	10.97g/10mL	10g/5mL	1.82
A8H0523-08RE1	Soil	EPA 8081B	08/17/18 12:50	08/20/18 07:21	11.51g/10mL	10g/5mL	1.74

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8080983</u>							
A8H0523-01	Soil	EPA 8000C	08/17/18 10:38	08/21/18 13:48			NA
A8H0523-02	Soil	EPA 8000C	08/17/18 10:42	08/21/18 13:48			NA
A8H0523-03	Soil	EPA 8000C	08/17/18 10:57	08/21/18 13:48			NA
A8H0523-04	Soil	EPA 8000C	08/17/18 11:01	08/21/18 13:48			NA
A8H0523-05	Soil	EPA 8000C	08/17/18 12:28	08/21/18 13:48			NA
A8H0523-06	Soil	EPA 8000C	08/17/18 12:32	08/21/18 13:48			NA
A8H0523-07	Soil	EPA 8000C	08/17/18 12:46	08/21/18 13:48			NA
A8H0523-08	Soil	EPA 8000C	08/17/18 12:50	08/21/18 13:48			NA

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12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0523 - 09 06 18 0648**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**Apex Laboratories**

- C-05** Extract has undergone a GPC (Gel-Permeation Chromatography) cleanup per EPA 3640A. Reporting levels may be raised due to dilution necessary for cleanup. Sample Final Volume includes the GPC dilution factor, see the Prep page for details.
- Q-29** Recovery for Lab Control Spike (LCS) is above the upper control limit. Data may be biased high.

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Darwin Thomas, Business Development Director



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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

DET Analyte DETECTED at or above the detection or reporting limit.  
ND Analyte NOT DETECTED at or above the detection or reporting limit.  
NR Result Not Reported  
RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.  
  
"dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.  
  
"wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.  
  
" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.  
  
" \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

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Project Number: **1503.20**  
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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0523 - 09 06 18 0648</b>
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**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8H0523 - 09 06 18 0648

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geo Element WO#: A8 #0523

Project/Project #: Northstar

**Delivery info:**

Date/Time Received: 8/17/18 @ 14:36 By: WJ

Delivered by: Apex Client  ESS FedEx UPS Swift Senvoy SDS Other

Cooler Inspection Inspected by: WJ : 8/17/18 @ 14:36

Chain of Custody Included? Yes  No \_\_\_ Custody Seals? Yes \_\_\_ No

Signed/Dated by Client? Yes  No \_\_\_

Signed/Dated by Apex? Yes  No \_\_\_

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>0.4</u>						
Received on Ice? (Y/N)	<u>Y</u>						
Temp. Blanks? (Y/N)	<u>N</u>						
Ice Type: (Gel/Real/Other)	<u>Gel</u>						
Condition:	<u>Good</u>						

Cooler out of temp? (Y/N) Possible reason why:

If some coolers are in temp and some out, were ~~good~~ not applied to out of temperature samples? Yes/No/NA

Samples Inspection: Inspected by: WJ : 8/17/18 @ 17:50

All Samples Intact? Yes  No \_\_\_ Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No \_\_\_ Comments: \_\_\_\_\_

Containers/Volumes Received Appropriate for Analysis? Yes  No \_\_\_ Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes \_\_\_ No \_\_\_ NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes \_\_\_ No \_\_\_ NA

Comments: \_\_\_\_\_

Additional Information: \_\_\_\_\_

Labeled by: AD Witness: CFH Cooler Inspected by: Client See Project Contact Form: Y



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Thursday, August 16, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8H0254 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8H0254, which was received by the laboratory on 8/9/2018 at 3:08:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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A handwritten signature in black ink, appearing to read "Darwin Thomas".

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Darwin Thomas, Business Development Director



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EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8H0254 - 08 16 18 0753

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
24D-NA	A8H0254-01	Soil	07/30/18 13:41	08/09/18 15:08
24D-NB	A8H0254-02	Soil	07/30/18 13:43	08/09/18 15:08
24D-NC	A8H0254-03	Soil	07/30/18 13:45	08/09/18 15:08
24D-ND	A8H0254-04	Soil	07/30/18 13:47	08/09/18 15:08
24D-SA	A8H0254-05	Soil	07/30/18 13:49	08/09/18 15:08
24D-SB	A8H0254-06	Soil	07/30/18 13:51	08/09/18 15:08
24D-SC	A8H0254-07	Soil	07/30/18 13:53	08/09/18 15:08
24D-SD	A8H0254-08	Soil	07/30/18 13:55	08/09/18 15:08

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Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0254 - 08 16 18 0753**

**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>24D-NA (A8H0254-01)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080654</b>		
<b>Dieldrin</b>	<b>0.0198</b>	---	0.000998	mg/kg dry	1	08/13/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 79 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>84 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<b>24D-NB (A8H0254-02)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080654</b>		
Dieldrin	ND	---	0.00105	mg/kg dry	1	08/13/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 80 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>81 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<b>24D-NC (A8H0254-03)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080654</b>		
<b>Dieldrin</b>	<b>0.00944</b>	---	0.00109	mg/kg dry	1	08/13/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 75 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>76 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<b>24D-ND (A8H0254-04)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080654</b>		
Dieldrin	ND	---	0.00101	mg/kg dry	1	08/13/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 76 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>80 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<b>24D-SA (A8H0254-05)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080654</b>		
<b>Dieldrin</b>	<b>0.00236</b>	---	0.000984	mg/kg dry	1	08/13/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 81 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>86 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<b>24D-SB (A8H0254-06)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080654</b>		
<b>Dieldrin</b>	<b>0.0119</b>	---	0.00103	mg/kg dry	1	08/13/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 71 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>75 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<b>24D-SC (A8H0254-07)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080654</b>		
<b>Dieldrin</b>	<b>0.0179</b>	---	0.00105	mg/kg dry	1	08/13/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 80 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>80 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>

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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>24D-SD (A8H0254-08)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080654</b>		
<b>Dieldrin</b>	<b>0.00576</b>	---	0.000962	mg/kg dry	1	08/13/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 77 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>81 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>	

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---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>24D-NA (A8H0254-01)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080650</b>	
% Solids	92.0	---	1.00	% by Weight	1	08/13/18	EPA 8000C	
<b>24D-NB (A8H0254-02)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080650</b>	
% Solids	89.6	---	1.00	% by Weight	1	08/13/18	EPA 8000C	
<b>24D-NC (A8H0254-03)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080650</b>	
% Solids	88.8	---	1.00	% by Weight	1	08/13/18	EPA 8000C	
<b>24D-ND (A8H0254-04)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080650</b>	
% Solids	90.5	---	1.00	% by Weight	1	08/13/18	EPA 8000C	
<b>24D-SA (A8H0254-05)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080650</b>	
% Solids	87.9	---	1.00	% by Weight	1	08/13/18	EPA 8000C	
<b>24D-SB (A8H0254-06)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080650</b>	
% Solids	90.3	---	1.00	% by Weight	1	08/13/18	EPA 8000C	
<b>24D-SC (A8H0254-07)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080650</b>	
% Solids	90.2	---	1.00	% by Weight	1	08/13/18	EPA 8000C	
<b>24D-SD (A8H0254-08)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080650</b>	
% Solids	89.4	---	1.00	% by Weight	1	08/13/18	EPA 8000C	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080654 - EPA 3546</b>												
<b>Soil</b>												
<b>Blank (8080654-BLK1)</b>												
Prepared: 08/10/18 10:06 Analyzed: 08/13/18 12:52												
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>												
<i>Recovery: 90 % Limits: 42-129 % Dilution: 1x</i>												
<i>Decachlorobiphenyl (Surr)</i>												
<i>92 % 65-151 % "</i>												
<b>LCS (8080654-BS1)</b>												
Prepared: 08/10/18 10:06 Analyzed: 08/13/18 13:10												
<u>EPA 8081B</u>												
Dieldrin	0.0472	---	0.00100	mg/kg wet	1	0.0500	---	94	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>												
<i>Recovery: 89 % Limits: 42-129 % Dilution: 1x</i>												
<i>Decachlorobiphenyl (Surr)</i>												
<i>87 % 65-151 % "</i>												
<b>Duplicate (8080654-DUP1)</b>												
Prepared: 08/10/18 10:06 Analyzed: 08/13/18 13:45												
<u>QC Source Sample: 24D-NA (A8H0254-01)</u>												
<u>EPA 8081B</u>												
Dieldrin	0.0153	---	0.00100	mg/kg dry	1	---	0.0198	---	---	26	30%	
Chlordane (Technical)	ND	---	0.0301	mg/kg dry	1	---	ND	---	---	---	30%	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>												
<i>Recovery: 63 % Limits: 42-129 % Dilution: 1x</i>												
<i>Decachlorobiphenyl (Surr)</i>												
<i>66 % 65-151 % "</i>												
<b>Matrix Spike (8080654-MS1)</b>												
Prepared: 08/10/18 10:06 Analyzed: 08/13/18 16:41												
<u>QC Source Sample: 24D-SD (A8H0254-08)</u>												
<u>EPA 8081B</u>												
Dieldrin	0.0454	---	0.000962	mg/kg dry	1	0.0481	0.00576	82	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>												
<i>Recovery: 81 % Limits: 42-129 % Dilution: 1x</i>												
<i>Decachlorobiphenyl (Surr)</i>												
<i>80 % 65-151 % "</i>												

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**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0254 - 08 16 18 0753**

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080650 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (8080650-DUP1)</b>			Prepared: 08/10/18 09:41 Analyzed: 08/13/18 08:36									
<u>QC Source Sample: Non-SDG (A8H0239-01)</u>												
% Solids	90.0	---	1.00	% by Weight	1	---	90.7	---	---	0.8	10%	
<b>Duplicate (8080650-DUP2)</b>			Prepared: 08/10/18 09:41 Analyzed: 08/13/18 08:36									
<u>QC Source Sample: Non-SDG (A8H0239-12)</u>												
% Solids	86.5	---	1.00	% by Weight	1	---	87.3	---	---	0.9	10%	
<b>Duplicate (8080650-DUP3)</b>			Prepared: 08/10/18 09:41 Analyzed: 08/13/18 08:36									
<u>QC Source Sample: Non-SDG (A8H0240-01)</u>												
% Solids	97.9	---	1.00	% by Weight	1	---	98.3	---	---	0.4	10%	
<b>Duplicate (8080650-DUP4)</b>			Prepared: 08/10/18 09:41 Analyzed: 08/13/18 08:36									
<u>QC Source Sample: Non-SDG (A8H0244-12)</u>												
% Solids	72.8	---	1.00	% by Weight	1	---	71.5	---	---	2	10%	
<b>Duplicate (8080650-DUP5)</b>			Prepared: 08/10/18 09:41 Analyzed: 08/13/18 08:36									
<u>QC Source Sample: Non-SDG (A8H0252-05)</u>												
% Solids	84.4	---	1.00	% by Weight	1	---	82.8	---	---	2	10%	
<b>Duplicate (8080650-DUP6)</b>			Prepared: 08/10/18 09:41 Analyzed: 08/13/18 08:36									
<u>QC Source Sample: Non-SDG (A8H0257-10)</u>												
% Solids	67.1	---	1.00	% by Weight	1	---	68.1	---	---	2	10%	
<b>Duplicate (8080650-DUP7)</b>			Prepared: 08/10/18 09:41 Analyzed: 08/13/18 08:36									
<u>QC Source Sample: Non-SDG (A8H0257-31)</u>												
% Solids	70.8	---	1.00	% by Weight	1	---	71.5	---	---	1	10%	
<b>Duplicate (8080650-DUP8)</b>			Prepared: 08/10/18 18:37 Analyzed: 08/13/18 08:36									
<u>QC Source Sample: Non-SDG (A8H0300-01)</u>												
% Solids	81.1	---	1.00	% by Weight	1	---	82.0	---	---	1	10%	

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**Apex Laboratories, LLC**

12232 S.W. Garden Place  
 Tigard, OR 97223  
 503-718-2323  
EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0254 - 08 16 18 0753</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080650 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (8080650-DUP9)</b>						Prepared: 08/10/18 18:37 Analyzed: 08/13/18 08:36						
<b>QC Source Sample: Non-SDG (A8H0302-02)</b>												
% Solids	<b>88.0</b>	---	1.00	% by Weight	1	---	87.9	---	---	0.2	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0254 - 08 16 18 0753</b>
---	--	---

**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8080654</u>							
A8H0254-01	Soil	EPA 8081B	07/30/18 13:41	08/10/18 10:06	10.89g/5mL	10g/5mL	0.92
A8H0254-02	Soil	EPA 8081B	07/30/18 13:43	08/10/18 10:06	10.64g/5mL	10g/5mL	0.94
A8H0254-03	Soil	EPA 8081B	07/30/18 13:45	08/10/18 10:06	10.35g/5mL	10g/5mL	0.97
A8H0254-04	Soil	EPA 8081B	07/30/18 13:47	08/10/18 10:06	10.97g/5mL	10g/5mL	0.91
A8H0254-05	Soil	EPA 8081B	07/30/18 13:49	08/10/18 10:06	11.56g/5mL	10g/5mL	0.87
A8H0254-06	Soil	EPA 8081B	07/30/18 13:51	08/10/18 10:06	10.79g/5mL	10g/5mL	0.93
A8H0254-07	Soil	EPA 8081B	07/30/18 13:53	08/10/18 10:06	10.51g/5mL	10g/5mL	0.95
A8H0254-08	Soil	EPA 8081B	07/30/18 13:55	08/10/18 10:06	11.64g/5mL	10g/5mL	0.86

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8080650</u>							
A8H0254-01	Soil	EPA 8000C	07/30/18 13:41	08/10/18 09:41			NA
A8H0254-02	Soil	EPA 8000C	07/30/18 13:43	08/10/18 09:41			NA
A8H0254-03	Soil	EPA 8000C	07/30/18 13:45	08/10/18 09:41			NA
A8H0254-04	Soil	EPA 8000C	07/30/18 13:47	08/10/18 09:41			NA
A8H0254-05	Soil	EPA 8000C	07/30/18 13:49	08/10/18 09:41			NA
A8H0254-06	Soil	EPA 8000C	07/30/18 13:51	08/10/18 09:41			NA
A8H0254-07	Soil	EPA 8000C	07/30/18 13:53	08/10/18 09:41			NA
A8H0254-08	Soil	EPA 8000C	07/30/18 13:55	08/10/18 09:41			NA

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503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0254 - 08 16 18 0753**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**There are No Qualifiers on Sample or QC Data for this report**

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Darwin Thomas, Business Development Director



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PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0254 - 08 16 18 0753**

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

DET Analyte DETECTED at or above the detection or reporting limit.  
ND Analyte NOT DETECTED at or above the detection or reporting limit.  
NR Result Not Reported  
RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.  
  
"dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.  
  
"wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.  
  
" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.  
  
" \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

Apex Laboratories

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Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0254 - 08 16 18 0753**

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories

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Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
**EPA ID: OR01039**

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0254 - 08 16 18 0753</b>
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**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Darwin Thomas, Business Development Director



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8H0254 - 08 16 18 0753

POF  
Project # 1503.20

Lab # A8H0254  
COC 1 of 1

**CHAIN OF CUSTODY**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Anderson Geological Project Mgr: Erik Anderson

Address: \_\_\_\_\_ Phone: \_\_\_\_\_ Email: \_\_\_\_\_

Sampled by: E. Anderson

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST	
					YES	NO
240-NA	7/30/08	13:47	S	1		
240-NB	"	13:43	"	1		
240-NC	"	13:45	"	1		
240-ND	"	13:47	"	1		
240-SA	"	13:49	"	1		
240-SB	"	13:51	"	1		
240-SC	"	13:53	"	1		
240-SD	"	13:55	"	1		

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day    2 Day    3 Day    4 DAY    5 DAY    Other: \_\_\_\_\_

SPECIAL INSTRUCTIONS: \_\_\_\_\_

RECEIVED BY: \_\_\_\_\_ RECEIVED BY: \_\_\_\_\_

Signature: E. Anderson    Signature: [Signature]

Date: 8/19/08    Date: \_\_\_\_\_

Printed Name: Erik Anderson    Printed Name: [Name]

Time: 15:00    Time: 15:08

Company: AGI    Company: [Company]

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Darwin Thomas, Business Development Director



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8H0254 - 08 16 18 0753

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geo Element WO#: A8H0254

Project/Project #: Northstar

**Delivery info:**

Date/Time Received: 8/9/18 @ 1508 By: MS

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: MS : 8/9/18 @ 1508

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>1.7</u>						
Received on Ice? (Y/N)	<input checked="" type="checkbox"/>						
Temp. Blanks? (Y/N)	<input checked="" type="checkbox"/>						
Ice Type: ( <u>Ice</u> /Real/Other)							
Condition:	<u>Good</u>						

Cooler out of temp? (Y/N) Possible reason why: NA  
If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA

**Samples Inspection:** Inspected by: MS : 8/9/18 @ 1525

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: NOT ON CONTAINERS

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

Additional Information: \_\_\_\_\_

Labeled by: MS Witness: AKC Cooler Inspected by: Client See Project Contact Form: Y



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Thursday, August 16, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8H0202 - Northstar - 1503.02

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8H0202, which was received by the laboratory on 8/8/2018 at 10:46:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

A handwritten signature in black ink that reads "Darwin Thomas".

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---

Darwin Thomas, Business Development Director



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12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.02  
Project Manager: Erik Anderson

Report ID:  
A8H0202 - 08 16 18 0757

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
3A-NCOMP	A8H0202-01	Soil	08/07/18 13:39	08/08/18 10:46
3A-SCOMP	A8H0202-02	Soil	08/07/18 13:46	08/08/18 10:46
3D-NCOMP	A8H0202-03	Soil	08/07/18 13:52	08/08/18 10:46
3D-SCOMP	A8H0202-04	Soil	08/07/18 14:00	08/08/18 10:46
20A-NCOMP	A8H0202-05	Soil	08/07/18 14:08	08/08/18 10:46
20A-SCOMP	A8H0202-06	Soil	08/07/18 14:15	08/08/18 10:46

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.02</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0202 - 08 16 18 0757</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>3A-NCOMP (A8H0202-01)</b>			<b>Matrix: Soil</b>			<b>Batch: 8080590</b>		
<b>Dieldrin</b>	<b>0.00125</b>	---	0.00109	mg/kg dry	1	08/13/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 81 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>94 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<b>3A-SCOMP (A8H0202-02)</b>			<b>Matrix: Soil</b>			<b>Batch: 8080590</b>		
<b>Dieldrin</b>	<b>0.00275</b>	---	0.000991	mg/kg dry	1	08/13/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 82 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>100 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<b>3D-NCOMP (A8H0202-03)</b>			<b>Matrix: Soil</b>			<b>Batch: 8080590</b>		
<b>Dieldrin</b>	<b>0.0110</b>	---	0.00103	mg/kg dry	1	08/13/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 82 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>101 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<b>3D-SCOMP (A8H0202-04)</b>			<b>Matrix: Soil</b>			<b>Batch: 8080590</b>		
<b>Dieldrin</b>	<b>0.0760</b>	---	0.00110	mg/kg dry	1	08/13/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 76 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>99 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<b>20A-NCOMP (A8H0202-05)</b>			<b>Matrix: Soil</b>			<b>Batch: 8080590</b>		
<b>Dieldrin</b>	<b>0.0287</b>	---	0.00109	mg/kg dry	1	08/13/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 85 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>108 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<b>20A-SCOMP (A8H0202-06)</b>			<b>Matrix: Soil</b>			<b>Batch: 8080590</b>		
<b>Dieldrin</b>	<b>0.0138</b>	---	0.00102	mg/kg dry	1	08/13/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 82 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>99 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/13/18</i>	<i>EPA 8081B</i>

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.02</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0202 - 08 16 18 0757</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>3A-NCOMP (A8H0202-01)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080558</b>	
% Solids	87.8	---	1.00	% by Weight	1	08/09/18	EPA 8000C	
<b>3A-SCOMP (A8H0202-02)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080608</b>	
% Solids	86.6	---	1.00	% by Weight	1	08/10/18	EPA 8000C	
<b>3D-NCOMP (A8H0202-03)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080608</b>	
% Solids	87.2	---	1.00	% by Weight	1	08/10/18	EPA 8000C	
<b>3D-SCOMP (A8H0202-04)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080608</b>	
% Solids	88.4	---	1.00	% by Weight	1	08/10/18	EPA 8000C	
<b>20A-NCOMP (A8H0202-05)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080608</b>	
% Solids	89.6	---	1.00	% by Weight	1	08/10/18	EPA 8000C	
<b>20A-SCOMP (A8H0202-06)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080558</b>	
% Solids	89.3	---	1.00	% by Weight	1	08/09/18	EPA 8000C	

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---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080590 - EPA 3546</b>						<b>Soil</b>						
<b>Blank (8080590-BLK1)</b>			Prepared: 08/08/18 14:39 Analyzed: 08/13/18 12:48									
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 81 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>106 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>LCS (8080590-BS1)</b>			Prepared: 08/08/18 14:39 Analyzed: 08/13/18 13:05									
<u>EPA 8081B</u>												
Dieldrin	0.0494	---	0.00100	mg/kg wet	1	0.0500	---	99	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 81 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>98 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Duplicate (8080590-DUP1)</b>			Prepared: 08/08/18 14:39 Analyzed: 08/13/18 13:40									
<u>QC Source Sample: 3A-NCOMP (A8H0202-01)</u>												
<u>EPA 8081B</u>												
Dieldrin	<b>0.00118</b>	---	0.00110	mg/kg dry	1	---	0.00125	---	---	6	30%	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 84 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>106 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Matrix Spike (8080590-MS1)</b>			Prepared: 08/08/18 14:39 Analyzed: 08/13/18 15:25									
<u>QC Source Sample: 20A-SCOMP (A8H0202-06)</u>												
<u>EPA 8081B</u>												
Dieldrin	0.0703	---	0.00103	mg/kg dry	1	0.0515	0.0138	110	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 91 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>111 %</i>		<i>65-151 %</i>		<i>"</i>						

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.02</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0202 - 08 16 18 0757</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080558 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (8080558-DUP1)</b>			Prepared: 08/08/18 09:09 Analyzed: 08/09/18 08:12									
<u>QC Source Sample: Non-SDG (A8H0170-02)</u>												
% Solids	90.3	---	1.00	% by Weight	1	---	90.7	---	---	0.5	10%	
<b>Duplicate (8080558-DUP2)</b>			Prepared: 08/08/18 09:09 Analyzed: 08/09/18 08:12									
<u>QC Source Sample: Non-SDG (A8H0175-01)</u>												
% Solids	92.2	---	1.00	% by Weight	1	---	93.4	---	---	1	10%	
<b>Duplicate (8080558-DUP3)</b>			Prepared: 08/08/18 19:00 Analyzed: 08/09/18 08:12									
<u>QC Source Sample: Non-SDG (A8H0222-02)</u>												
% Solids	84.5	---	1.00	% by Weight	1	---	84.7	---	---	0.3	10%	
<b>Duplicate (8080558-DUP4)</b>			Prepared: 08/08/18 19:00 Analyzed: 08/09/18 08:12									
<u>QC Source Sample: Non-SDG (A8H0228-02)</u>												
% Solids	92.5	---	1.00	% by Weight	1	---	93.2	---	---	0.7	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.02</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0202 - 08 16 18 0757</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080608 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (8080608-DUP1)</b>			Prepared: 08/09/18 09:05 Analyzed: 08/10/18 08:28									
<u>QC Source Sample: Non-SDG (A8H0171-01)</u>												
% Solids	91.9	---	1.00	% by Weight	1	---	92.0	---	---	0.2	10%	
<b>Duplicate (8080608-DUP2)</b>			Prepared: 08/09/18 09:05 Analyzed: 08/10/18 08:28									
<u>QC Source Sample: Non-SDG (A8H0212-06)</u>												
% Solids	75.9	---	1.00	% by Weight	1	---	76.6	---	---	0.9	10%	
<b>Duplicate (8080608-DUP3)</b>			Prepared: 08/09/18 09:05 Analyzed: 08/10/18 08:28									
<u>QC Source Sample: Non-SDG (A8H0229-05)</u>												
% Solids	79.7	---	1.00	% by Weight	1	---	80.3	---	---	0.7	10%	
<b>Duplicate (8080608-DUP4)</b>			Prepared: 08/09/18 18:56 Analyzed: 08/10/18 08:28									
<u>QC Source Sample: Non-SDG (A8H0252-12)</u>												
% Solids	82.7	---	1.00	% by Weight	1	---	84.0	---	---	2	10%	
<b>Duplicate (8080608-DUP5)</b>			Prepared: 08/09/18 18:56 Analyzed: 08/10/18 08:28									
<u>QC Source Sample: Non-SDG (A8H0255-07)</u>												
% Solids	96.7	---	1.00	% by Weight	1	---	97.1	---	---	0.3	10%	
<b>Duplicate (8080608-DUP6)</b>			Prepared: 08/09/18 19:41 Analyzed: 08/10/18 08:28									
<u>QC Source Sample: Non-SDG (A8H0263-01)</u>												
% Solids	85.0	---	1.00	% by Weight	1	---	85.5	---	---	0.6	10%	
<b>Duplicate (8080608-DUP7)</b>			Prepared: 08/09/18 19:41 Analyzed: 08/10/18 08:28									
<u>QC Source Sample: Non-SDG (A8H0267-03)</u>												
% Solids	79.6	---	1.00	% by Weight	1	---	79.4	---	---	0.2	10%	

No Client related Batch OC samples analyzed for this batch. See notes page for more information.

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**Anderson Geological**  
 PO Box 649  
 Wilsonville, OR 97070

Project: **Northstar**  
 Project Number: **1503.02**  
 Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0202 - 08 16 18 0757**

**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8080590</u>							
A8H0202-01	Soil	EPA 8081B	08/07/18 13:39	08/08/18 14:39	10.42g/5mL	10g/5mL	0.96
A8H0202-02	Soil	EPA 8081B	08/07/18 13:46	08/08/18 14:39	11.65g/5mL	10g/5mL	0.86
A8H0202-03	Soil	EPA 8081B	08/07/18 13:52	08/08/18 14:39	11.13g/5mL	10g/5mL	0.90
A8H0202-04	Soil	EPA 8081B	08/07/18 14:00	08/08/18 14:39	10.28g/5mL	10g/5mL	0.97
A8H0202-05	Soil	EPA 8081B	08/07/18 14:08	08/08/18 14:39	10.25g/5mL	10g/5mL	0.98
A8H0202-06	Soil	EPA 8081B	08/07/18 14:15	08/08/18 14:39	10.93g/5mL	10g/5mL	0.92

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8080558</u>							
A8H0202-01	Soil	EPA 8000C	08/07/18 13:39	08/08/18 19:00			NA
A8H0202-06	Soil	EPA 8000C	08/07/18 14:15	08/08/18 19:00			NA
<u>Batch: 8080608</u>							
A8H0202-02	Soil	EPA 8000C	08/07/18 13:46	08/09/18 09:05			NA
A8H0202-03	Soil	EPA 8000C	08/07/18 13:52	08/09/18 09:05			NA
A8H0202-04	Soil	EPA 8000C	08/07/18 14:00	08/09/18 09:05			NA
A8H0202-05	Soil	EPA 8000C	08/07/18 14:08	08/09/18 09:05			NA

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Darwin Thomas, Business Development Director



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.02  
Project Manager: Erik Anderson

**Report ID:**  
A8H0202 - 08 16 18 0757

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**There are No Qualifiers on Sample or QC Data for this report**

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Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.02**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0202 - 08 16 18 0757**

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

Basis: Results for soil samples are generally reported on a 100% dry weight basis.

The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.

"dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.

"wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).

-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.

-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.

For further details, please request a copy of this document.

Apex Laboratories

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PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.02**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0202 - 08 16 18 0757**

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories

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**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
**EPA ID: OR01039**

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.02</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0202 - 08 16 18 0757</b>
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**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Darwin Thomas, Business Development Director





Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.02  
Project Manager: Erik Anderson

**Report ID:**  
**A8H0202 - 08 16 18 0757**

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geological Element WO#: A8 H0202  
Project/Project #: North Star / 1503.02

**Delivery info:**

Date/Time Received: 8-8-18 @ 1046 By: MR  
Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: MR : 8-8-18 @ 1200

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>-</u>						
Received on Ice? (Y/N)							
Temp. Blanks? (Y/N)	<u>4.6</u>						
Ice Type: (Gel/Real/Other)							
Condition:	<u>good</u>						

Cooler out of temp? (Y/N) Possible reason why: \_\_\_\_\_

If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA

**Samples Inspection:** Inspected by: MR : 8/8/18 @ 12:05

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: \_\_\_\_\_

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

**Additional Information:** \_\_\_\_\_

Labeled by: \_\_\_\_\_ Witness: \_\_\_\_\_ Cooler Inspected by: \_\_\_\_\_ See Project Contact Form: Y

by

MR

MR



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Thursday, August 16, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8H0097 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8H0097, which was received by the laboratory on 8/3/2018 at 2:55:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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A handwritten signature in black ink, appearing to read "Darwin Thomas".

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Darwin Thomas, Business Development Director



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8H0097 - 08 16 18 0748

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
3B-NCOMP	A8H0097-01	Soil	08/03/18 12:20	08/03/18 14:55
3B-SCOMP	A8H0097-02	Soil	08/03/18 12:28	08/03/18 14:55
3C-NCOMP	A8H0097-03	Soil	08/03/18 13:16	08/03/18 14:55
3C-SCOMP	A8H0097-04	Soil	08/03/18 13:22	08/03/18 14:55
20B-NCOMP	A8H0097-05	Soil	08/03/18 13:53	08/03/18 14:55
20B-SCOMP	A8H0097-06	Soil	08/03/18 13:58	08/03/18 14:55

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0097 - 08 16 18 0748</b>
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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>3B-NCOMP (A8H0097-01RE1)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080544</b>	<b>C-05</b>
<b>Dieldrin</b>	<b>0.00268</b>	---	0.00206	mg/kg dry	1	08/09/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 71 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/09/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>97 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/09/18</i>	<i>EPA 8081B</i>	
<b>3B-SCOMP (A8H0097-02RE1)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080544</b>	<b>C-05</b>
<b>Dieldrin</b>	<b>0.0953</b>	---	0.00186	mg/kg dry	1	08/09/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 84 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/09/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>98 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/09/18</i>	<i>EPA 8081B</i>	
<b>3C-NCOMP (A8H0097-03RE1)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080544</b>	<b>C-05</b>
<b>Dieldrin</b>	<b>0.0529</b>	---	0.00200	mg/kg dry	1	08/09/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 80 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/09/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>97 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/09/18</i>	<i>EPA 8081B</i>	
<b>3C-SCOMP (A8H0097-04RE1)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080544</b>	<b>C-05</b>
<b>Dieldrin</b>	<b>0.0573</b>	---	0.00196	mg/kg dry	1	08/09/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 68 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/09/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>88 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/09/18</i>	<i>EPA 8081B</i>	
<b>20B-NCOMP (A8H0097-05RE1)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080544</b>	<b>C-05</b>
<b>Dieldrin</b>	<b>0.0627</b>	---	0.00188	mg/kg dry	1	08/09/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 89 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/09/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>106 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/09/18</i>	<i>EPA 8081B</i>	
<b>20B-SCOMP (A8H0097-06RE1)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080544</b>	<b>C-05</b>
<b>Dieldrin</b>	<b>0.0670</b>	---	0.00185	mg/kg dry	1	08/09/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 69 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/09/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>93 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/09/18</i>	<i>EPA 8081B</i>	

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0097 - 08 16 18 0748</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>3B-NCOMP (A8H0097-01)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080482</b>	
% Solids	85.6	---	1.00	% by Weight	1	08/07/18	EPA 8000C	
<b>3B-SCOMP (A8H0097-02)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080482</b>	
% Solids	90.4	---	1.00	% by Weight	1	08/07/18	EPA 8000C	
<b>3C-NCOMP (A8H0097-03)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080482</b>	
% Solids	90.2	---	1.00	% by Weight	1	08/07/18	EPA 8000C	
<b>3C-SCOMP (A8H0097-04)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080482</b>	
% Solids	91.4	---	1.00	% by Weight	1	08/07/18	EPA 8000C	
<b>20B-NCOMP (A8H0097-05)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080482</b>	
% Solids	90.7	---	1.00	% by Weight	1	08/07/18	EPA 8000C	
<b>20B-SCOMP (A8H0097-06)</b>				<b>Matrix: Soil</b>			<b>Batch: 8080482</b>	
% Solids	91.9	---	1.00	% by Weight	1	08/07/18	EPA 8000C	

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PO Box 649	Project Number: <b>1503.20</b>	<b>Report ID:</b>
Wilsonville, OR 97070	Project Manager: <b>Erik Anderson</b>	<b>A8H0097 - 08 16 18 0748</b>

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080544 - EPA 3546/3640A (GPC)</b>						<b>Soil</b>						
<b>Blank (8080544-BLK1)</b>						Prepared: 08/07/18 07:15 Analyzed: 08/08/18 11:28						<b>C-05</b>
<b>EPA 8081B</b>												
Aldrin	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
alpha-BHC	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
beta-BHC	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
delta-BHC	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
gamma-BHC (Lindane)	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
cis-Chlordane	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
trans-Chlordane	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
4,4'-DDD	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
4,4'-DDE	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
4,4'-DDT	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Dieldrin	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Endosulfan I	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Endosulfan II	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Endosulfan sulfate	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Endrin	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Endrin Aldehyde	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Endrin ketone	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Heptachlor	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Heptachlor epoxide	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Methoxychlor	ND	---	0.00500	mg/kg wet	1	---	---	---	---	---	---	
Chlordane (Technical)	ND	---	0.0500	mg/kg wet	1	---	---	---	---	---	---	
Toxaphene (Total)	ND	---	0.0500	mg/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 97 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>106 %</i>		<i>65-151 %</i>		<i>"</i>						

<b>LCS (8080544-BS1)</b>						Prepared: 08/07/18 07:15 Analyzed: 08/08/18 11:46						<b>C-05</b>
<b>EPA 8081B</b>												
Aldrin	0.0478	---	0.00200	mg/kg wet	1	0.0500	---	96	45-136%	---	---	
alpha-BHC	0.0529	---	0.00200	mg/kg wet	1	0.0500	---	106	45-137%	---	---	
beta-BHC	0.0554	---	0.00200	mg/kg wet	1	0.0500	---	111	50-136%	---	---	
delta-BHC	0.0561	---	0.00200	mg/kg wet	1	0.0500	---	112	47-139%	---	---	
gamma-BHC (Lindane)	0.0518	---	0.00200	mg/kg wet	1	0.0500	---	104	49-135%	---	---	
cis-Chlordane	0.0484	---	0.00200	mg/kg wet	1	0.0500	---	97	54-133%	---	---	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080544 - EPA 3546/3640A (GPC)</b>						<b>Soil</b>						
<b>LCS (8080544-BS1)</b>						Prepared: 08/07/18 07:15 Analyzed: 08/08/18 11:46						<b>C-05</b>
trans-Chlordane	0.0507	---	0.00200	mg/kg wet	1	0.0500	---	101	53-135%	---	---	
4,4'-DDD	0.0654	---	0.00200	mg/kg wet	1	0.0500	---	131	56-139%	---	---	Q-41
4,4'-DDE	0.0593	---	0.00200	mg/kg wet	1	0.0500	---	119	56-134%	---	---	
4,4'-DDT	0.0699	---	0.00200	mg/kg wet	1	0.0500	---	140	50-141%	---	---	
Dieldrin	0.0523	---	0.00200	mg/kg wet	1	0.0500	---	105	56-136%	---	---	
Endosulfan I	0.0510	---	0.00200	mg/kg wet	1	0.0500	---	102	52-132%	---	---	
Endosulfan II	0.0554	---	0.00200	mg/kg wet	1	0.0500	---	111	53-134%	---	---	
Endosulfan sulfate	0.0602	---	0.00200	mg/kg wet	1	0.0500	---	120	55-136%	---	---	
Endrin	0.0649	---	0.00200	mg/kg wet	1	0.0500	---	130	56-140%	---	---	Q-41
Endrin Aldehyde	0.0461	---	0.00200	mg/kg wet	1	0.0500	---	92	35-137%	---	---	
Endrin ketone	0.0585	---	0.00200	mg/kg wet	1	0.0500	---	117	55-136%	---	---	
Heptachlor	0.0571	---	0.00200	mg/kg wet	1	0.0500	---	114	47-136%	---	---	
Heptachlor epoxide	0.0514	---	0.00200	mg/kg wet	1	0.0500	---	103	52-136%	---	---	
Methoxychlor	0.0777	---	0.00600	mg/kg wet	1	0.0500	---	<b>155</b>	<b>52-143%</b>	---	---	Q-41

Surr: 2,4,5,6-TCMX (Surr) Recovery: 100 % Limits: 42-129 % Dilution: 1x  
Decachlorobiphenyl (Surr) 109 % 65-151 % "

<b>Duplicate (8080544-DUP1)</b>	Prepared: 08/07/18 07:15 Analyzed: 08/08/18 12:21						<b>C-05</b>
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**QC Source Sample: Non-SDG (A8H0081-01RE1)**

Aldrin	ND	---	0.00189	mg/kg dry	1	---	ND	---	---	---	30%	
alpha-BHC	ND	---	0.00189	mg/kg dry	1	---	ND	---	---	---	30%	
beta-BHC	ND	---	0.00189	mg/kg dry	1	---	ND	---	---	---	30%	
delta-BHC	ND	---	0.00189	mg/kg dry	1	---	ND	---	---	---	30%	
gamma-BHC (Lindane)	ND	---	0.00189	mg/kg dry	1	---	ND	---	---	---	30%	
cis-Chlordane	ND	---	0.00189	mg/kg dry	1	---	ND	---	---	---	30%	
trans-Chlordane	ND	---	0.00189	mg/kg dry	1	---	ND	---	---	---	30%	
4,4'-DDD	ND	---	0.00189	mg/kg dry	1	---	ND	---	---	---	30%	
4,4'-DDE	<b>0.00681</b>	---	0.00189	mg/kg dry	1	---	0.00633	---	---	7	30%	
4,4'-DDT	<b>0.0223</b>	---	0.00189	mg/kg dry	1	---	0.0217	---	---	3	30%	
Dieldrin	ND	---	0.00189	mg/kg dry	1	---	ND	---	---	---	30%	
Endosulfan I	ND	---	0.00189	mg/kg dry	1	---	ND	---	---	---	30%	
Endosulfan II	ND	---	0.00189	mg/kg dry	1	---	ND	---	---	---	30%	
Endosulfan sulfate	ND	---	0.00189	mg/kg dry	1	---	ND	---	---	---	30%	
Endrin	ND	---	0.00189	mg/kg dry	1	---	ND	---	---	---	30%	

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0097 - 08 16 18 0748</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes	
<b>Batch 8080544 - EPA 3546/3640A (GPC)</b>						<b>Soil</b>							
<b>Duplicate (8080544-DUP1)</b>			Prepared: 08/07/18 07:15 Analyzed: 08/08/18 12:21						<b>C-05</b>				
<b>QC Source Sample: Non-SDG (A8H0081-01RE1)</b>													
Endrin Aldehyde	ND	---	0.00189	mg/kg dry	1	---	ND	---	---	---	30%		
Endrin ketone	ND	---	0.00189	mg/kg dry	1	---	ND	---	---	---	30%		
Heptachlor	ND	---	0.00189	mg/kg dry	1	---	ND	---	---	---	30%		
Heptachlor epoxide	ND	---	0.00189	mg/kg dry	1	---	0.000961	---	---	***	30%		
Methoxychlor	ND	---	0.00566	mg/kg dry	1	---	ND	---	---	---	30%		
Chlordane (Technical)	ND	---	0.0566	mg/kg dry	1	---	ND	---	---	---	30%		
Toxaphene (Total)	ND	---	0.0566	mg/kg dry	1	---	ND	---	---	---	30%		
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 97 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>							
<i>Decachlorobiphenyl (Surr)</i>		<i>98 %</i>		<i>65-151 %</i>		<i>"</i>							

<b>Matrix Spike (8080544-MS1)</b>			Prepared: 08/07/18 07:15 Analyzed: 08/09/18 15:56						<b>C-05</b>				
<b>QC Source Sample: 20B-SCOMP (A8H0097-06RE1)</b>													
<b>EPA 8081B</b>													
Aldrin	0.0271	---	0.00185	mg/kg dry	1	0.0462	0.00134	56	45-136%	---	---		
alpha-BHC	0.0252	---	0.00185	mg/kg dry	1	0.0462	ND	55	45-137%	---	---		
beta-BHC	0.0367	---	0.00185	mg/kg dry	1	0.0462	ND	79	50-136%	---	---		
delta-BHC	0.0405	---	0.00203	mg/kg dry	1	0.0462	ND	88	47-139%	---	---	R-02	
gamma-BHC (Lindane)	0.0287	---	0.00185	mg/kg dry	1	0.0462	ND	62	49-135%	---	---		
cis-Chlordane	0.0333	---	0.00185	mg/kg dry	1	0.0462	ND	72	54-133%	---	---		
trans-Chlordane	0.0330	---	0.00185	mg/kg dry	1	0.0462	ND	71	53-135%	---	---		
4,4'-DDD	0.0472	---	0.00185	mg/kg dry	1	0.0462	0.00629	88	56-139%	---	---		
4,4'-DDE	0.167	---	0.00185	mg/kg dry	1	0.0462	0.143	<b>53</b>	<b>56-134%</b>	---	---	Q-03	
4,4'-DDT	0.135	---	0.00185	mg/kg dry	1	0.0462	0.110	52	50-141%	---	---		
Dieldrin	0.0939	---	0.00185	mg/kg dry	1	0.0462	0.0670	58	56-136%	---	---		
Endosulfan I	0.0341	---	0.00185	mg/kg dry	1	0.0462	ND	74	52-132%	---	---		
Endosulfan II	0.0387	---	0.00185	mg/kg dry	1	0.0462	ND	84	53-134%	---	---		
Endosulfan sulfate	0.0426	---	0.00185	mg/kg dry	1	0.0462	ND	92	55-136%	---	---		
Endrin	0.0423	---	0.00185	mg/kg dry	1	0.0462	ND	91	56-140%	---	---		
Endrin Aldehyde	0.0348	---	0.00240	mg/kg dry	1	0.0462	ND	75	35-137%	---	---	R-02	
Endrin ketone	0.0435	---	0.00185	mg/kg dry	1	0.0462	ND	94	55-136%	---	---		
Heptachlor	0.0311	---	0.00185	mg/kg dry	1	0.0462	ND	67	47-136%	---	---		
Heptachlor epoxide	0.0317	---	0.00203	mg/kg dry	1	0.0462	ND	69	52-136%	---	---	R-02	
Methoxychlor	0.0619	---	0.00555	mg/kg dry	1	0.0462	ND	134	52-143%	---	---		

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12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0097 - 08 16 18 0748**

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080544 - EPA 3546/3640A (GPC)</b>							<b>Soil</b>					
<b>Matrix Spike (8080544-MS1)</b>					Prepared: 08/07/18 07:15 Analyzed: 08/09/18 15:56					<b>C-05</b>		
<b>QC Source Sample: 20B-SCOMP (A8H0097-06RE1)</b>												
Surr: 2,4,5,6-TCMX (Surr)		Recovery: 48 %		Limits: 42-129 %		Dilution: 1x						
Decachlorobiphenyl (Surr)		82 %		65-151 %		"						

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0097 - 08 16 18 0748</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080482 - Total Solids (Dry Weight)</b>							<b>Soil</b>					
<b>Duplicate (8080482-DUP1)</b>			Prepared: 08/06/18 10:01 Analyzed: 08/07/18 11:14									
<u>QC Source Sample: Non-SDG (A8H0085-04)</u>												
% Solids	75.3	---	1.00	% by Weight	1	---	75.7	---	---	0.5	10%	
<b>Duplicate (8080482-DUP2)</b>			Prepared: 08/06/18 10:01 Analyzed: 08/07/18 11:14									
<u>QC Source Sample: 3B-SCOMP (A8H0097-02)</u>												
<u>EPA 8000C</u>												
% Solids	89.5	---	1.00	% by Weight	1	---	90.4	---	---	1	10%	
<b>Duplicate (8080482-DUP3)</b>			Prepared: 08/06/18 10:01 Analyzed: 08/07/18 11:14									
<u>QC Source Sample: Non-SDG (A8H0117-09)</u>												
% Solids	78.7	---	1.00	% by Weight	1	---	79.5	---	---	0.9	10%	
<b>Duplicate (8080482-DUP4)</b>			Prepared: 08/06/18 18:11 Analyzed: 08/07/18 11:14									
<u>QC Source Sample: Non-SDG (A8H0147-01)</u>												
% Solids	92.3	---	1.00	% by Weight	1	---	93.8	---	---	2	10%	
<b>Duplicate (8080482-DUP5)</b>			Prepared: 08/06/18 18:11 Analyzed: 08/07/18 11:14									
<u>QC Source Sample: Non-SDG (A8H0151-01)</u>												
% Solids	93.6	---	1.00	% by Weight	1	---	93.9	---	---	0.3	10%	
<b>Duplicate (8080482-DUP6)</b>			Prepared: 08/06/18 19:09 Analyzed: 08/07/18 11:14									
<u>QC Source Sample: Non-SDG (A8H0153-02)</u>												
% Solids	93.8	---	1.00	% by Weight	1	---	94.0	---	---	0.2	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0097 - 08 16 18 0748</b>
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**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546/3640A (GPC)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8080544</u>							
A8H0097-01RE1	Soil	EPA 8081B	08/03/18 12:20	08/07/18 07:15	11.32g/10mL	10g/5mL	1.77
A8H0097-02RE1	Soil	EPA 8081B	08/03/18 12:28	08/07/18 07:15	11.9g/10mL	10g/5mL	1.68
A8H0097-03RE1	Soil	EPA 8081B	08/03/18 13:16	08/07/18 07:15	11.1g/10mL	10g/5mL	1.80
A8H0097-04RE1	Soil	EPA 8081B	08/03/18 13:22	08/07/18 07:15	11.15g/10mL	10g/5mL	1.79
A8H0097-05RE1	Soil	EPA 8081B	08/03/18 13:53	08/07/18 07:15	11.74g/10mL	10g/5mL	1.70
A8H0097-06RE1	Soil	EPA 8081B	08/03/18 13:58	08/07/18 07:15	11.78g/10mL	10g/5mL	1.70

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8080482</u>							
A8H0097-01	Soil	EPA 8000C	08/03/18 12:20	08/06/18 10:01			NA
A8H0097-02	Soil	EPA 8000C	08/03/18 12:28	08/06/18 10:01			NA
A8H0097-03	Soil	EPA 8000C	08/03/18 13:16	08/06/18 10:01			NA
A8H0097-04	Soil	EPA 8000C	08/03/18 13:22	08/06/18 10:01			NA
A8H0097-05	Soil	EPA 8000C	08/03/18 13:53	08/06/18 10:01			NA
A8H0097-06	Soil	EPA 8000C	08/03/18 13:58	08/06/18 10:01			NA

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**EPA ID: OR01039**

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0097 - 08 16 18 0748**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**Apex Laboratories**

- C-05** Extract has undergone a GPC (Gel-Permeation Chromatography) cleanup per EPA 3640A. Reporting levels may be raised due to dilution necessary for cleanup. Sample Final Volume includes the GPC dilution factor, see the Prep page for details.
- Q-03** Spike recovery and/or RPD is outside control limits due to the high concentration of analyte present in the sample.
- Q-41** Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high.
- R-02** The Reporting Limit for this analyte has been raised to account for interference from coeluting organic compounds present in the sample.

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---

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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

DET Analyte DETECTED at or above the detection or reporting limit.  
ND Analyte NOT DETECTED at or above the detection or reporting limit.  
NR Result Not Reported  
RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.  
  
"dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.  
  
"wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.  
  
" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.  
  
" \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

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Project Number: **1503.20**  
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**Report ID:**  
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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

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503-718-2323  
**EPA ID: OR01039**

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0097 - 08 16 18 0748**

**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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Darwin Thomas, Business Development Director



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8H0097 - 08 16 18 0748

COC 1 of 1

Lab # A8H0097

Project # 1503.20

PO#

Project Name: Northstar

Email:

Phone:

Fax:

Project Mgr: Erik Anderson

Company: Anderson Geological

Address:

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Sampled by: E. Anderson

Site Location: OR WA

Other:

SAMPLE ID

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	YES	NO
3B-Ncomp	12/18/20	12:20	S	1		
3B-Scomp		12:29				
3C-Ncomp		18:16				
3C-Scomp		13:22				
20B-Ncomp		13:53				
20B-Scomp		13:58				

ANALYSIS REQUEST

TCLP Metals (8)

RCRA Metals (8)

609 TTO

8082 PCBs

8270 SIM PAHs

8270 SVOC

8260 BTEX VOCs

8260 HVOCS

8260 RBDN VOCs

8260 VOCs Full List

NWTPH-CX

NWTPH-DX

NWTPH-ICID

SPECIAL INSTRUCTIONS:

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other:

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: E. Anderson Date: 8/2/18 Signature: [Signature]

RECEIVED BY: [Signature] Date: 8/18/18 Signature: [Signature]

Printed Name: Erik Anderson Time: 14:55 Printed Name: [Signature] Time: 14:55

Company: AGS Company: Apex

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Darwin Thomas

Darwin Thomas, Business Development Director



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8H0097 - 08 16 18 0748

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geo Element WO#: A8 H2097  
Project/Project #: Northstar / 1503-20

**Delivery info:**

Date/Time Received: 8/3/18 @ 14:55 By: MS  
Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: MS : 8/3/18 @ 14:55

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>3.9</u>						

Received on Ice?  (Y/N)

Temp. Blanks?  (Y/N)

Ice Type:  (Gel/Real/Other)

Condition: good

Cooler out of temp?  (Y/N) Possible reason why: \_\_\_\_\_

If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA

**Samples Inspection:** Inspected by: MS : 8/3/18 @ 15:00

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: Labels read 12:28 on 3B - NCOMP, 12:20 on 3B - SLOMP.

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

**Additional Information:** \_\_\_\_\_

Labeled by: \_\_\_\_\_ Witness: \_\_\_\_\_ Cooler Inspected by: \_\_\_\_\_ See Project Contact Form: Y

MS MS Client



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Friday, August 10, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8H0017 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8H0017, which was received by the laboratory on 8/1/2018 at 3:20:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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---

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EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0017 - 08 10 18 0712**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
20C-NCOMP	A8H0017-01	Soil	08/01/18 14:15	08/01/18 15:20
20C-SCOMP	A8H0017-02	Soil	08/01/18 14:18	08/01/18 15:20
21D-NCOMP	A8H0017-03	Soil	08/01/18 14:35	08/01/18 15:20
21D-SCOMP	A8H0017-04	Soil	08/01/18 14:40	08/01/18 15:20

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0017 - 08 10 18 0712</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>20C-NCOMP (A8H0017-01RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080473</b>		<b>C-05</b>
<b>Dieldrin</b>	<b>0.0632</b>	---	0.00202	mg/kg dry	1	08/07/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 81 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/07/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>86 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/07/18</i>	<i>EPA 8081B</i>	
<b>20C-SCOMP (A8H0017-02RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080473</b>		<b>C-05</b>
<b>Dieldrin</b>	<b>0.0645</b>	---	0.00197	mg/kg dry	1	08/07/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 75 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/07/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>77 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/07/18</i>	<i>EPA 8081B</i>	
<b>21D-NCOMP (A8H0017-03RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080473</b>		<b>C-05</b>
<b>Dieldrin</b>	<b>0.0360</b>	---	0.00197	mg/kg dry	1	08/07/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 72 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/07/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>83 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/07/18</i>	<i>EPA 8081B</i>	
<b>21D-SCOMP (A8H0017-04RE1)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080473</b>		<b>C-05</b>
<b>Dieldrin</b>	<b>0.0546</b>	---	0.00195	mg/kg dry	1	08/07/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 77 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>08/07/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>82 %</i>	<i>65-151 %</i>	<i>1</i>	<i>08/07/18</i>	<i>EPA 8081B</i>	

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0017 - 08 10 18 0712</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>20C-NCOMP (A8H0017-01)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080405</b>		
% Solids	87.1	---	1.00	% by Weight	1	08/03/18	EPA 8000C	
<b>20C-SCOMP (A8H0017-02)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080405</b>		
% Solids	87.4	---	1.00	% by Weight	1	08/03/18	EPA 8000C	
<b>21D-NCOMP (A8H0017-03)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080405</b>		
% Solids	88.9	---	1.00	% by Weight	1	08/03/18	EPA 8000C	
<b>21D-SCOMP (A8H0017-04)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080405</b>		
% Solids	89.4	---	1.00	% by Weight	1	08/03/18	EPA 8000C	

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**Report ID:**  
**A8H0017 - 08 10 18 0712**

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080473 - EPA 3546/3640A (GPC)</b>												<b>Soil</b>
<b>Blank (8080473-BLK1)</b>												<b>C-05</b>
Prepared: 08/03/18 07:24 Analyzed: 08/07/18 09:40												
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
Surr: 2,4,5,6-TCMX (Surr)		Recovery: 85 %		Limits: 42-129 %		Dilution: 1x						
Decachlorobiphenyl (Surr)		103 %		65-151 %		"						
<b>LCS (8080473-BS1)</b>												<b>C-05</b>
Prepared: 08/03/18 07:24 Analyzed: 08/07/18 09:58												
<u>EPA 8081B</u>												
Dieldrin	0.0548	---	0.00200	mg/kg wet	1	0.0500	---	110	56-136%	---	---	
Surr: 2,4,5,6-TCMX (Surr)		Recovery: 96 %		Limits: 42-129 %		Dilution: 1x						
Decachlorobiphenyl (Surr)		107 %		65-151 %		"						
<b>Duplicate (8080473-DUP1)</b>												<b>C-05</b>
Prepared: 08/03/18 07:24 Analyzed: 08/07/18 10:32												
<u>QC Source Sample: 20C-NCOMP (A8H0017-01RE1)</u>												
<u>EPA 8081B</u>												
Dieldrin	0.0736	---	0.00206	mg/kg dry	1	---	0.0632	---	---	15	30%	
Surr: 2,4,5,6-TCMX (Surr)		Recovery: 90 %		Limits: 42-129 %		Dilution: 1x						
Decachlorobiphenyl (Surr)		92 %		65-151 %		"						
<b>Matrix Spike (8080473-MS1)</b>												<b>C-05</b>
Prepared: 08/03/18 07:24 Analyzed: 08/07/18 11:42												
<u>QC Source Sample: 21D-SCOMP (A8H0017-04RE1)</u>												
<u>EPA 8081B</u>												
Dieldrin	0.0988	---	0.00196	mg/kg dry	1	0.0490	0.0546	90	56-136%	---	---	
Surr: 2,4,5,6-TCMX (Surr)		Recovery: 83 %		Limits: 42-129 %		Dilution: 1x						
Decachlorobiphenyl (Surr)		92 %		65-151 %		"						

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Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
 Tigard, OR 97223  
 503-718-2323  
 EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0017 - 08 10 18 0712</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080405 - Total Solids (Dry Weight)</b>							<b>Soil</b>					
<b>Duplicate (8080405-DUP3)</b>			Prepared: 08/02/18 09:04 Analyzed: 08/03/18 08:09									
<b>QC Source Sample: 21D-SCOMP (A8H0017-04)</b>												
<b>EPA 8000C</b>												
% Solids	89.0	---	1.00	% by Weight	1	---	89.4	---	---	0.5	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0017 - 08 10 18 0712**

**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546/3640A (GPC)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8080473</u>							
A8H0017-01RE1	Soil	EPA 8081B	08/01/18 14:15	08/03/18 07:24	11.4g/10mL	10g/5mL	1.75
A8H0017-02RE1	Soil	EPA 8081B	08/01/18 14:18	08/03/18 07:24	11.63g/10mL	10g/5mL	1.72
A8H0017-03RE1	Soil	EPA 8081B	08/01/18 14:35	08/03/18 07:24	11.41g/10mL	10g/5mL	1.75
A8H0017-04RE1	Soil	EPA 8081B	08/01/18 14:40	08/03/18 07:24	11.46g/10mL	10g/5mL	1.75

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8080405</u>							
A8H0017-01	Soil	EPA 8000C	08/01/18 14:15	08/02/18 09:04			NA
A8H0017-02	Soil	EPA 8000C	08/01/18 14:18	08/02/18 09:04			NA
A8H0017-03	Soil	EPA 8000C	08/01/18 14:35	08/02/18 09:04			NA
A8H0017-04	Soil	EPA 8000C	08/01/18 14:40	08/02/18 09:04			NA

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Anderson Geological  
PO Box 649  
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Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0017 - 08 10 18 0712**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**Apex Laboratories**

**C-05** Extract has undergone a GPC (Gel-Permeation Chromatography) cleanup per EPA 3640A. Reporting levels may be raised due to dilution necessary for cleanup. Sample Final Volume includes the GPC dilution factor, see the Prep page for details.

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Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0017 - 08 10 18 0712**

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
- "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

Apex Laboratories

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8H0017 - 08 10 18 0712</b>
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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

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**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8H0017 - 08 10 18 0712**

**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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Darwin Thomas, Business Development Director



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8H0017 - 08 10 18 0712

c.c. 1 of 1

**CHAIN OF CUSTODY**

Lab # A8H0017      PO#

Company: Anderson Geological      Project Mgr: Northstar      Project # 1503.20

Address: \_\_\_\_\_      Phone: \_\_\_\_\_      Email: \_\_\_\_\_

Sampled by: E. Anderson

LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST	
					Site Location: OR    WA	Other: _____
20C-NCOMP	8-1-18	14:15	S	1	AL, SN, AS, BA, BR, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ	TC, TP Metals (B)
20C-SCOMP	8-1-18	14:18	S	1	AL, SN, AS, BA, BR, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ	TC, TP Metals (B)
21D-NCOMP	8-1-18	14:35	S	1	AL, SN, AS, BA, BR, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ	TC, TP Metals (B)
21D-SCOMP	8-1-18	14:40	S	1	AL, SN, AS, BA, BR, CA, CB, CC, CD, CE, CF, CG, CH, CI, CJ, CK, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ	TC, TP Metals (B)

TOTAL DISS. TC, TP

1200-Z

1200-COLS

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SPECIAL INSTRUCTIONS:

Normal Turn Around Time (TAT) = 10 Business Days      YES      NO

TAT Requested (circle):      1 Day      2 Day      3 Day      4 DAY      5 DAY      Other: \_\_\_\_\_

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: Erik Anderson      Date: 8-1-18      Signature: \_\_\_\_\_      Date: \_\_\_\_\_

RECEIVED BY: \_\_\_\_\_      Date: \_\_\_\_\_      Signature: \_\_\_\_\_      Date: \_\_\_\_\_

Printed Name: Erik Anderson      Time: 15:20      Printed Name: \_\_\_\_\_      Time: \_\_\_\_\_

Company: AGI      Company: \_\_\_\_\_

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Darwin Thomas, Business Development Director

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8H0017 - 08 10 18 0712

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geological Element WO#: A8H0017

Project/Project #: Northstar / 1503.20

**Delivery info:**

Date/Time Received: 8/1/18 @ 1520 By: (Signature)

Delivered by: Apex \_\_\_ Client  ESS \_\_\_ FedEx \_\_\_ UPS \_\_\_ Swift \_\_\_ Senvoy \_\_\_ SDS \_\_\_ Other \_\_\_

**Cooler Inspection** Inspected by: (Signature) : 8/1/18 @ 1520

Chain of Custody Included? Yes  No \_\_\_ Custody Seals? Yes \_\_\_ No

Signed/Dated by Client? Yes  No \_\_\_

Signed/Dated by Apex? Yes  No \_\_\_

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>4.0</u>						
Received on Ice? (Y/N)	<u>(Y)</u>						
Temp. Blanks? (Y/N)	<u>(N)</u>						
Ice Type: (Gel/Real/Other)	<u>(Gel)</u>						
Condition:	<u>good</u>						

Cooler out of temp? (Y/N) Possible reason why: \_\_\_\_\_

If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA (NA)

**Samples Inspection:** Inspected by: (Signature) : 8/1/18 @ 1520

All Samples Intact? Yes  No \_\_\_ Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No \_\_\_ Comments: \_\_\_\_\_

Containers/Volumes Received Appropriate for Analysis? Yes  No \_\_\_ Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes \_\_\_ No \_\_\_ NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes \_\_\_ No \_\_\_ NA

Comments: \_\_\_\_\_

**Additional Information:** \_\_\_\_\_

Labeled by: (Signature) Witness: Th Cooler Inspected by: Client unloaded See Project Contact Form: Y



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Thursday, August 16, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8G0785 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8G0785, which was received by the laboratory on 7/30/2018 at 2:51:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

A handwritten signature in black ink, appearing to read "Darwin Thomas".

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Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

**Report ID:**  
A8G0785 - 08 16 18 0820

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
24C-NCOMP	A8G0785-01	Soil	07/30/18 13:15	07/30/18 14:51
24C-SCOMP	A8G0785-02	Soil	07/30/18 13:22	07/30/18 14:51
24D-NCOMP	A8G0785-03	Soil	07/30/18 13:36	07/30/18 14:51
24D-SCOMP	A8G0785-04	Soil	07/30/18 13:40	07/30/18 14:51

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0785 - 08 16 18 0820</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>24C-NCOMP (A8G0785-01)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080369</b>		
Dieldrin	ND	---	0.00102	mg/kg dry	1	08/02/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 83 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/02/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>92 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/02/18</i>	<i>EPA 8081B</i>
<b>24C-SCOMP (A8G0785-02)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080369</b>		
Dieldrin	ND	---	0.00106	mg/kg dry	1	08/02/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 85 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/02/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>95 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/02/18</i>	<i>EPA 8081B</i>
<b>24D-NCOMP (A8G0785-03)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080369</b>		
<b>Dieldrin</b>	<b>0.00993</b>	---	0.00105	mg/kg dry	1	08/02/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 83 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/02/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>107 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/02/18</i>	<i>EPA 8081B</i>
<b>24D-SCOMP (A8G0785-04)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080369</b>		
<b>Dieldrin</b>	<b>0.0134</b>	---	0.00101	mg/kg dry	1	08/02/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 86 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>08/02/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>101 %</i>		<i>65-151 %</i>		<i>1</i>	<i>08/02/18</i>	<i>EPA 8081B</i>

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EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0785 - 08 16 18 0820</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>24C-NCOMP (A8G0785-01)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080368</b>		
% Solids	89.0	---	1.00	% by Weight	1	08/02/18	EPA 8000C	
<b>24C-SCOMP (A8G0785-02)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080368</b>		
% Solids	86.3	---	1.00	% by Weight	1	08/02/18	EPA 8000C	
<b>24D-NCOMP (A8G0785-03)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080368</b>		
% Solids	89.6	---	1.00	% by Weight	1	08/02/18	EPA 8000C	
<b>24D-SCOMP (A8G0785-04)</b>				<b>Matrix: Soil</b>		<b>Batch: 8080368</b>		
% Solids	88.9	---	1.00	% by Weight	1	08/02/18	EPA 8000C	

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Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0785 - 08 16 18 0820**

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080369 - EPA 3546</b>						<b>Soil</b>						
<b>Blank (8080369-BLK1)</b>			Prepared: 08/01/18 09:26 Analyzed: 08/02/18 12:44									
<b>EPA 8081B</b>												
Aldrin	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
alpha-BHC	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
beta-BHC	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
delta-BHC	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
gamma-BHC (Lindane)	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
cis-Chlordane	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
trans-Chlordane	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
4,4'-DDD	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
4,4'-DDE	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
4,4'-DDT	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Dieldrin	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Endosulfan I	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Endosulfan II	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Endosulfan sulfate	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Endrin	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Endrin Aldehyde	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Endrin ketone	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Heptachlor	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Heptachlor epoxide	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Methoxychlor	ND	---	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Chlordane (Technical)	ND	---	0.0250	mg/kg wet	1	---	---	---	---	---	---	
Toxaphene (Total)	ND	---	0.0250	mg/kg wet	1	---	---	---	---	---	---	
Surr: 2,4,5,6-TCMX (Surr)		Recovery: 86 %		Limits: 42-129 %		Dilution: 1x						
Decachlorobiphenyl (Surr)		102 %		65-151 %		"						

<b>LCS (8080369-BS1)</b>			Prepared: 08/01/18 09:26 Analyzed: 08/02/18 13:01									
<b>EPA 8081B</b>												
Aldrin	0.0509	---	0.00100	mg/kg wet	1	0.0500	---	102	45-136%	---	---	
alpha-BHC	0.0518	---	0.00100	mg/kg wet	1	0.0500	---	104	45-137%	---	---	
beta-BHC	0.0509	---	0.00100	mg/kg wet	1	0.0500	---	102	50-136%	---	---	
delta-BHC	0.0500	---	0.00100	mg/kg wet	1	0.0500	---	100	47-139%	---	---	
gamma-BHC (Lindane)	0.0538	---	0.00100	mg/kg wet	1	0.0500	---	108	49-135%	---	---	
cis-Chlordane	0.0527	---	0.00100	mg/kg wet	1	0.0500	---	105	54-133%	---	---	

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Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0785 - 08 16 18 0820**

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080369 - EPA 3546</b>												
<b>Soil</b>												
<b>LCS (8080369-BS1)</b>												
Prepared: 08/01/18 09:26 Analyzed: 08/02/18 13:01												
trans-Chlordane	0.0525	---	0.00100	mg/kg wet	1	0.0500	---	105	53-135%	---	---	
4,4'-DDD	0.0504	---	0.00100	mg/kg wet	1	0.0500	---	101	56-139%	---	---	
4,4'-DDE	0.0508	---	0.00100	mg/kg wet	1	0.0500	---	102	56-134%	---	---	
4,4'-DDT	0.0599	---	0.00100	mg/kg wet	1	0.0500	---	120	50-141%	---	---	
Dieldrin	0.0547	---	0.00100	mg/kg wet	1	0.0500	---	109	56-136%	---	---	
Endosulfan I	0.0521	---	0.00100	mg/kg wet	1	0.0500	---	104	52-132%	---	---	
Endosulfan II	0.0546	---	0.00100	mg/kg wet	1	0.0500	---	109	53-134%	---	---	
Endosulfan sulfate	0.0542	---	0.00100	mg/kg wet	1	0.0500	---	108	55-136%	---	---	
Endrin	0.0609	---	0.00100	mg/kg wet	1	0.0500	---	122	56-140%	---	---	
Endrin Aldehyde	0.0487	---	0.00100	mg/kg wet	1	0.0500	---	97	35-137%	---	---	
Endrin ketone	0.0579	---	0.00100	mg/kg wet	1	0.0500	---	116	55-136%	---	---	
Heptachlor	0.0559	---	0.00100	mg/kg wet	1	0.0500	---	112	47-136%	---	---	
Heptachlor epoxide	0.0519	---	0.00100	mg/kg wet	1	0.0500	---	104	52-136%	---	---	
Methoxychlor	0.0620	---	0.00300	mg/kg wet	1	0.0500	---	124	52-143%	---	---	

Surr: 2,4,5,6-TCMX (Surr) Recovery: 87 % Limits: 42-129 % Dilution: 1x  
Decachlorobiphenyl (Surr) 104 % 65-151 % "

**Duplicate (8080369-DUP1)** Prepared: 08/01/18 09:26 Analyzed: 08/02/18 13:06

**QC Source Sample: 24C-NCOMP (A8G0785-01)**

**EPA 8081B**

Aldrin	ND	---	0.00107	mg/kg dry	1	---	ND	---	---	---	30%	
alpha-BHC	ND	---	0.00107	mg/kg dry	1	---	ND	---	---	---	30%	
beta-BHC	ND	---	0.00107	mg/kg dry	1	---	ND	---	---	---	30%	
delta-BHC	ND	---	0.00107	mg/kg dry	1	---	ND	---	---	---	30%	
gamma-BHC (Lindane)	ND	---	0.00107	mg/kg dry	1	---	ND	---	---	---	30%	
cis-Chlordane	ND	---	0.00107	mg/kg dry	1	---	ND	---	---	---	30%	
trans-Chlordane	ND	---	0.00107	mg/kg dry	1	---	ND	---	---	---	30%	
4,4'-DDD	ND	---	0.00107	mg/kg dry	1	---	ND	---	---	---	30%	
4,4'-DDE	<b>0.00154</b>	---	0.00107	mg/kg dry	1	---	0.00132	---	---	15	30%	
4,4'-DDT	ND	---	0.00107	mg/kg dry	1	---	0.000882	---	---	***	30%	
Dieldrin	ND	---	0.00107	mg/kg dry	1	---	ND	---	---	---	30%	
Endosulfan I	ND	---	0.00107	mg/kg dry	1	---	ND	---	---	---	30%	
Endosulfan II	ND	---	0.00107	mg/kg dry	1	---	ND	---	---	---	30%	
Endosulfan sulfate	ND	---	0.00107	mg/kg dry	1	---	ND	---	---	---	30%	

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0785 - 08 16 18 0820</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080369 - EPA 3546</b>												
<b>Soil</b>												
<b>Duplicate (8080369-DUP1)</b>												
Prepared: 08/01/18 09:26 Analyzed: 08/02/18 13:06												
<b>QC Source Sample: 24C-NCOMP (A8G0785-01)</b>												
Endrin	ND	---	0.00107	mg/kg dry	1	---	ND	---	---	---	30%	
Endrin Aldehyde	ND	---	0.00107	mg/kg dry	1	---	ND	---	---	---	30%	
Endrin ketone	ND	---	0.00107	mg/kg dry	1	---	ND	---	---	---	30%	
Heptachlor	ND	---	0.00107	mg/kg dry	1	---	ND	---	---	---	30%	
Heptachlor epoxide	ND	---	0.00107	mg/kg dry	1	---	ND	---	---	---	30%	
Methoxychlor	ND	---	0.00322	mg/kg dry	1	---	ND	---	---	---	30%	
Chlordane (Technical)	ND	---	0.0322	mg/kg dry	1	---	ND	---	---	---	30%	
Toxaphene (Total)	ND	---	0.0322	mg/kg dry	1	---	ND	---	---	---	30%	
Surr: 2,4,5,6-TCMX (Surr) Recovery: 86 % Limits: 42-129 % Dilution: 1x												
Decachlorobiphenyl (Surr) 103 % 65-151 % "												

<b>Matrix Spike (8080369-MS1)</b>												
Prepared: 08/01/18 09:26 Analyzed: 08/02/18 14:46												
<b>QC Source Sample: Non-SDG (A8G0789-04)</b>												
<b>EPA 8081B</b>												
Aldrin	0.0420	---	0.000911	mg/kg dry	1	0.0456	ND	92	45-136%	---	---	
alpha-BHC	0.0426	---	0.000911	mg/kg dry	1	0.0456	ND	94	45-137%	---	---	
beta-BHC	0.0451	---	0.000911	mg/kg dry	1	0.0456	ND	99	50-136%	---	---	
delta-BHC	0.0441	---	0.000911	mg/kg dry	1	0.0456	ND	97	47-139%	---	---	
gamma-BHC (Lindane)	0.0437	---	0.000911	mg/kg dry	1	0.0456	ND	96	49-135%	---	---	
cis-Chlordane	0.0441	---	0.000911	mg/kg dry	1	0.0456	ND	97	54-133%	---	---	
trans-Chlordane	0.0456	---	0.000911	mg/kg dry	1	0.0456	ND	100	53-135%	---	---	
4,4'-DDD	0.0446	---	0.000911	mg/kg dry	1	0.0456	ND	98	56-139%	---	---	
4,4'-DDE	0.0446	---	0.000911	mg/kg dry	1	0.0456	ND	98	56-134%	---	---	
4,4'-DDT	0.0549	---	0.000911	mg/kg dry	1	0.0456	ND	120	50-141%	---	---	
Dieldrin	0.0471	---	0.000911	mg/kg dry	1	0.0456	ND	103	56-136%	---	---	
Endosulfan I	0.0458	---	0.000911	mg/kg dry	1	0.0456	ND	101	52-132%	---	---	
Endosulfan II	0.0463	---	0.000911	mg/kg dry	1	0.0456	ND	102	53-134%	---	---	
Endosulfan sulfate	0.0500	---	0.000911	mg/kg dry	1	0.0456	ND	110	55-136%	---	---	
Endrin	0.0534	---	0.000911	mg/kg dry	1	0.0456	ND	117	56-140%	---	---	
Endrin Aldehyde	0.0431	---	0.000911	mg/kg dry	1	0.0456	ND	95	35-137%	---	---	
Endrin ketone	0.0508	---	0.000911	mg/kg dry	1	0.0456	ND	112	55-136%	---	---	
Heptachlor	0.0491	---	0.000911	mg/kg dry	1	0.0456	ND	108	47-136%	---	---	
Heptachlor epoxide	0.0451	---	0.000911	mg/kg dry	1	0.0456	ND	99	52-136%	---	---	

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Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
 Tigard, OR 97223  
 503-718-2323  
 EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0785 - 08 16 18 0820</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080369 - EPA 3546</b>						<b>Soil</b>						
<b>Matrix Spike (8080369-MS1)</b>			Prepared: 08/01/18 09:26 Analyzed: 08/02/18 14:46									
<b>QC Source Sample: Non-SDG (A8G0789-04)</b>												
Methoxychlor	0.0571	---	0.00273	mg/kg dry	1	0.0456	ND	125	52-143%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 87 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>100 %</i>		<i>65-151 %</i>		<i>"</i>						

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0785 - 08 16 18 0820</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8080368 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (8080368-DUP1)</b>			Prepared: 08/01/18 09:15 Analyzed: 08/02/18 08:19									
<u>QC Source Sample: Non-SDG (A8G0783-02)</u>												
% Solids	84.6	---	1.00	% by Weight	1	---	85.3	---	---	0.8	10%	
<b>Duplicate (8080368-DUP2)</b>			Prepared: 08/01/18 09:15 Analyzed: 08/02/18 08:19									
<u>QC Source Sample: Non-SDG (A8G0787-07)</u>												
% Solids	70.7	---	1.00	% by Weight	1	---	71.4	---	---	1	10%	
<b>Duplicate (8080368-DUP3)</b>			Prepared: 08/01/18 09:15 Analyzed: 08/02/18 08:19									
<u>QC Source Sample: Non-SDG (A8G0823-02)</u>												
% Solids	83.4	---	1.00	% by Weight	1	---	83.8	---	---	0.5	10%	
<b>Duplicate (8080368-DUP4)</b>			Prepared: 08/01/18 09:15 Analyzed: 08/02/18 08:19									
<u>QC Source Sample: Non-SDG (A8H0001-02)</u>												
% Solids	60.7	---	1.00	% by Weight	1	---	62.7	---	---	3	10%	
<b>Duplicate (8080368-DUP5)</b>			Prepared: 08/01/18 18:03 Analyzed: 08/02/18 08:19									
<u>QC Source Sample: Non-SDG (A8H0019-01)</u>												
% Solids	81.6	---	1.00	% by Weight	1	---	81.8	---	---	0.2	10%	
<b>Duplicate (8080368-DUP6)</b>			Prepared: 08/01/18 18:03 Analyzed: 08/02/18 08:19									
<u>QC Source Sample: Non-SDG (A8H0024-01)</u>												
% Solids	76.6	---	1.00	% by Weight	1	---	77.8	---	---	1	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8080369</u>							
A8G0785-01	Soil	EPA 8081B	07/30/18 13:15	08/01/18 09:26	11.06g/5mL	10g/5mL	0.90
A8G0785-02	Soil	EPA 8081B	07/30/18 13:22	08/01/18 09:26	10.91g/5mL	10g/5mL	0.92
A8G0785-03	Soil	EPA 8081B	07/30/18 13:36	08/01/18 09:26	10.6g/5mL	10g/5mL	0.94
A8G0785-04	Soil	EPA 8081B	07/30/18 13:40	08/01/18 09:26	11.09g/5mL	10g/5mL	0.90

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8080368</u>							
A8G0785-01	Soil	EPA 8000C	07/30/18 13:15	08/01/18 09:15			NA
A8G0785-02	Soil	EPA 8000C	07/30/18 13:22	08/01/18 09:15			NA
A8G0785-03	Soil	EPA 8000C	07/30/18 13:36	08/01/18 09:15			NA
A8G0785-04	Soil	EPA 8000C	07/30/18 13:40	08/01/18 09:15			NA

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Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0785 - 08 16 18 0820**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**There are No Qualifiers on Sample or QC Data for this report**

---

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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

Basis: Results for soil samples are generally reported on a 100% dry weight basis.

The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.

"dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.

"wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).

-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.

-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.

For further details, please request a copy of this document.

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Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories

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Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
**EPA ID: OR01039**

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0785 - 08 16 18 0820**

**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Darwin Thomas, Business Development Director





Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8G0785 - 08 16 18 0820

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geo Element WO#: A8 G0785

Project/Project #: Northstar / 1503.20

**Delivery info:**

Date/Time Received: 7/30/18 @ 14:57 By: WJ

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: WJ : 7/30/18 @ 14:57

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

Temperature (deg. C) 2.1

Received on Ice?  (Y/N)

Temp. Blanks?  (Y/N)

Ice Type:  (Gel/Real/Other)

Condition: Good

Cooler out of temp?  (Y/N) Possible reason why: \_\_\_\_\_

If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No  NA

**Samples Inspection:** Inspected by: WJ : 7/30/18 @ 14:55

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: \_\_\_\_\_

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

**Additional Information:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Labeled by: WJ Witness: [Signature] Cooler Inspected by: Client See Project Contact Form: Y

Darwin Thomas



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Tuesday, July 31, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8G0765 - Northstar - 1503.30

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8G0765, which was received by the laboratory on 7/28/2018 at 10:07:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [DAuvil@apex-labs.com](mailto:DAuvil@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

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---

Darrell Auvil For Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
**EPA ID: OR01039**

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.30**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0765 - 07 31 18 1518**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
25C-NCOMP(2)	A8G0765-05	Soil	07/27/18 15:20	07/28/18 10:07
25C-SCOMP(2)	A8G0765-10	Soil	07/27/18 15:40	07/28/18 10:07

Apex Laboratories

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Darrell Auvil For Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.30</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0765 - 07 31 18 1518</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>25C-NCOMP(2) (A8G0765-05)</b>				<b>Matrix: Soil</b>		<b>Batch: 8071142</b>		
Dieldrin	ND	---	0.976	ug/kg	1	07/30/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 86 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>07/30/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>99 %</i>		<i>65-151 %</i>		<i>1</i>	<i>07/30/18</i>	<i>EPA 8081B</i>
<b>25C-SCOMP(2) (A8G0765-10)</b>				<b>Matrix: Soil</b>		<b>Batch: 8071142</b>		
Dieldrin	<b>2.64</b>	---	0.930	ug/kg	1	07/30/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 88 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>07/30/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>101 %</i>		<i>65-151 %</i>		<i>1</i>	<i>07/30/18</i>	<i>EPA 8081B</i>

Apex Laboratories

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**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.30</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0765 - 07 31 18 1518</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>25C-NCOMP(2) (A8G0765-05)</b>				<b>Matrix: Soil</b>		<b>Batch: 8071173</b>		
% Solids	88.3	---	1.00	% by Weight	1	07/31/18	EPA 8000C	
<b>25C-SCOMP(2) (A8G0765-10)</b>				<b>Matrix: Soil</b>		<b>Batch: 8071173</b>		
% Solids	87.6	---	1.00	% by Weight	1	07/31/18	EPA 8000C	

Apex Laboratories

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Darrell Auvil For Darwin Thomas, Business Development Director



<b>Anderson Geological</b>	Project: <b>Northstar</b>	
PO Box 649	Project Number: <b>1503.30</b>	<b>Report ID:</b>
Wilsonville, OR 97070	Project Manager: <b>Erik Anderson</b>	<b>A8G0765 - 07 31 18 1518</b>

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8071142 - EPA 3546</b>						<b>Solid</b>						
<b>Blank (8071142-BLK1)</b>			Prepared: 07/30/18 07:36 Analyzed: 07/30/18 13:03									
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.909	ug/kg	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 90 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>109 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>LCS (8071142-BS1)</b>						Prepared: 07/30/18 07:36 Analyzed: 07/30/18 13:21						
<u>EPA 8081B</u>												
Dieldrin	53.8	---	1.00	ug/kg	1	50.0	---	108	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 88 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>102 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Duplicate (8071142-DUP1)</b>						Prepared: 07/30/18 07:36 Analyzed: 07/30/18 13:56						
<u>QC Source Sample: 25C-NCOMP(2) (A8G0765-05)</u>												
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.938	ug/kg	1	---	0.952	---	---	***	30%	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 85 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>105 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Matrix Spike (8071142-MS1)</b>						Prepared: 07/30/18 07:36 Analyzed: 07/30/18 14:31						
<u>QC Source Sample: 25C-SCOMP(2) (A8G0765-10)</u>												
<u>EPA 8081B</u>												
Dieldrin	48.2	---	0.926	ug/kg	1	46.3	2.64	98	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 91 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>102 %</i>		<i>65-151 %</i>		<i>"</i>						

Apex Laboratories

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Darrell Auvil For Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.30</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0765 - 07 31 18 1518</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8071173 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (8071173-DUP1)</b>			Prepared: 07/30/18 17:34 Analyzed: 07/31/18 07:54									
<u>QC Source Sample: Non-SDG (A8G0732-03)</u>												
% Solids	75.6	---	1.00	% by Weight	1	---	90.5	---	---	18	10%	Q-17
<b>Duplicate (8071173-DUP2)</b>			Prepared: 07/30/18 17:34 Analyzed: 07/31/18 07:54									
<u>QC Source Sample: 25C-NCOMP(2) (A8G0765-05)</u>												
<u>EPA 8000C</u>												
% Solids	88.1	---	1.00	% by Weight	1	---	88.3	---	---	0.2	10%	
<b>Duplicate (8071173-DUP3)</b>			Prepared: 07/30/18 17:34 Analyzed: 07/31/18 07:54									
<u>QC Source Sample: Non-SDG (A8G0792-02)</u>												
% Solids	91.4	---	1.00	% by Weight	1	---	92.0	---	---	0.7	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.30</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0765 - 07 31 18 1518</b>
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**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 8071142</u>							
A8G0765-05	Soil	EPA 8081B	07/27/18 15:20	07/30/18 07:36	10.25g/5mL	10g/5mL	0.98
A8G0765-10	Soil	EPA 8081B	07/27/18 15:40	07/30/18 07:36	10.75g/5mL	10g/5mL	0.93

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 8071173</u>							
A8G0765-05	Soil	EPA 8000C	07/27/18 15:20	07/30/18 17:34			NA
A8G0765-10	Soil	EPA 8000C	07/27/18 15:40	07/30/18 17:34			NA

Apex Laboratories

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Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.30**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0765 - 07 31 18 1518**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**Apex Laboratories**

Q-17 RPD between original and duplicate sample is outside of established control limits.

---

Apex Laboratories

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---

Darrell Auvil For Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.30</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0765 - 07 31 18 1518</b>
---	--	---

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
  - "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
  - "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
  - " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.  
  
Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.30</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0765 - 07 31 18 1518</b>
---	--	---

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
**EPA ID: OR01039**

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.30</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0765 - 07 31 18 1518</b>
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**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.30  
Project Manager: Erik Anderson

Report ID:  
A8G0765 - 07 31 18 1518

**CHAIN OF CUSTODY**

Lab # 28607165      coc 1 of 1

PO# 1503.30

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Anderson Geological      Project Mgr: Erik Anderson      Project Name: Northstar

Address: \_\_\_\_\_      Phone: \_\_\_\_\_      Fax: \_\_\_\_\_      Email: \_\_\_\_\_

Sampled by: E. Anderson

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST	
					YES	NO
25C-NA(2)	7/27/18	15:12	S	1		
25C-116(2)	15:14					
25C-NC(2)	15:16					
25C-N0(2)	15:18					
25C-NCOMP(2)	15:20					
25C-SM(2)	15:32					
25C-SB(2)	15:34					
25C-SC(2)	15:36					
25C-S0(2)	15:38					
25C-SComp(2)	15:48					

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day      2 Day      3 Day      4 DAY      5 DAY      Other: \_\_\_\_\_

SPECIAL INSTRUCTIONS: \_\_\_\_\_

RECEIVED BY: \_\_\_\_\_      RECEIVED BY: \_\_\_\_\_

Signature: E. Anderson      Date: 7/28/18      Signature: \_\_\_\_\_      Date: \_\_\_\_\_

Printed Name: Erik Anderson      Time: 12:07      Printed Name: ANNA KAPA      Time: 10:07

Company: Ag1      Company: Apex Labs

Apex Laboratories

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<u>Anderson Geological</u> PO Box 649 Wilsonville, OR 97070	Project: <u>Northstar</u> Project Number: <u>1503.30</u> Project Manager: <u>Erik Anderson</u>	<b>Report ID:</b> <u>A8G0765 - 07 31 18 1518</u>
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**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geological Element WO#: A8G0765  
 Project/Project #: Northstar / #1503.30

**Delivery info:**  
 Date/Time Received: 7/28/18 @ 1007 By: HEK  
 Delivered by: Apex \_\_\_ Client  ESS \_\_\_ FedEx \_\_\_ UPS \_\_\_ Swift \_\_\_ Senvoy \_\_\_ SDS \_\_\_ Other \_\_\_

**Cooler Inspection** Inspected by: ALC : 7/28/18 @ 1008  
 Chain of Custody Included? Yes  No \_\_\_ Custody Seals? Yes \_\_\_ No   
 Signed/Dated by Client? Yes  No \_\_\_  
 Signed/Dated by Apex? Yes  No \_\_\_

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>3.3</u>						
Received on Ice? (Y/N)	<input checked="" type="checkbox"/>						
Temp. Blanks? (Y/N)	<input checked="" type="checkbox"/>						
Ice Type: (Gel/Real/Other)	<input checked="" type="checkbox"/>						
Condition:	<u>good</u>						

Cooler out of temp? (Y/N) Possible reason why: NA  
 If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA NA

**Samples Inspection:** Inspected by: TG : 7/28/18 @ 10:12

All Samples Intact? Yes  No \_\_\_ Comments: \_\_\_\_\_  
 Bottle Labels/COCs agree? Yes  No \_\_\_ Comments: \_\_\_\_\_  
 Containers/Volumes Received Appropriate for Analysis? Yes  No \_\_\_ Comments: \_\_\_\_\_  
 Do VOA Vials have Visible Headspace? Yes \_\_\_ No \_\_\_ NA   
 Comments: \_\_\_\_\_  
 Water Samples: pH Checked and Appropriate (except VOAs): Yes \_\_\_ No \_\_\_ NA   
 Comments: \_\_\_\_\_  
 Additional Information: \_\_\_\_\_

Labeled by: TG Witness: ALC Cooler Inspected by: client See Project Contact Form: Y



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Tuesday, July 31, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8G0620 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8G0620, which was received by the laboratory on 7/24/2018 at 1:50:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [DAuvil@apex-labs.com](mailto:DAuvil@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Darrell Auvil For Darwin Thomas, Business Development Director



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Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8G0620 - 07 31 18 1515

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
23C-N Comp(2)	A8G0620-05	Soil	07/24/18 09:08	07/24/18 13:50
25A-N Comp	A8G0620-10	Soil	07/24/18 10:56	07/24/18 13:50
25A-S Comp	A8G0620-15	Soil	07/24/18 11:09	07/24/18 13:50
25B-N Comp	A8G0620-20	Soil	07/24/18 11:48	07/24/18 13:50
25B-S Comp	A8G0620-25	Soil	07/24/18 12:00	07/24/18 13:50

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0620 - 07 31 18 1515</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>23C-N Comp (A8G0620-05)</b>				<b>Matrix: Soil</b>		<b>Batch: 8070971</b>		
Dieldrin	ND	---	1.08	ug/kg dry	1	07/25/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 73 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>07/25/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>83 %</i>		<i>65-151 %</i>		<i>1</i>	<i>07/25/18</i>	<i>EPA 8081B</i>
<b>25A-N Comp (A8G0620-10)</b>				<b>Matrix: Soil</b>		<b>Batch: 8070971</b>		
Dieldrin	ND	---	1.13	ug/kg dry	1	07/25/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 77 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>07/25/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>79 %</i>		<i>65-151 %</i>		<i>1</i>	<i>07/25/18</i>	<i>EPA 8081B</i>
<b>25A-S Comp (A8G0620-15)</b>				<b>Matrix: Soil</b>		<b>Batch: 8070971</b>		
Dieldrin	ND	---	1.04	ug/kg dry	1	07/25/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 74 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>07/25/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>77 %</i>		<i>65-151 %</i>		<i>1</i>	<i>07/25/18</i>	<i>EPA 8081B</i>
<b>25B-N Comp (A8G0620-20)</b>				<b>Matrix: Soil</b>		<b>Batch: 8070971</b>		
Dieldrin	<b>68.3</b>	---	1.02	ug/kg dry	1	07/25/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 76 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>07/25/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>85 %</i>		<i>65-151 %</i>		<i>1</i>	<i>07/25/18</i>	<i>EPA 8081B</i>
<b>25B-S Comp (A8G0620-25)</b>				<b>Matrix: Soil</b>		<b>Batch: 8070971</b>		
Dieldrin	<b>73.0</b>	---	1.06	ug/kg dry	1	07/25/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 81 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>07/25/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>89 %</i>		<i>65-151 %</i>		<i>1</i>	<i>07/25/18</i>	<i>EPA 8081B</i>



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0620 - 07 31 18 1515</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>23C-N Comp(2) (A8G0620-05)</b>				<b>Matrix: Soil</b>			<b>Batch: 8070962</b>	
% Solids	86.9	---	1.00	% by Weight	1	07/25/18	EPA 8000C	
<b>25A-N Comp (A8G0620-10)</b>				<b>Matrix: Soil</b>			<b>Batch: 8071053</b>	
% Solids	86.4	---	1.00	% by Weight	1	07/27/18	EPA 8000C	
<b>25A-S Comp (A8G0620-15)</b>				<b>Matrix: Soil</b>			<b>Batch: 8071053</b>	
% Solids	87.9	---	1.00	% by Weight	1	07/27/18	EPA 8000C	
<b>25B-N Comp (A8G0620-20)</b>				<b>Matrix: Soil</b>			<b>Batch: 8071053</b>	
% Solids	89.3	---	1.00	% by Weight	1	07/27/18	EPA 8000C	
<b>25B-S Comp (A8G0620-25)</b>				<b>Matrix: Soil</b>			<b>Batch: 8070962</b>	
% Solids	92.2	---	1.00	% by Weight	1	07/25/18	EPA 8000C	

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---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8070971 - EPA 3546</b>												
<b>Soil</b>												
<b>Blank (8070971-BLK1)</b> Prepared: 07/24/18 16:13 Analyzed: 07/25/18 12:58												
<u>EPA 8081B</u>												
Dieldrin	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 82 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>91 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>LCS (8070971-BS1)</b> Prepared: 07/24/18 16:13 Analyzed: 07/25/18 13:15												
<u>EPA 8081B</u>												
Dieldrin	47.7	---	1.00	ug/kg wet	1	50.0	---	95	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 86 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>90 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Duplicate (8070971-DUP1)</b> Prepared: 07/24/18 16:13 Analyzed: 07/25/18 13:50												
<u>QC Source Sample: 23C-N Comp(2) (A8G0620-05)</u>												
<u>EPA 8081B</u>												
Dieldrin	ND	---	1.08	ug/kg dry	1	---	ND	---	---	---	30%	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 76 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>76 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Matrix Spike (8070971-MS1)</b> Prepared: 07/24/18 16:13 Analyzed: 07/25/18 15:23												
<u>QC Source Sample: 25B-S Comp (A8G0620-25)</u>												
<u>EPA 8081B</u>												
Dieldrin	116	---	2.10	ug/kg dry	2	52.6	73.0	82	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 78 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 2x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>88 %</i>		<i>65-151 %</i>		<i>"</i>						



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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8070962 - Total Solids (Dry Weight)</b>							<b>Soil</b>					
<b>Duplicate (8070962-DUP1)</b>			Prepared: 07/24/18 09:49 Analyzed: 07/25/18 08:43									
<u>QC Source Sample: Non-SDG (A8G0500-03)</u>												
% Solids	96.1	---	1.00	% by Weight	1	---	96.1	---	---	0.03	10%	
<b>Duplicate (8070962-DUP2)</b>			Prepared: 07/24/18 09:49 Analyzed: 07/25/18 08:43									
<u>QC Source Sample: Non-SDG (A8G0542-09)</u>												
% Solids	83.9	---	1.00	% by Weight	1	---	82.2	---	---	2	10%	
<b>Duplicate (8070962-DUP3)</b>			Prepared: 07/24/18 09:49 Analyzed: 07/25/18 08:43									
<u>QC Source Sample: Non-SDG (A8G0555-13)</u>												
% Solids	73.6	---	1.00	% by Weight	1	---	74.2	---	---	0.8	10%	
<b>Duplicate (8070962-DUP4)</b>			Prepared: 07/24/18 09:49 Analyzed: 07/25/18 08:43									
<u>QC Source Sample: Non-SDG (A8G0595-05)</u>												
% Solids	97.2	---	1.00	% by Weight	1	---	97.7	---	---	0.5	10%	
<b>Duplicate (8070962-DUP5)</b>			Prepared: 07/24/18 09:49 Analyzed: 07/25/18 08:43									
<u>QC Source Sample: Non-SDG (A8G0621-01)</u>												
% Solids	80.4	---	1.00	% by Weight	1	---	78.1	---	---	3	10%	
<b>Duplicate (8070962-DUP6)</b>			Prepared: 07/24/18 09:49 Analyzed: 07/25/18 08:43									
<u>QC Source Sample: Non-SDG (A8G0631-01)</u>												
% Solids	86.9	---	1.00	% by Weight	1	---	86.1	---	---	0.9	10%	
<b>Duplicate (8070962-DUP7)</b>			Prepared: 07/24/18 09:49 Analyzed: 07/25/18 08:43									
<u>QC Source Sample: Non-SDG (A8G0635-01)</u>												
% Solids	77.4	---	1.00	% by Weight	1	---	77.5	---	---	0.2	10%	
<b>Duplicate (8070962-DUP8)</b>			Prepared: 07/24/18 09:49 Analyzed: 07/25/18 08:43									
<u>QC Source Sample: Non-SDG (A8G0636-01)</u>												
% Solids	77.0	---	1.00	% by Weight	1	---	77.4	---	---	0.6	10%	

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Darrell Auvil For Darwin Thomas, Business Development Director



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**EPA ID: OR01039**

<b><u>Anderson Geological</u></b> PO Box 649 Wilsonville, OR 97070	Project: <b><u>Northstar</u></b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0620 - 07 31 18 1515</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
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No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0620 - 07 31 18 1515</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8071053 - Total Solids (Dry Weight)</b>							<b>Soil</b>					
<b>Duplicate (8071053-DUP1)</b>			Prepared: 07/26/18 09:12 Analyzed: 07/27/18 08:47									
<u>QC Source Sample: Non-SDG (A8G0566-05)</u>												
% Solids	72.2	---	1.00	% by Weight	1	---	72.9	---	---	1	10%	
<b>Duplicate (8071053-DUP2)</b>			Prepared: 07/26/18 09:12 Analyzed: 07/27/18 08:47									
<u>QC Source Sample: Non-SDG (A8G0611-21)</u>												
% Solids	75.7	---	1.00	% by Weight	1	---	75.5	---	---	0.2	10%	
<b>Duplicate (8071053-DUP3)</b>			Prepared: 07/26/18 09:12 Analyzed: 07/27/18 08:47									
<u>QC Source Sample: Non-SDG (A8G0653-02)</u>												
% Solids	98.6	---	1.00	% by Weight	1	---	98.7	---	---	0.1	10%	
<b>Duplicate (8071053-DUP4)</b>			Prepared: 07/26/18 09:12 Analyzed: 07/27/18 08:47									
<u>QC Source Sample: Non-SDG (A8G0687-01)</u>												
% Solids	94.3	---	1.00	% by Weight	1	---	94.3	---	---	0.03	10%	
<b>Duplicate (8071053-DUP5)</b>			Prepared: 07/26/18 18:32 Analyzed: 07/27/18 08:47									
<u>QC Source Sample: Non-SDG (A8G0702-02)</u>												
% Solids	92.2	---	1.00	% by Weight	1	---	92.3	---	---	0.08	10%	
<b>Duplicate (8071053-DUP6)</b>			Prepared: 07/26/18 18:32 Analyzed: 07/27/18 08:47									
<u>QC Source Sample: Non-SDG (A8G0702-12)</u>												
% Solids	92.3	---	1.00	% by Weight	1	---	92.8	---	---	0.6	10%	
<b>Duplicate (8071053-DUP7)</b>			Prepared: 07/26/18 18:32 Analyzed: 07/27/18 08:47									
<u>QC Source Sample: Non-SDG (A8G0709-03)</u>												
% Solids	74.7	---	1.00	% by Weight	1	---	74.8	---	---	0.1	10%	
<b>Duplicate (8071053-DUP8)</b>			Prepared: 07/26/18 18:32 Analyzed: 07/27/18 08:47									
<u>QC Source Sample: Non-SDG (A8G0719-02)</u>												
% Solids	89.0	---	1.00	% by Weight	1	---	89.4	---	---	0.4	10%	

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Darrell Auvil For Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

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 503-718-2323  
 EPA ID: OR01039

<b>Anderson Geological</b>	Project: <b>Northstar</b>	
PO Box 649	Project Number: <b>1503.20</b>	<b>Report ID:</b>
Wilsonville, OR 97070	Project Manager: <b>Erik Anderson</b>	<b>A8G0620 - 07 31 18 1515</b>

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8071053 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (8071053-DUP9)</b>						Prepared: 07/26/18 18:32 Analyzed: 07/27/18 08:47						
<b>QC Source Sample: Non-SDG (A8G0724-02)</b>												
% Solids	<b>86.3</b>	---	1.00	% by Weight	1	---	85.7	---	---	0.7	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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Darrell Auvil For Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0620 - 07 31 18 1515**

**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8070971							
A8G0620-05	Soil	EPA 8081B	07/24/18 09:08	07/24/18 16:13	10.69g/5mL	10g/5mL	0.94
A8G0620-10	Soil	EPA 8081B	07/24/18 10:56	07/24/18 16:13	10.26g/5mL	10g/5mL	0.98
A8G0620-15	Soil	EPA 8081B	07/24/18 11:09	07/24/18 16:13	10.91g/5mL	10g/5mL	0.92
A8G0620-20	Soil	EPA 8081B	07/24/18 11:48	07/24/18 16:13	10.94g/5mL	10g/5mL	0.91
A8G0620-25	Soil	EPA 8081B	07/24/18 12:00	07/24/18 16:13	10.24g/5mL	10g/5mL	0.98

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8070962							
A8G0620-05	Soil	EPA 8000C	07/24/18 09:08	07/24/18 09:49			NA
A8G0620-25	Soil	EPA 8000C	07/24/18 12:00	07/24/18 14:01			NA
Batch: 8071053							
A8G0620-10	Soil	EPA 8000C	07/24/18 10:56	07/26/18 09:12			NA
A8G0620-15	Soil	EPA 8000C	07/24/18 11:09	07/26/18 09:12			NA
A8G0620-20	Soil	EPA 8000C	07/24/18 11:48	07/26/18 09:12			NA



Apex Laboratories, LLC

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503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0620 - 07 31 18 1515**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**There are No Qualifiers on Sample or QC Data for this report**

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Apex Laboratories

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

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Darrell Auvil For Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0620 - 07 31 18 1515</b>
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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
  - "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
  - "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
  - " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.  
  
Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.



<b>Anderson Geological</b>	Project: <b>Northstar</b>	
PO Box 649	Project Number: <b>1503.20</b>	<b>Report ID:</b>
Wilsonville, OR 97070	Project Manager: <b>Erik Anderson</b>	<b>A8G0620 - 07 31 18 1515</b>

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
**EPA ID: OR01039**

<b><u>Anderson Geological</u></b> PO Box 649 Wilsonville, OR 97070	Project: <b><u>Northstar</u></b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0620 - 07 31 18 1515</b>
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**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Darrell Auvil For Darwin Thomas, Business Development Director



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8G0620 - 07 31 18 1515

**CHAIN OF CUSTODY**

APEX LABS      12232 S.W. Garden Place, Tigard, OR 97223      Ph: 503-718-2323      Fax: 503-718-0333

Lab # A8G0620      Project # 1503.20      COC 1 of 3

Company: Anderson Geological      Project Mgr: Erik Anderson      Project Name: Northstar      PO#

Address: \_\_\_\_\_      Phone: \_\_\_\_\_      Email: \_\_\_\_\_

Sampled by: E. Anderson

Site Location:  OR     WA    Other: \_\_\_\_\_

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS		ANALYSIS REQUEST
				YES	NO	
23C-NA(2)	7/24/18	09:00	S	1		1200-Z 1200-COLS TOTAL DISS TCTP As, Ag, Na, TL, V, Zn Hg, Mg, Mn, Ni, Pb, Se, Cd Cr, Cu, Fe, Ni, P, Zn AL, Sb, As, Ba, Be, Bi, Br, Ca, Co, Cs, Cr, Cu, Fe, Ni, Pb, Se, Cd TCLP Metals (8) RCRA Metals (8) 600 TTO 8087 PCBs 8270 SIM PAHs 8270 SVOC 8260 BTEX VOCs 8260 HVOCS 8260 RBDN VOCs 8260 VOCs Full List NMTTH-GS NMTTH-DS NMTTH-DCID
23C-NB(2)	11/09/02	5	S	1		Hold
23C-NC(2)	11/09/04	5	S	1		Hold
23C-ND(2)	11/09/06	5	S	1		Hold
23C-NCOMP(2)	11/09/08	5	S	1		Hold
25A-NA	11/10/48	5	S	1		Hold
25A-NB	11/10/50	5	S	1		Hold
25A-NC	11/10/52	5	S	1		Hold
25A-ND	11/10/54	5	S	1		Hold
25A-NCOMP	11/10/56	5	S	1		Hold

SPECIAL INSTRUCTIONS:  
 - 1-day turnaround  
 - 5-day turnaround

RELINQUISHED BY: \_\_\_\_\_ RECEIVED BY: \_\_\_\_\_  
 Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Printed Name: Erik Anderson Date: 7/29/18  
 Time: 13:50 Printed Name: Amy Sorenson  
 Company: Apex Labs Company: Apex Labs

Apex Laboratories

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Anderson Geological Project: **Northstar**  
 PO Box 649 Project Number: **1503.20**  
 Wilsonville, OR 97070 Project Manager: **Erik Anderson** Report ID: **A8G0620 - 07 31 18 1515**

COC 2 of 3

**CHAIN OF CUSTODY**

Lab # 1503.20 PO# 1503.20

Company: Anderson Geological Project Name: Northstar

Address: 12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Project Mgr: Erik Anderson Project # 1503.20

Sampled by: E. Anderson Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

Site Location: OR WA Other: \_\_\_\_\_

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS			ANALYSIS REQUEST	RESULTS
					YES	NO	Normal Turn Around Time (TAT) = 10 Business Days		
25A-SA		7/24/18	11:01	S					HPLD
25A-SB		11:03							HPLD
25A-SC		11:05							HPLD
25A-SD		11:07							HPLD
25A-SCOMP		11:09						X	HPLD
25B-NA		11:40							HPLD
25B-NB		11:42							HPLD
25B-NC		11:44							HPLD
25B-ND		11:46							HPLD
25B-NCOMP		11:48						X	HPLD

ANALYSIS REQUEST

AL, Sb, As, Ba, Be, Bi, Br, Cd, Cr, Cu, Pb, Fe, Ni, P, Se, Ag, Na, Te, V, Zn

TOTAL DISS TCFP

1200-COLS

1200-Z

SPECIAL INSTRUCTIONS:

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

RECEIVED BY: Erik Anderson Date: 7/24/18 Signature: [Signature] Date: \_\_\_\_\_

REQUISITIONED BY: Erik Anderson Date: 7/24/18 Signature: [Signature] Date: \_\_\_\_\_

Printed Name: Erik Anderson Time: 13:50 Printed Name: APX Labs Time: 13:50

Company: AGI Company: Apex Labs

Apex Laboratories

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8G0620 - 07 31 18 1515

COC 3 of 3

**CHAIN OF CUSTODY**

Lab # A8G0620 PO# 1503.20

Company: Anderson Geological Project Name: Northstar

Address: \_\_\_\_\_ Project Mgr: Erik Anderson Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

Sampled by: E. Anderson

Site Location: WA  
Other: \_\_\_\_\_

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS		ANALYSIS REQUEST
				YES	NO	
25B-SA	7/24/18	11:52	S	1		1200-Z 1200-COLS TOTAL DISS TCFP Se, Ag, Na, TL, V, Zn Hg, ME, Mn, Mo, Ni, Pb, Cr, Cd Al, Sb, As, Ba, Be, Bi, Br, Ca, C, Co, Cu, Fe, Ni, P, K TCFP Metals (8) RCRA Metals (8) 609 TTO 8082 PCBs 8270 SIM PAHs 8270 SVOC 8260 BTEX VOCs 8260 HVOCS 8260 RHM VOCs 8260 VOCs Full List SWTH-GX SWTH-DX SWTH-HCID
25B-SB	11-34					1200-Z 1200-COLS TOTAL DISS TCFP Se, Ag, Na, TL, V, Zn Hg, ME, Mn, Mo, Ni, Pb, Cr, Cd Al, Sb, As, Ba, Be, Bi, Br, Ca, C, Co, Cu, Fe, Ni, P, K TCFP Metals (8) RCRA Metals (8) 609 TTO 8082 PCBs 8270 SIM PAHs 8270 SVOC 8260 BTEX VOCs 8260 HVOCS 8260 RHM VOCs 8260 VOCs Full List SWTH-GX SWTH-DX SWTH-HCID
25B-SC	11-36					1200-Z 1200-COLS TOTAL DISS TCFP Se, Ag, Na, TL, V, Zn Hg, ME, Mn, Mo, Ni, Pb, Cr, Cd Al, Sb, As, Ba, Be, Bi, Br, Ca, C, Co, Cu, Fe, Ni, P, K TCFP Metals (8) RCRA Metals (8) 609 TTO 8082 PCBs 8270 SIM PAHs 8270 SVOC 8260 BTEX VOCs 8260 HVOCS 8260 RHM VOCs 8260 VOCs Full List SWTH-GX SWTH-DX SWTH-HCID
25B-SD	11-38					1200-Z 1200-COLS TOTAL DISS TCFP Se, Ag, Na, TL, V, Zn Hg, ME, Mn, Mo, Ni, Pb, Cr, Cd Al, Sb, As, Ba, Be, Bi, Br, Ca, C, Co, Cu, Fe, Ni, P, K TCFP Metals (8) RCRA Metals (8) 609 TTO 8082 PCBs 8270 SIM PAHs 8270 SVOC 8260 BTEX VOCs 8260 HVOCS 8260 RHM VOCs 8260 VOCs Full List SWTH-GX SWTH-DX SWTH-HCID
25B-SComp	12-30					1200-Z 1200-COLS TOTAL DISS TCFP Se, Ag, Na, TL, V, Zn Hg, ME, Mn, Mo, Ni, Pb, Cr, Cd Al, Sb, As, Ba, Be, Bi, Br, Ca, C, Co, Cu, Fe, Ni, P, K TCFP Metals (8) RCRA Metals (8) 609 TTO 8082 PCBs 8270 SIM PAHs 8270 SVOC 8260 BTEX VOCs 8260 HVOCS 8260 RHM VOCs 8260 VOCs Full List SWTH-GX SWTH-DX SWTH-HCID

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: E. Anderson Date: 7/24/18 Signature: [Signature] Date: 7/24/18

RECEIVED BY: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name: Erik Anderson Time: 13:50 Printed Name: Missy Kupper Time: 1:50

Company: AGI Company: Apex Labs



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

**Report ID:**  
**A8G0620 - 07 31 18 1515**

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geological Element WO#: A8 60620  
Project/Project #: Northstar / #1503.20

**Delivery info:**

Date/Time Received: 7/24/18 @ 1350 By: AKK  
Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: AKK : 7/24/18 @ 1354

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

Temperature (deg. C) 3.0

Received on Ice? (Y/N) (Y)

Temp. Blanks? (Y/N) (N)

Ice Type: (Ice/Real/Other) (Ice)

Condition: good

Cooler out of temp? (Y/N) (N) Possible reason why: \_\_\_\_\_

If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA (NA)

**Samples Inspection:** Inspected by: AKK : 7/24/18 @ 1530

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: AKK 7/24/18

NO T on CONTS. 25B-SComp ID on Cont. reads 2B-S Comp.

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

\_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

**Additional Information:** \_\_\_\_\_

\_\_\_\_\_

Labeled by: AKK Witness: JS Cooler Inspected by: client See Project Contact Form: Y



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Tuesday, July 24, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8G0498 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8G0498, which was received by the laboratory on 7/19/2018 at 2:57:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

A handwritten signature in black ink, appearing to read "Darwin Thomas".

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Darwin Thomas, Business Development Director



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0498 - 07 24 18 0730**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
23C-NCOMP	A8G0498-05	Soil	07/19/18 13:48	07/19/18 14:57
23C-SCOMP	A8G0498-10	Soil	07/19/18 14:04	07/19/18 14:57

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0498 - 07 24 18 0730</b>
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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>23C-NCOMP (A8G0498-05)</b>			<b>Matrix: Soil</b>		<b>Batch: 8070867</b>			
<b>Dieldrin</b>	<b>0.0241</b>	---	0.00106	mg/kg dry	1	07/20/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 86 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>07/20/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>95 %</i>	<i>65-151 %</i>	<i>1</i>	<i>07/20/18</i>	<i>EPA 8081B</i>	
<b>23C-SCOMP (A8G0498-10)</b>			<b>Matrix: Soil</b>		<b>Batch: 8070867</b>			
<b>Dieldrin</b>	<b>0.00458</b>	---	0.00105	mg/kg dry	1	07/20/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 83 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>07/20/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>92 %</i>	<i>65-151 %</i>	<i>1</i>	<i>07/20/18</i>	<i>EPA 8081B</i>	

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**EPA ID: OR01039**

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0498 - 07 24 18 0730</b>
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**ANALYTICAL SAMPLE RESULTS**

<b>Percent Dry Weight</b>									
Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes	
<b>23C-NCOMP (A8G0498-05)</b>			<b>Matrix: Soil</b>			<b>Batch: 8070875</b>			
% Solids	88.2	---	1.00	% by Weight	1	07/23/18	EPA 8000C		
<b>23C-SCOMP (A8G0498-10)</b>			<b>Matrix: Soil</b>			<b>Batch: 8070875</b>			
% Solids	89.0	---	1.00	% by Weight	1	07/23/18	EPA 8000C		

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0498 - 07 24 18 0730</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8070867 - EPA 3546</b>						<b>Soil</b>						
<b>Blank (8070867-BLK1)</b>			Prepared: 07/20/18 07:35 Analyzed: 07/20/18 12:47									
<b>EPA 8081B</b>												
Aldrin	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
alpha-BHC	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
beta-BHC	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
delta-BHC	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
gamma-BHC (Lindane)	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
cis-Chlordane	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
trans-Chlordane	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
4,4'-DDD	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
4,4'-DDE	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
4,4'-DDT	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Dieldrin	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Endosulfan I	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Endosulfan II	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Endosulfan sulfate	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Endrin	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Endrin Aldehyde	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Endrin ketone	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Heptachlor	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Heptachlor epoxide	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
Methoxychlor	ND	---	0.00250	mg/kg wet	1	---	---	---	---	---	---	
Chlordane (Technical)	ND	---	0.0250	mg/kg wet	1	---	---	---	---	---	---	
Toxaphene (Total)	ND	---	0.0250	mg/kg wet	1	---	---	---	---	---	---	
Surr: 2,4,5,6-TCMX (Surr)		Recovery: 81 %		Limits: 42-129 %		Dilution: 1x						
Decachlorobiphenyl (Surr)		97 %		65-151 %		"						

<b>LCS (8070867-BS1)</b>			Prepared: 07/20/18 07:35 Analyzed: 07/20/18 13:04									
<b>EPA 8081B</b>												
Aldrin	0.0455	---	0.00100	mg/kg wet	1	0.0500	---	91	45-136%	---	---	
alpha-BHC	0.0529	---	0.00100	mg/kg wet	1	0.0500	---	106	45-137%	---	---	
beta-BHC	0.0495	---	0.00100	mg/kg wet	1	0.0500	---	99	50-136%	---	---	
delta-BHC	0.0542	---	0.00100	mg/kg wet	1	0.0500	---	108	47-139%	---	---	
gamma-BHC (Lindane)	0.0575	---	0.00100	mg/kg wet	1	0.0500	---	115	49-135%	---	---	
cis-Chlordane	0.0577	---	0.00100	mg/kg wet	1	0.0500	---	115	54-133%	---	---	

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0498 - 07 24 18 0730</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8070867 - EPA 3546</b>						<b>Soil</b>						
<b>LCS (8070867-BS1)</b>			Prepared: 07/20/18 07:35 Analyzed: 07/20/18 13:04									
trans-Chlordane	0.0568	---	0.00100	mg/kg wet	1	0.0500	---	114	53-135%	---	---	
4,4'-DDD	0.0485	---	0.00100	mg/kg wet	1	0.0500	---	97	56-139%	---	---	
4,4'-DDE	0.0561	---	0.00100	mg/kg wet	1	0.0500	---	112	56-134%	---	---	
4,4'-DDT	0.0615	---	0.00100	mg/kg wet	1	0.0500	---	123	50-141%	---	---	
Dieldrin	0.0580	---	0.00100	mg/kg wet	1	0.0500	---	116	56-136%	---	---	
Endosulfan I	0.0575	---	0.00100	mg/kg wet	1	0.0500	---	115	52-132%	---	---	
Endosulfan II	0.0545	---	0.00100	mg/kg wet	1	0.0500	---	109	53-134%	---	---	
Endosulfan sulfate	0.0576	---	0.00100	mg/kg wet	1	0.0500	---	115	55-136%	---	---	
Endrin	0.0610	---	0.00100	mg/kg wet	1	0.0500	---	122	56-140%	---	---	
Endrin Aldehyde	0.0553	---	0.00100	mg/kg wet	1	0.0500	---	111	35-137%	---	---	Q-41
Endrin ketone	0.0556	---	0.00100	mg/kg wet	1	0.0500	---	111	55-136%	---	---	Q-41
Heptachlor	0.0556	---	0.00100	mg/kg wet	1	0.0500	---	111	47-136%	---	---	
Heptachlor epoxide	0.0565	---	0.00100	mg/kg wet	1	0.0500	---	113	52-136%	---	---	
Methoxychlor	0.0600	---	0.00300	mg/kg wet	1	0.0500	---	120	52-143%	---	---	Q-41
Surr: 2,4,5,6-TCMX (Surr)		Recovery: 84 %		Limits: 42-129 %		Dilution: 1x						
Decachlorobiphenyl (Surr)		105 %		65-151 %		"						

<b>Duplicate (8070867-DUP1)</b>			Prepared: 07/20/18 07:35 Analyzed: 07/20/18 13:57									
<b>QC Source Sample: 23C-NCOMP (A8G0498-05)</b>												
<b>EPA 8081B</b>												
Aldrin	ND	---	0.00108	mg/kg dry	1	---	ND	---	---	---	30%	
alpha-BHC	ND	---	0.00108	mg/kg dry	1	---	ND	---	---	---	30%	
beta-BHC	ND	---	0.00108	mg/kg dry	1	---	0.000635	---	---	***	30%	
delta-BHC	ND	---	0.00108	mg/kg dry	1	---	ND	---	---	---	30%	
gamma-BHC (Lindane)	ND	---	0.00108	mg/kg dry	1	---	0.00137	---	---	***	<b>30%</b>	Q-05
cis-Chlordane	<b>0.00129</b>	---	0.00108	mg/kg dry	1	---	ND	---	---	---	<b>30%</b>	Q-05
trans-Chlordane	<b>0.00113</b>	---	0.00108	mg/kg dry	1	---	ND	---	---	---	<b>30%</b>	Q-05
4,4'-DDD	ND	---	0.00108	mg/kg dry	1	---	ND	---	---	---	30%	
4,4'-DDE	<b>0.0113</b>	---	0.00108	mg/kg dry	1	---	0.0158	---	---	<b>33</b>	<b>30%</b>	Q-01
4,4'-DDT	<b>0.00585</b>	---	0.00108	mg/kg dry	1	---	0.00875	---	---	<b>40</b>	<b>30%</b>	Q-01
Dieldrin	<b>0.0194</b>	---	0.00108	mg/kg dry	1	---	0.0241	---	---	22	30%	
Endosulfan I	ND	---	0.00108	mg/kg dry	1	---	ND	---	---	---	30%	
Endosulfan II	ND	---	0.00108	mg/kg dry	1	---	ND	---	---	---	30%	
Endosulfan sulfate	ND	---	0.00108	mg/kg dry	1	---	ND	---	---	---	30%	

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0498 - 07 24 18 0730</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8070867 - EPA 3546</b>												
<b>Soil</b>												
<b>Duplicate (8070867-DUP1)</b>			Prepared: 07/20/18 07:35 Analyzed: 07/20/18 13:57									
<b>QC Source Sample: 23C-NCOMP (A8G0498-05)</b>												
Endrin	ND	---	0.00108	mg/kg dry	1	---	ND	---	---	---	30%	
Endrin Aldehyde	ND	---	0.00108	mg/kg dry	1	---	ND	---	---	---	30%	
Endrin ketone	ND	---	0.00108	mg/kg dry	1	---	ND	---	---	---	30%	
Heptachlor	ND	---	0.00108	mg/kg dry	1	---	ND	---	---	---	30%	
Heptachlor epoxide	ND	---	0.00108	mg/kg dry	1	---	ND	---	---	---	30%	
Methoxychlor	ND	---	0.00323	mg/kg dry	1	---	ND	---	---	---	30%	
Chlordane (Technical)	ND	---	0.0323	mg/kg dry	1	---	ND	---	---	---	30%	
Toxaphene (Total)	ND	---	0.0323	mg/kg dry	1	---	ND	---	---	---	30%	
Surr: 2,4,5,6-TCMX (Surr) Recovery: 70 % Limits: 42-129 % Dilution: 1x												
Decachlorobiphenyl (Surr) 80 % 65-151 % "												

<b>Matrix Spike (8070867-MS1)</b>			Prepared: 07/20/18 07:35 Analyzed: 07/20/18 14:31									
<b>QC Source Sample: 23C-SCOMP (A8G0498-10)</b>												
<b>EPA 8081B</b>												
Aldrin	0.0459	---	0.000994	mg/kg dry	1	0.0497	ND	92	45-136%	---	---	
alpha-BHC	0.0474	---	0.000994	mg/kg dry	1	0.0497	ND	95	45-137%	---	---	
beta-BHC	0.0486	---	0.000994	mg/kg dry	1	0.0497	ND	98	50-136%	---	---	
delta-BHC	0.0558	---	0.000994	mg/kg dry	1	0.0497	ND	112	47-139%	---	---	
gamma-BHC (Lindane)	0.0514	---	0.000994	mg/kg dry	1	0.0497	ND	103	49-135%	---	---	
cis-Chlordane	0.0443	---	0.000994	mg/kg dry	1	0.0497	ND	89	54-133%	---	---	
trans-Chlordane	0.0500	---	0.000994	mg/kg dry	1	0.0497	ND	101	53-135%	---	---	
4,4'-DDD	0.0471	---	0.000994	mg/kg dry	1	0.0497	ND	95	56-139%	---	---	
4,4'-DDE	0.0813	---	0.000994	mg/kg dry	1	0.0497	0.0333	97	56-134%	---	---	
4,4'-DDT	0.0672	---	0.000994	mg/kg dry	1	0.0497	0.0145	106	50-141%	---	---	
Dieldrin	0.0422	---	0.000994	mg/kg dry	1	0.0497	0.00458	76	56-136%	---	---	
Endosulfan I	0.0478	---	0.000994	mg/kg dry	1	0.0497	ND	96	52-132%	---	---	
Endosulfan II	0.0439	---	0.000994	mg/kg dry	1	0.0497	ND	88	53-134%	---	---	
Endosulfan sulfate	0.0411	---	0.00144	mg/kg dry	1	0.0497	0.00151	80	55-136%	---	---	
Endrin	0.0426	---	0.000994	mg/kg dry	1	0.0497	ND	86	56-140%	---	---	
Endrin Aldehyde	0.0406	---	0.00114	mg/kg dry	1	0.0497	0.00118	79	35-137%	---	---	
Endrin ketone	0.0428	---	0.00144	mg/kg dry	1	0.0497	0.00149	83	55-136%	---	---	
Heptachlor	0.0507	---	0.000994	mg/kg dry	1	0.0497	ND	102	47-136%	---	---	
Heptachlor epoxide	0.0519	---	0.000994	mg/kg dry	1	0.0497	ND	105	52-136%	---	---	

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 Tigard, OR 97223  
 503-718-2323  
 EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0498 - 07 24 18 0730</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8070867 - EPA 3546</b>						<b>Soil</b>						
<b>Matrix Spike (8070867-MS1)</b>			Prepared: 07/20/18 07:35 Analyzed: 07/20/18 14:31									
<b>QC Source Sample: 23C-SCOMP (A8G0498-10)</b>												
Methoxychlor	0.0742	---	0.00696	mg/kg dry	1	0.0497	0.00731	135	52-143%	---	---	Q-41
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 89 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>97 %</i>		<i>65-151 %</i>		<i>"</i>						

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8070875 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (8070875-DUP1)</b>			Prepared: 07/20/18 09:10 Analyzed: 07/23/18 08:28									
<b>QC Source Sample: Non-SDG (A8G0456-08)</b>												
% Solids	75.1	---	1.00	% by Weight	1	---	75.3	---	---	0.3	10%	
<b>Duplicate (8070875-DUP2)</b>			Prepared: 07/20/18 09:10 Analyzed: 07/23/18 08:28									
<b>QC Source Sample: Non-SDG (A8G0490-08)</b>												
% Solids	73.4	---	1.00	% by Weight	1	---	73.3	---	---	0.06	10%	
<b>Duplicate (8070875-DUP3)</b>			Prepared: 07/20/18 09:10 Analyzed: 07/23/18 08:28									
<b>QC Source Sample: Non-SDG (A8G0513-05)</b>												
% Solids	83.1	---	1.00	% by Weight	1	---	83.4	---	---	0.4	10%	
<b>Duplicate (8070875-DUP4)</b>			Prepared: 07/20/18 09:10 Analyzed: 07/23/18 08:28									
<b>QC Source Sample: Non-SDG (A8G0517-01)</b>												
% Solids	82.9	---	1.00	% by Weight	1	---	83.5	---	---	0.7	10%	
<b>Duplicate (8070875-DUP5)</b>			Prepared: 07/20/18 17:36 Analyzed: 07/23/18 08:28									
<b>QC Source Sample: Non-SDG (A8G0544-02)</b>												
% Solids	76.0	---	1.00	% by Weight	1	---	76.9	---	---	1	10%	
<b>Duplicate (8070875-DUP6)</b>			Prepared: 07/20/18 18:00 Analyzed: 07/23/18 08:28									
<b>QC Source Sample: Non-SDG (A8G0550-02)</b>												
% Solids	79.6	---	1.00	% by Weight	1	---	79.7	---	---	0.05	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8070867</u>							
A8G0498-05	Soil	EPA 8081B	07/19/18 13:48	07/20/18 07:35	10.65g/5mL	10g/5mL	0.94
A8G0498-10	Soil	EPA 8081B	07/19/18 14:04	07/20/18 07:35	10.71g/5mL	10g/5mL	0.93

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8070875</u>							
A8G0498-05	Soil	EPA 8000C	07/19/18 13:48	07/20/18 09:10			NA
A8G0498-10	Soil	EPA 8000C	07/19/18 14:04	07/20/18 09:10			NA

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Anderson Geological  
PO Box 649  
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Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0498 - 07 24 18 0730**

## QUALIFIER DEFINITIONS

### Client Sample and Quality Control (QC) Sample Qualifier Definitions:

#### Apex Laboratories

- Q-01** Spike recovery and/or RPD is outside acceptance limits.
- Q-05** Analyses are not controlled on RPD values from sample and duplicate concentrations that are below 5 times the reporting level.
- Q-41** Estimated Results. Recovery of Continuing Calibration Verification sample above upper control limit for this analyte. Results are likely biased high.

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8G0498 - 07 24 18 0730

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.  
ND Analyte NOT DETECTED at or above the detection or reporting limit.  
NR Result Not Reported  
RPD Relative Percent Difference

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.  
"dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.  
"wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.  
" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.  
" \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

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Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
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**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Cert?
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

**Report ID:**  
**A8G0498 - 07 24 18 0730**

**CHAIN OF CUSTODY**

Lab # A8G0498-18 GPMKc 1 of 1 POF Project # 1503.20

Company: Anderson Geological Project Mgr: Erik Anderson Project Name: Northstar

Address: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

Sampled by: F. Anderson

Site Location: OR WA Other: \_\_\_\_\_

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST	
					1200-Z	1200-COLS
23C-NA	7/16/18	13:40	S	1		
23C-NB	13:42					HOLD
23C-NC	13:44					HOLD
23C-ND	13:46					HOLD
23C-NCOMP	13:48					HOLD
23C-SA	13:56					HOLD
23C-SB	13:59					HOLD
23C-SC	14:00					HOLD
23C-SD	14:02					HOLD
23C-SCOMP	14:04					HOLD

ANALYSIS REQUEST (continued):

1200-Z	
1200-COLS	
TOTAL DISS TCFP	
As, Ag, Na, TL, V, Pb, Cu, Cr, Cd, Ni, Mn, Zn, Hg, Al, Si, As, Ba, Be, Ca, Co, Fe, Ni, Se, V, Zn, Cr, Pb, TCEP, Meq/L (B)	
RCA Meq/L (B)	
609 TIO	
8082 PCBs	
8270 SIM PAHs	
8270 SVOC	
8260 BTEX VOCs	
8260 BVOCs	
8260 RBDN VOCs	
8260 VOCs Full Lab	
NWTH-Gs	
NWTH-Ds	
NWTH-HCID	

SPECIAL INSTRUCTIONS:

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 2 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

RECEIVED BY: [Signature] Date: 7/19/18 Signature: [Signature] Date: 7/19/18

RELINQUISHED BY: [Signature] Date: 7/19/18 Signature: [Signature] Date: 7/19/18

Printed Name: Erik Anderson Time: 14:57 Printed Name: [Signature] Time: 14:57

Company: AG Company: \_\_\_\_\_

Apex Laboratories

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[Signature]



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8G0498 - 07 24 18 0730

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geo Element WO#: A8 G0498

Project/Project #: Northstar

Delivery info:  
Date/Time Received: 7/19/18 @ 14:57 By: WS  
Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

Cooler Inspection Inspected by: WS : 7/19/18 @ 14:57

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

Temperature (deg. C) 3.4

Received on Ice?  (Y/N)

Temp. Blanks?  (Y/N)

Ice Type:  Real/Other

Condition: Good

Cooler out of temp?  Possible reason why: \_\_\_\_\_

If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No

Samples Inspection: Inspected by: WS : 7/19/18 @ 16:00

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: \_\_\_\_\_

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

Additional Information: \_\_\_\_\_

Labeled by: \_\_\_\_\_ Witness: \_\_\_\_\_ Cooler Inspected by: \_\_\_\_\_ See Project Contact Form: Y

WS WS Client

*Darwin Thomas*



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Wednesday, July 25, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8G0337 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8G0337, which was received by the laboratory on 7/13/2018 at 1:36:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

A handwritten signature in black ink, appearing to read "Darwin Thomas".

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---

Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0337 - 07 25 18 0815**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
25C-S Comp	A8G0337-05	Soil	07/13/18 10:52	07/13/18 13:36
25C-N Comp	A8G0337-10	Soil	07/13/18 11:15	07/13/18 13:36
25D-S Comp	A8G0337-15	Soil	07/13/18 12:01	07/13/18 13:36
25D-N Comp	A8G0337-20	Soil	07/13/18 12:28	07/13/18 13:36

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0337 - 07 25 18 0815</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>25C-S Comp (A8G0337-05RE1)</b>			<b>Matrix: Soil</b>			<b>Batch: 8070760</b>		<b>C-05</b>
Dieldrin	0.0376	---	0.00210	mg/kg dry	1	07/18/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 75 %</i>		<i>Limits: 42-129 %</i>	<i>1</i>	<i>07/18/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>		<i>80 %</i>		<i>65-151 %</i>	<i>1</i>	<i>07/18/18</i>	<i>EPA 8081B</i>	
<b>25C-N Comp (A8G0337-10RE1)</b>			<b>Matrix: Soil</b>			<b>Batch: 8070760</b>		<b>C-05</b>
Dieldrin	0.0238	---	0.00198	mg/kg dry	1	07/18/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 60 %</i>		<i>Limits: 42-129 %</i>	<i>1</i>	<i>07/18/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>		<i>69 %</i>		<i>65-151 %</i>	<i>1</i>	<i>07/18/18</i>	<i>EPA 8081B</i>	
<b>25D-S Comp (A8G0337-15RE1)</b>			<b>Matrix: Soil</b>			<b>Batch: 8070760</b>		<b>C-05</b>
Dieldrin	ND	---	0.00225	mg/kg dry	1	07/18/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 57 %</i>		<i>Limits: 42-129 %</i>	<i>1</i>	<i>07/18/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>		<i>68 %</i>		<i>65-151 %</i>	<i>1</i>	<i>07/18/18</i>	<i>EPA 8081B</i>	
<b>25D-N Comp (A8G0337-20RE1)</b>			<b>Matrix: Soil</b>			<b>Batch: 8070760</b>		<b>C-05</b>
Dieldrin	ND	---	0.00216	mg/kg dry	1	07/18/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 55 %</i>		<i>Limits: 42-129 %</i>	<i>1</i>	<i>07/18/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>		<i>68 %</i>		<i>65-151 %</i>	<i>1</i>	<i>07/18/18</i>	<i>EPA 8081B</i>	

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0337 - 07 25 18 0815</b>
---	--	---

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>25C-S Comp (A8G0337-05)</b>			<b>Matrix: Soil</b>			<b>Batch: 8070697</b>		
% Solids	89.2	---	1.00	% by Weight	1	07/17/18	EPA 8000C	
<b>25C-N Comp (A8G0337-10)</b>			<b>Matrix: Soil</b>			<b>Batch: 8070697</b>		
% Solids	90.2	---	1.00	% by Weight	1	07/17/18	EPA 8000C	
<b>25D-S Comp (A8G0337-15)</b>			<b>Matrix: Soil</b>			<b>Batch: 8070697</b>		
% Solids	85.5	---	1.00	% by Weight	1	07/17/18	EPA 8000C	
<b>25D-N Comp (A8G0337-20)</b>			<b>Matrix: Soil</b>			<b>Batch: 8070697</b>		
% Solids	86.8	---	1.00	% by Weight	1	07/17/18	EPA 8000C	

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0337 - 07 25 18 0815</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8070760 - EPA 3546/3640A (GPC)</b>						<b>Soil</b>						
<b>Blank (8070760-BLK1)</b>						Prepared: 07/16/18 07:48 Analyzed: 07/18/18 12:07						<b>C-05</b>
<b>EPA 8081B</b>												
Dieldrin	ND	---	0.00167	mg/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 67 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>79 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>LCS (8070760-BS1)</b>						Prepared: 07/16/18 07:48 Analyzed: 07/18/18 12:24						<b>C-05</b>
<b>EPA 8081B</b>												
Dieldrin	0.0431	---	0.00200	mg/kg wet	1	0.0500	---	86	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 75 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>86 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Duplicate (8070760-DUP2)</b>						Prepared: 07/16/18 07:48 Analyzed: 07/18/18 17:03						<b>C-05, R-04</b>
<b>QC Source Sample: Non-SDG (A8G0332-01RE2)</b>												
Dieldrin	ND	---	0.212	mg/kg dry	20	---	0.267	---	---	***	30%	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 251 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 20x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>223 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Matrix Spike (8070760-MS1)</b>						Prepared: 07/16/18 07:48 Analyzed: 07/18/18 16:11						<b>C-05</b>
<b>QC Source Sample: 25D-N Comp (A8G0337-20RE1)</b>												
<b>EPA 8081B</b>												
Dieldrin	0.0438	---	0.00206	mg/kg dry	1	0.0515	ND	85	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 69 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>79 %</i>		<i>65-151 %</i>		<i>"</i>						

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0337 - 07 25 18 0815</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8070697 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (8070697-DUP1)</b>			Prepared: 07/16/18 08:42 Analyzed: 07/17/18 08:10									
<b>QC Source Sample: Non-SDG (A8G0328-02)</b>												
% Solids	96.3	---	1.00	% by Weight	1	---	96.5	---	---	0.2	10%	
<b>Duplicate (8070697-DUP2)</b>			Prepared: 07/16/18 08:42 Analyzed: 07/17/18 08:10									
<b>QC Source Sample: Non-SDG (A8G0336-05)</b>												
% Solids	85.8	---	1.00	% by Weight	1	---	85.8	---	---	0.02	10%	
<b>Duplicate (8070697-DUP3)</b>			Prepared: 07/16/18 08:42 Analyzed: 07/17/18 08:10									
<b>QC Source Sample: Non-SDG (A8G0362-01)</b>												
% Solids	80.6	---	1.00	% by Weight	1	---	79.8	---	---	1	10%	
<b>Duplicate (8070697-DUP4)</b>			Prepared: 07/16/18 17:59 Analyzed: 07/17/18 08:10									
<b>QC Source Sample: Non-SDG (A8G0388-01)</b>												
% Solids	92.4	---	1.00	% by Weight	1	---	91.6	---	---	0.8	10%	
<b>Duplicate (8070697-DUP5)</b>			Prepared: 07/16/18 17:59 Analyzed: 07/17/18 08:10									
<b>QC Source Sample: Non-SDG (A8G0389-02)</b>												
% Solids	88.6	---	1.00	% by Weight	1	---	87.4	---	---	1	10%	
<b>Duplicate (8070697-DUP6)</b>			Prepared: 07/16/18 19:52 Analyzed: 07/17/18 08:10									
<b>QC Source Sample: Non-SDG (A8G0379-14)</b>												
% Solids	88.9	---	1.00	% by Weight	1	---	90.3	---	---	1	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8G0337 - 07 25 18 0815

SAMPLE PREPARATION INFORMATION

Organochlorine Pesticides by EPA 8081B

Prep: EPA 3546/3640A (GPC)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8070760</u>							
A8G0337-05RE1	Soil	EPA 8081B	07/13/18 10:52	07/16/18 07:48	10.68g/10mL	10g/5mL	1.87
A8G0337-10RE1	Soil	EPA 8081B	07/13/18 11:15	07/16/18 07:48	11.23g/10mL	10g/5mL	1.78
A8G0337-15RE1	Soil	EPA 8081B	07/13/18 12:01	07/16/18 07:48	10.42g/10mL	10g/5mL	1.92
A8G0337-20RE1	Soil	EPA 8081B	07/13/18 12:28	07/16/18 07:48	10.65g/10mL	10g/5mL	1.88

Percent Dry Weight

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<u>Batch: 8070697</u>							
A8G0337-05	Soil	EPA 8000C	07/13/18 10:52	07/16/18 08:42			NA
A8G0337-10	Soil	EPA 8000C	07/13/18 11:15	07/16/18 08:42			NA
A8G0337-15	Soil	EPA 8000C	07/13/18 12:01	07/16/18 08:42			NA
A8G0337-20	Soil	EPA 8000C	07/13/18 12:28	07/16/18 08:42			NA

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**EPA ID: OR01039**

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0337 - 07 25 18 0815**

## QUALIFIER DEFINITIONS

### **Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

#### **Apex Laboratories**

- C-05** Extract has undergone a GPC (Gel-Permeation Chromatography) cleanup per EPA 3640A. Reporting levels may be raised due to dilution necessary for cleanup. Sample Final Volume includes the GPC dilution factor, see the Prep page for details.
- R-04** Reporting levels elevated due to dilution necessary for analysis.
- S-05** Surrogate recovery is estimated due to sample dilution required for high analyte concentration and/or matrix interference.

---

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---

Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0337 - 07 25 18 0815**

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
- "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

Apex Laboratories

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Darwin Thomas, Business Development Director



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Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0337 - 07 25 18 0815**

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories

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Darwin Thomas, Business Development Director



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PO Box 649  
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Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0337 - 07 25 18 0815**

**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Cert?
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Darwin Thomas, Business Development Director



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Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8G0337 - 07 25 18 0815

COC 1 of 2

**CHAIN OF CUSTODY**

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Anderson Geological Project Mgr: Erik Anderson Project Name: Northstar Project # 1503.20

Address: \_\_\_\_\_ Phone: \_\_\_\_\_ Email: \_\_\_\_\_

Sampled by: E. Anderson Lab # A8G0337 PO# \_\_\_\_\_

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	SPECIAL INSTRUCTIONS		ANALYSIS REQUEST
					YES	NO	
25C-5A	7/10/18	10:44	S	1			1200-COLS TOTAL DISS TCLP Pb, Ag, Ni, TL, V, Zn Cd, Cr, Cu, Fe, Mn, Ni, Pb, Zn AL, Sb, As, Ba, Bi, Br, Ca TCLP Metals (8) RCRA Metals (8) 600 TTO 8082 PCBs 8270 SIM PAHs 8270 SVOC 8260 BTEX VOCs 8260 HVOCS 8260 RBDN VOCs 8260 VOCs Full List NWTPh-GX NWTPh-DX NWTPh-HCID
25C-5B	10-46						(40LD)
25C-5C	10-48						(40LD)
25C-5D	10-50						(40LD)
25C-5COMP	10-52						(40LD)
25C-NA	11-07						(40LD)
25C-NB	11-07						(40LD)
25C-NC	11-11						(40LD)
25C-ND	11-13						(40LD)
25C-NCOMP	11-15						(40LD)

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day, 2 Day, 3 Day, 4 DAY, 5 DAY, Other: \_\_\_\_\_

SAMPLES ARE HELD FOR 30 DAYS

RECEIVED BY: \_\_\_\_\_ RECEIVED BY: \_\_\_\_\_

Signature: Erik Anderson Date: 7/15/18 Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name: Erik Anderson Time: 13:34 Printed Name: Ami Sankar Time: 13:36

Company: AG Company: Apex Labs

Apex Laboratories

Darwin Thomas, Business Development Director

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

**Report ID:**  
**A8G0337 - 07 25 18 0815**

COC 2 of 2

**CHAIN OF CUSTODY**

**APEX LABS**      Lab # A8G0337      PO# 1503.20

12232 S.W. Garden Place, Tigard, OR 97223 PH: 503-718-2323 Fax: 503-718-0333

Company: Anderson Geological      Project Name: Northstar      Project #: 1503.20

Address: E. Anderson      Project Mgr: Erik Anderson      Email: \_\_\_\_\_

Site Location: WA      Phone: \_\_\_\_\_      Fax: \_\_\_\_\_

Other: \_\_\_\_\_

SAMPLE ID	LAB ID #	DATE	TIME	# OF CONTAINERS	ANALYSIS REQUEST		REMARKS
					YES	NO	
25D-SA		7/13/18	11:53	5			HOLD
25D-SB			11:55				HOLD
25D-SC			11:57				HOLD
25D-SD			11:59				HOLD
25D-SComp			12:01			X	
25D-NA			12:20				HOLD
25D-NB			12:22				HOLD
25D-NC			12:24				HOLD
25D-MD			12:26				HOLD
25D-MComp			12:28			X	

ANALYSIS REQUEST

AL, SB, AS, BA, BB, BC, CA, CB, CC, CD, CE, CF, CG, CH, CI, CL, CM, CN, CO, CP, CQ, CR, CS, CT, CU, CV, CW, CX, CY, CZ, DA, DB, DC, DD, DE, DF, DG, DH, DI, DJ, DK, DL, DM, DN, DO, DP, DQ, DR, DS, DT, DU, DV, DW, DX, DY, DZ, EA, EB, EC, ED, EE, EF, EG, EH, EI, EJ, EK, EL, EM, EN, EO, EP, EQ, ER, ES, ET, EU, EV, EW, EX, EY, EZ, FA, FB, FC, FD, FE, FF, FG, FH, FI, FJ, FK, FL, FM, FN, FO, FP, FQ, FR, FS, FT, FU, FV, FW, FX, FY, FZ, GA, GB, GC, GD, GE, GF, GG, GH, GI, GJ, GK, GL, GM, GN, GO, GP, GQ, GR, GS, GT, GU, GV, GW, GX, GY, GZ, HA, HB, HC, HD, HE, HF, HG, HH, HI, HJ, HK, HL, HM, HN, HO, HP, HQ, HR, HS, HT, HU, HV, HW, HX, HY, HZ, IA, IB, IC, ID, IE, IF, IG, IH, II, IJ, IK, IL, IM, IN, IO, IP, IQ, IR, IS, IT, IU, IV, IW, IX, IY, IZ, JA, JB, JC, JD, JE, JF, JG, JH, JI, JJ, JK, JL, JM, JN, JO, JP, JQ, JR, JS, JT, JU, JV, JW, JX, JY, JZ, KA, KB, KC, KD, KE, KF, KG, KH, KI, KJ, KK, KL, KM, KN, KO, KP, KQ, KR, KS, KT, KU, KV, KW, KX, KY, KZ, LA, LB, LC, LD, LE, LF, LG, LH, LI, LJ, LK, LL, LM, LN, LO, LP, LQ, LR, LS, LT, LU, LV, LW, LX, LY, LZ, MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK, ML, MN, MO, MP, MQ, MR, MS, MT, MU, MV, MW, MX, MY, MZ, NA, NB, NC, ND, NE, NF, NG, NH, NI, NJ, NK, NL, NM, NO, NP, NQ, NR, NS, NT, NU, NV, NW, NX, NY, NZ, OA, OB, OC, OD, OE, OF, OG, OH, OI, OJ, OK, OL, OM, ON, OO, OP, OQ, OR, OS, OT, OU, OV, OW, OX, OY, OZ, PA, PB, PC, PD, PE, PF, PG, PH, PI, PJ, PK, PL, PM, PN, PO, PP, PQ, PR, PS, PT, PU, PV, PW, PX, PY, PZ, QA, QB, QC, QD, QE, QF, QG, QH, QI, QJ, QK, QL, QM, QN, QO, QP, QQ, QR, QS, QT, QU, QV, QW, QX, QY, QZ, RA, RB, RC, RD, RE, RF, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RQ, RR, RS, RT, RU, RV, RW, RX, RY, RZ, SA, SB, SC, SD, SE, SF, SG, SH, SI, SJ, SK, SL, SM, SN, SO, SP, SQ, SR, SS, ST, SU, SV, SW, SX, SY, SZ, TA, TB, TC, TD, TE, TF, TG, TH, TI, TJ, TK, TL, TM, TN, TO, TP, TQ, TR, TS, TT, TU, TV, TW, TX, TY, TZ, UA, UB, UC, UD, UE, UF, UG, UH, UI, UJ, UK, UL, UM, UN, UO, UP, UQ, UR, US, UT, UY, UZ, VA, VB, VC, VD, VE, VF, VG, VH, VI, VJ, VK, VL, VM, VN, VO, VP, VQ, VR, VS, VT, VU, VV, VW, VX, VY, VZ, WA, WB, WC, WD, WE, WF, WG, WH, WI, WJ, WK, WL, WM, WN, WO, WP, WQ, WR, WS, WT, WU, WV, WW, WX, WY, WZ, XA, XB, XC, XD, XE, XF, XG, XH, XI, XJ, XK, XL, XM, XN, XO, XP, XQ, XR, XS, XT, XU, XV, XW, XX, XY, XZ, YA, YB, YC, YD, YE, YF, YG, YH, YI, YJ, YK, YL, YM, YN, YO, YP, YQ, YR, YS, YT, YU, YV, YW, YX, YY, YZ, ZA, ZB, ZC, ZD, ZE, ZF, ZG, ZH, ZI, ZJ, ZK, ZL, ZM, ZN, ZO, ZP, ZQ, ZR, ZS, ZT, ZU, ZV, ZW, ZX, ZY, ZZ

SPECIAL INSTRUCTIONS:

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day    2 Day    3 Day    4 DAY    5 DAY    Other: \_\_\_\_\_

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: E. Anderson      RECEIVED BY: \_\_\_\_\_  
Signature: \_\_\_\_\_      Date: 7/13/18      Signature: \_\_\_\_\_  
Printed Name: Erik Anderson      Time: 13:34      Printed Name: \_\_\_\_\_      Time: \_\_\_\_\_  
Company: AG      Company: Apex Labs

Apex Laboratories

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Darwin Thomas, Business Development Director



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8G0337 - 07 25 18 0815

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geological Element WO#: A8 20337

Project/Project #: Northstar P #1503.20

**Delivery info:**

Date/Time Received: 7/13/18 @ 1334 By: AKC

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: AKC : 7/13/18 @ 1334

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

Temperature (deg. C) 

Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
<u>5.9</u>						

Received on Ice?  (Y/N)

Temp. Blanks?  (Y/N)

Ice Type:  Gel/ Real/ Other

Condition: good

Cooler out of temp? (Y/N) Possible reason why: NA

If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA

**Samples Inspection:** Inspected by: AKC : 7/13/18 @ 1340

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: 25C-SA acc 7/13/18 25C-NA ID

on label reads 25C-SA, matched by ID on lid (25C-NA) &

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

\_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

Additional Information: DIT on label.

\_\_\_\_\_

\_\_\_\_\_

Labeled by: AKC Witness: AKC Cooler Inspected by: client See Project Contact Form: Y



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Thursday, July 26, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8G0178 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8G0178, which was received by the laboratory on 7/10/2018 at 9:28:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [DAuvil@apex-labs.com](mailto:DAuvil@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

A handwritten signature in black ink, appearing to read "Darrell Auvil".

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---

Darrell Auvil For Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0178 - 07 26 18 1242**

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
26C-SCOMP(2)	A8G0178-05	Soil	07/10/18 08:08	07/10/18 09:28

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Darrell Auvil For Darwin Thomas, Business Development Director



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12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0178 - 07 26 18 1242</b>
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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>26C-SCOMP(2) (A8G0178-05)</b>			<b>Matrix: Soil</b>					
				<b>Batch: 8070503</b>				
<b>Dieldrin</b>	<b>3.25</b>	---	1.13	ug/kg dry	1	07/10/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 88 %</i>	<i>Limits: 42-129 %</i>	<i>1</i>	<i>07/10/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>			<i>85 %</i>	<i>65-151 %</i>	<i>1</i>	<i>07/10/18</i>	<i>EPA 8081B</i>	

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0178 - 07 26 18 1242</b>
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**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>26C-SCOMP(2) (A8G0178-05)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070501</b>				
% Solids	82.7	---	1.00	% by Weight	1	07/11/18	EPA 8000C	

Apex Laboratories

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Darrell Auvil For Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0178 - 07 26 18 1242</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8070503 - EPA 3546</b>						<b>Soil</b>						
<b>Blank (8070503-BLK1)</b>			Prepared: 07/10/18 09:41 Analyzed: 07/10/18 12:18									
<b>EPA 8081B</b>												
Dieldrin	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 95 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>102 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>LCS (8070503-BS1)</b>			Prepared: 07/10/18 09:41 Analyzed: 07/10/18 12:35									
<b>EPA 8081B</b>												
Dieldrin	50.2	---	1.00	ug/kg wet	1	50.0	---	100	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 92 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>95 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Duplicate (8070503-DUP1)</b>			Prepared: 07/10/18 09:41 Analyzed: 07/10/18 13:11									
<b>QC Source Sample: 26C-SCOMP(2) (A8G0178-05)</b>												
<b>EPA 8081B</b>												
Dieldrin	4.25	---	1.14	ug/kg dry	1	---	3.25	---	---	26	30%	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 82 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>76 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Matrix Spike (8070503-MS1)</b>			Prepared: 07/10/18 09:41 Analyzed: 07/10/18 13:28									
<b>QC Source Sample: 26C-SCOMP(2) (A8G0178-05)</b>												
<b>EPA 8081B</b>												
Dieldrin	46.6	---	1.11	ug/kg dry	1	55.3	3.25	78	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 86 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>79 %</i>		<i>65-151 %</i>		<i>"</i>						



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
 Tigard, OR 97223  
 503-718-2323  
EPA ID: OR01039

<b>Anderson Geological</b>	Project: <b>Northstar</b>	
PO Box 649	Project Number: <b>1503.20</b>	<b>Report ID:</b>
Wilsonville, OR 97070	Project Manager: <b>Erik Anderson</b>	<b>A8G0178 - 07 26 18 1242</b>

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8070501 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (8070501-DUP2)</b>		Prepared: 07/10/18 18:17 Analyzed: 07/11/18 07:58										
<b>QC Source Sample: 26C-SCOMP(2) (A8G0178-05)</b>												
<b>EPA 8000C</b>												
% Solids	82.3	---	1.00	% by Weight	1	---	82.7	---	---	0.4	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

Apex Laboratories

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Darrell Auvil For Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0178 - 07 26 18 1242</b>
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**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 8070503</u>							
A8G0178-05	Soil	EPA 8081B	07/10/18 08:08	07/10/18 09:41	10.75g/5mL	10g/5mL	0.93

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)					Sample	Default	RL Prep
Lab Number	Matrix	Method	Sampled	Prepared	Initial/Final	Initial/Final	Factor
<u>Batch: 8070501</u>							
A8G0178-05	Soil	EPA 8000C	07/10/18 08:08	07/10/18 18:17			NA

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0178 - 07 26 18 1242**

**QUALIFIER DEFINITIONS**

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

There are No Qualifiers on Sample or QC Data for this report

---

Apex Laboratories

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---

Darrell Auvil For Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0178 - 07 26 18 1242</b>
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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis. The Result Basis is listed following the units as "dry", "wet", or "" (blank) designation.
  - "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
  - "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
  - "" Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) are not included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0178 - 07 26 18 1242</b>
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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0178 - 07 26 18 1242</b>
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**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Cert?
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.



Anderson Geological Project: **Northstar**  
 PO Box 649 Project Number: **1503.20**  
 Wilsonville, OR 97070 Project Manager: **Erik Anderson** Report ID: **A8G0178 - 07 26 18 1242**

**APEX LABS** 12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

**CHAIN OF CUSTODY** Lab # **A8G0178** PO# **1503.20**

Company: **Anderson Geological** Project Mgr: **Erik Anderson** Project Name: **Northstar**

Address: **Wilsonville, OR 97070** Phone: \_\_\_\_\_ Email: \_\_\_\_\_

Sampled by: **E. Anderson**

Site Location:  WA Other: \_\_\_\_\_

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	YES	NO
26C-SA(2)	7/19/18	10:00	S	1		
26C-SB(2)	"	08:02	S	1		
26C-SC(2)	"	08:04	S	1		
26C-SD(2)	"	09:06	S	1		
26C-SEMP(2)	"	09:08	S	1		

ANALYSIS REQUEST

1200-Z  
1200-COLS  
1200-COLS  
TOTAL DISS TCFP  
Se, Ag, Na, Ti, V, Zn  
Hg, Mg, Mn, Ni, Pb, Cd  
Cr, Cu, Fe, Ni, Ni, Ni  
AT, Sb, As, Ba, Be, Cd, Co, Cr, Cu, Fe, Pb, Zn  
TCDF Metals (8)  
PCRA Metals (8)  
600 TTO  
8082 PCBs  
8170 SIM PAHs  
8170 SVOC  
8160 BTEX VOCs  
8160 HVOCS  
8160 RBDN VOCs  
8160 VOCs Full List  
NWTPH-GX  
NWTPH-DX  
NWTPH-ICID

SPECIAL INSTRUCTIONS:

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): **1 Day** 2 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

SAMPLES ARE HELD FOR 30 DAYS

RECEIVED BY: **Erik Anderson** Date: **7/19/18** Signature: *[Signature]* Date: **7/19/18** Signature: *[Signature]*

Printed Name: **Erik Anderson** Time: **09:28** Printed Name: **Raymond** Time: **9:28**

Company: **Apex** Company: \_\_\_\_\_

Apex Laboratories

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<u>Anderson Geological</u> PO Box 649 Wilsonville, OR 97070	Project: <u>Northstar</u> Project Number: <u>1503.20</u> Project Manager: <u>Erik Anderson</u>	<b>Report ID:</b> <u>A8G0178 - 07 26 18 1242</u>
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**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geo Element WO#: A8 G0178

Project/Project #: Northstar

**Delivery info:**  
Date/Time Received: 7/10/18 @ 9:28 By: WAS  
Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: WAS : 7/10/18 @  
Chain of Custody Included? Yes  No  Custody Seals? Yes  No   
Signed/Dated by Client? Yes  No   
Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>3.4</u>						
Received on Ice? (Y/N)	<input checked="" type="checkbox"/>						
Temp. Blanks? (Y/N)	<input checked="" type="checkbox"/>						
Ice Type: (Gel/Real/Other)	<u>Real</u>						
Condition:	<u>good</u>						

Cooler out of temp? (Y/N) Possible reason why: \_\_\_\_\_  
If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA

**Samples Inspection:** Inspected by: WAS : 7/10/18 @ 9:30  
All Samples Intact? Yes  No  Comments: \_\_\_\_\_  
Bottle Labels/COCs agree? Yes  No  Comments: \_\_\_\_\_  
Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_  
Do VOA Vials have Visible Headpace? Yes  No  NA   
Comments: \_\_\_\_\_  
Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA   
Comments: \_\_\_\_\_  
Additional Information: \_\_\_\_\_

Labeled by: WAS Witness: OM Cooler Inspected by: Chent See Project Contact Form: Y



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Thursday, August 16, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8G0159 - Northstar - [none]

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8G0159, which was received by the laboratory on 7/9/2018 at 9:52:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [dthomas@apex-labs.com](mailto:dthomas@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

A handwritten signature in black ink, appearing to read "Darwin Thomas".

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---

Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: [none] Project Manager: Erik Anderson	<b>Report ID:</b> A8G0159 - 08 16 18 0814
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**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
20D-EComp(2)	A8G0159-05	Soil	07/09/18 08:26	07/09/18 09:52
25D-EComp(2)	A8G0159-10	Soil	07/09/18 08:40	07/09/18 09:52

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Darwin Thomas, Business Development Director



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: [none]  
Project Manager: Erik Anderson

Report ID:  
A8G0159 - 08 16 18 0814

ANALYTICAL SAMPLE RESULTS

Organochlorine Pesticides by EPA 8081B

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>20D-EComp(2) (A8G0159-05)</b>				<b>Matrix: Soil</b>		<b>Batch: 8070484</b>		
Dieldrin	ND	---	0.00109	mg/kg dry	1	07/10/18	EPA 8081B	A-01
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 77 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>07/10/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>75 %</i>		<i>65-151 %</i>		<i>1</i>	<i>07/10/18</i>	<i>EPA 8081B</i>
<b>25D-EComp(2) (A8G0159-10)</b>				<b>Matrix: Soil</b>		<b>Batch: 8070484</b>		
Dieldrin	0.00179	---	0.00118	mg/kg dry	1	07/10/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 81 %</i>		<i>Limits: 42-129 %</i>		<i>1</i>	<i>07/10/18</i>	<i>EPA 8081B</i>
<i>Decachlorobiphenyl (Surr)</i>		<i>86 %</i>		<i>65-151 %</i>		<i>1</i>	<i>07/10/18</i>	<i>EPA 8081B</i>

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Darwin Thomas, Business Development Director



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503-718-2323  
EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: [none] Project Manager: Erik Anderson	<b>Report ID:</b> A8G0159 - 08 16 18 0814
---	---	--

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>20D-EComp(2) (A8G0159-05)</b>				<b>Matrix: Soil</b>		<b>Batch: 8070501</b>		
% Solids	81.7	---	1.00	% by Weight	1	07/11/18	EPA 8000C	
<b>25D-EComp(2) (A8G0159-10)</b>				<b>Matrix: Soil</b>		<b>Batch: 8070501</b>		
% Solids	80.7	---	1.00	% by Weight	1	07/11/18	EPA 8000C	

Apex Laboratories

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Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: [none] Project Manager: Erik Anderson	<b>Report ID:</b> A8G0159 - 08 16 18 0814
---	---	--

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8070484 - EPA 3546</b>						<b>Soil</b>						
<b>Blank (8070484-BLK1)</b>			Prepared: 07/09/18 12:27 Analyzed: 07/10/18 14:21									
<b>EPA 8081B</b>												
Dieldrin	ND	---	0.000833	mg/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 92 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>104 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>LCS (8070484-BS1)</b>			Prepared: 07/09/18 12:27 Analyzed: 07/10/18 14:38									
<b>EPA 8081B</b>												
Dieldrin	0.0535	---	0.00100	mg/kg wet	1	0.0500	---	107	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 87 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>98 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Duplicate (8070484-DUP1)</b>			Prepared: 07/09/18 12:27 Analyzed: 07/10/18 15:13									
<b>QC Source Sample: 20D-EComp(2) (A8G0159-05)</b>												
<b>EPA 8081B</b>												
Dieldrin	ND	---	0.00108	mg/kg dry	1	---	ND	---	---	---	30%	Q-05
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 82 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>89 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Matrix Spike (8070484-MS1)</b>			Prepared: 07/09/18 12:27 Analyzed: 07/10/18 15:49									
<b>QC Source Sample: 25D-EComp(2) (A8G0159-10)</b>												
<b>EPA 8081B</b>												
Dieldrin	0.0559	---	0.00108	mg/kg dry	1	0.0542	0.00179	100	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 88 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>95 %</i>		<i>65-151 %</i>		<i>"</i>						

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: [none] Project Manager: Erik Anderson	<b>Report ID:</b> A8G0159 - 08 16 18 0814
---	---	--

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8070501 - Total Solids (Dry Weight)</b>							<b>Soil</b>					
<b>Duplicate (8070501-DUP1)</b>			Prepared: 07/10/18 09:28 Analyzed: 07/11/18 07:58									
<u>QC Source Sample: 20D-EComp(2) (A8G0159-05)</u>												
<u>EPA 8000C</u>												
% Solids	81.6	---	1.00	% by Weight	1	---	81.7	---	---	0.2	10%	
<b>Duplicate (8070501-DUP2)</b>			Prepared: 07/10/18 18:17 Analyzed: 07/11/18 07:58									
<u>QC Source Sample: Non-SDG (A8G0178-05)</u>												
% Solids	82.3	---	1.00	% by Weight	1	---	82.7	---	---	0.4	10%	
<b>Duplicate (8070501-DUP3)</b>			Prepared: 07/10/18 18:17 Analyzed: 07/11/18 07:58									
<u>QC Source Sample: Non-SDG (A8G0210-02)</u>												
% Solids	78.8	---	1.00	% by Weight	1	---	80.0	---	---	1	10%	
<b>Duplicate (8070501-DUP4)</b>			Prepared: 07/10/18 18:33 Analyzed: 07/11/18 07:58									
<u>QC Source Sample: Non-SDG (A8G0215-01)</u>												
% Solids	90.8	---	1.00	% by Weight	1	---	90.5	---	---	0.3	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: [none]  
Project Manager: Erik Anderson

**Report ID:**  
A8G0159 - 08 16 18 0814

**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8070484							
A8G0159-05	Soil	EPA 8081B	07/09/18 08:26	07/09/18 12:27	11.19g/5mL	10g/5mL	0.89
A8G0159-10	Soil	EPA 8081B	07/09/18 08:40	07/09/18 12:27	10.49g/5mL	10g/5mL	0.95

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8070501							
A8G0159-05	Soil	EPA 8000C	07/09/18 08:26	07/10/18 09:28			NA
A8G0159-10	Soil	EPA 8000C	07/09/18 08:40	07/10/18 09:28			NA

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EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: [none]  
Project Manager: Erik Anderson

Report ID:  
A8G0159 - 08 16 18 0814

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**Apex Laboratories**

- A-01 Sample results are less than MDL and duplicate results have hits greater than the MDL. See duplicate results.
- Q-05 Analyses are not controlled on RPD values from sample and duplicate concentrations that are below 5 times the reporting level.

---

Apex Laboratories

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---

Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: [none]  
Project Manager: **Erik Anderson**

**Report ID:**  
A8G0159 - 08 16 18 0814

**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as "dry", "wet", or " " (blank) designation.
- "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.  
  
Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

Apex Laboratories

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Darwin Thomas, Business Development Director



**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: [none]  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0159 - 08 16 18 0814**

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

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**Apex Laboratories, LLC**

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503-718-2323  
EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: [none] Project Manager: Erik Anderson	<b>Report ID:</b> A8G0159 - 08 16 18 0814
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**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: [none]  
Project Manager: Erik Anderson

Report ID:  
A8G0159 - 08 16 18 0814

coc 1 of 1

**CHAIN OF CUSTODY**

APEX LABS  
12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Anderson Geological  
Lab # A8G0159  
Project # PO#

Project Name: Northstar  
Project Mgr: Erik Anderson  
Address: Anderson Geological  
Phone: Erik Anderson  
Email: Erik Anderson

Sampled by: E. Anderson  
Site Location: WA  
Other: \_\_\_\_\_

SAMPLE ID	LAB ID #	DATE	TIME	# OF CONTAINERS	ANALYSIS REQUEST		
					YES	NO	
200-EA(2)		7/9/18	08:18	5			
200-EB(2)		08:20		1			
200-EC(2)		08:22		1			
200-ED(2)		08:24		1			
200-EComp(2)		08:26		1			
250-EA(2)		08:34		1			
250-EB(2)		08:36		1			
250-EC(2)		08:38		1			
250-ED(2)		08:40		1			
250-EComp(2)		08:40		1			

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day, 2 Day, 3 Day, 4 DAY, 5 DAY, Other: \_\_\_\_\_

SPECIAL INSTRUCTIONS:

RECEIVED BY: [Signature] Date: 7/19/18

RECEIVED BY: [Signature] Date: 08-16-18

Signature: Erik Anderson  
Printed Name: Erik Anderson  
Company: AGI

Signature: [Signature]  
Date: 08-16-18  
Printed Name: Erik Anderson  
Company: AGI

Signature: [Signature]  
Date: 08-16-18  
Printed Name: Erik Anderson  
Company: AGI

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Darwin Thomas, Business Development Director



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: [none]  
Project Manager: Erik Anderson

Report ID:  
A8G0159 - 08 16 18 0814

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geological Element WO#: A8G0159

Project/Project #: Northstar

**Delivery info:**

Date/Time Received: 7/9/18 @ 952 By: [Signature]

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: [Signature] : 7/9/18 @ 952

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>0.6</u>						
Received on Ice? (Y/N)	<u>(Y)</u>						
Temp. Blanks? (Y/N)	<u>(N)</u>						
Ice Type: (Gel/Real/Other)	<u>(Gel)</u>						
Condition:	<u>good</u>						

Cooler out of temp? (Y/N) Possible reason why: \_\_\_\_\_

If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA (NA)

**Samples Inspection:** Inspected by: [Signature] : 7/9/18 @ 952

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: 1 on container for 2SD-EComp(2) reads 842

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

**Additional Information:** \_\_\_\_\_

\_\_\_\_\_

Labeled by: [Signature] Witness: [Signature] Cooler Inspected by: Client unloaded See Project Contact Form: Y

Darwin Thomas



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Wednesday, July 25, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8G0100 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8G0100, which was received by the laboratory on 7/5/2018 at 11:40:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [DAuvil@apex-labs.com](mailto:DAuvil@apex-labs.com), or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

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This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

A handwritten signature in black ink, appearing to read "Darrell Auvil".

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*

---

Darrell Auvil For Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0100 - 07 25 18 1535</b>
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**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
26C-SCOMP	A8G0100-05	Soil	07/05/18 10:39	07/05/18 11:40

Apex Laboratories

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Darrell Auvil For Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
 Tigard, OR 97223  
 503-718-2323  
 EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0100 - 07 25 18 1535</b>
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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>26C-SCOMP (A8G0100-05RE1)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070388</b>				
<b>Dieldrin</b>	<b>112</b>	---	5.46	ug/kg dry	5	07/06/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>			<i>Recovery: 76 %</i>	<i>Limits: 42-129 %</i>	5	07/06/18	EPA 8081B	
<i>Decachlorobiphenyl (Surr)</i>			89 %	65-151 %	5	07/06/18	EPA 8081B	

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Darrell Auvil For Darwin Thomas, Business Development Director



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12232 S.W. Garden Place  
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503-718-2323  
EPA ID: OR01039

<b>Anderson Geological</b>	Project: <b>Northstar</b>	
PO Box 649	Project Number: <b>1503.20</b>	<b>Report ID:</b>
Wilsonville, OR 97070	Project Manager: <b>Erik Anderson</b>	<b>A8G0100 - 07 25 18 1535</b>

**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>26C-SCOMP (A8G0100-05)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070433</b>				
% Solids	<b>88.9</b>	---	1.00	% by Weight	1	07/09/18	EPA 8000C	

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Darrell Auvil For Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0100 - 07 25 18 1535</b>
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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8070388 - EPA 3546</b>						<b>Soil</b>						
<b>Blank (8070388-BLK1)</b>		Prepared: 07/05/18 10:02 Analyzed: 07/05/18 15:29										
<b>EPA 8081B</b>												
Dieldrin	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 78 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>98 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>LCS (8070388-BS1)</b>						Prepared: 07/05/18 10:02 Analyzed: 07/05/18 15:46						
<b>EPA 8081B</b>												
Dieldrin	48.5	---	1.00	ug/kg wet	1	50.0	---	97	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 80 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>95 %</i>		<i>65-151 %</i>		<i>"</i>						



**Apex Laboratories, LLC**

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EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0100 - 07 25 18 1535</b>
---	--	---

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8070433 - Total Solids (Dry Weight)</b>						<b>Soil</b>						

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0100 - 07 25 18 1535</b>
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**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

Prep: EPA 3546

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8070388							
A8G0100-05RE1	Soil	EPA 8081B	07/05/18 10:39	07/05/18 15:42	10.29g/5mL	10g/5mL	0.97

**Percent Dry Weight**

Prep: Total Solids (Dry Weight)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 8070433							
A8G0100-05	Soil	EPA 8000C	07/05/18 10:39	07/06/18 09:30			NA

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503-718-2323  
EPA ID: OR01039

Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0100 - 07 25 18 1535**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**There are No Qualifiers on Sample or QC Data for this report**

---

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Darrell Auvil For Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0100 - 07 25 18 1535</b>
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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis. The Result Basis is listed following the units as "dry", "wet", or "" (blank) designation.
  - "dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
  - "wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
  - "" Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) are not included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0100 - 07 25 18 1535</b>
---	--	---

**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
**EPA ID: OR01039**

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0100 - 07 25 18 1535</b>
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**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Cert?
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

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Darrell Auvil For Darwin Thomas, Business Development Director



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8G0100 - 07 25 18 1535

COC 1 of 1

**CHAIN OF CUSTODY**

Company: Anderson Geological Lab # A8G0100 PO# 1503.20  
 12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333  
 Project Mgr: Erik Anderson Project Name: Northstar  
 Address: \_\_\_\_\_ Phone: \_\_\_\_\_ Email: \_\_\_\_\_  
 Sampled by: E. Anderson Fax: \_\_\_\_\_

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST	
						YES	NO
26C-SA		7/5/18	10:31	S			
26C-SB			10:33				HOLD
26C-SC			10:35				HOLD
26C-SD			10:37				HOLD
26C-SCOMP			10:39				HOLD
26N-NS1			10:40			X	HOLD
26N-NS2			10:50				HOLD
26N-NS3			10:52				HOLD
26N-NS4			10:54				HOLD
26N-NSCOMP			10:56			X	HOLD

SPECIAL INSTRUCTIONS:

TAT Requested (circle): 1 Day, 2 Day, 3 Day, 4 DAY, 5 DAY, Other: \_\_\_\_\_

RECEIVED BY: \_\_\_\_\_ RECEIVED BY: \_\_\_\_\_  
 Signature: Erik Anderson Date: 7/5/18 Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Printed Name: Erik Anderson Time: 11:40 Printed Name: \_\_\_\_\_ Time: \_\_\_\_\_  
 Company: AG Company: \_\_\_\_\_

Apex Laboratories

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Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8G0100 - 07 25 18 1535

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geological Element WO#: A8 GO100

Project/Project #: Northstar / 1503.20

**Delivery info:**

Date/Time Received: 7/5/18 @ 1140 By: (S)

Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other

**Cooler Inspection** Inspected by: (S) : 7/5/18 @ 1140

Chain of Custody Included? Yes  No  Custody Seals? Yes  No

Signed/Dated by Client? Yes  No

Signed/Dated by Apex? Yes  No

Cooler #1 Cooler #2 Cooler #3 Cooler #4 Cooler #5 Cooler #6 Cooler #7

Temperature (deg. C) 1.9 \_\_\_\_\_

Received on Ice?  (Y/N) \_\_\_\_\_

Temp. Blanks?  (Y/N) \_\_\_\_\_

Ice Type:  (Gel/Real/Other) \_\_\_\_\_

Condition: good \_\_\_\_\_

Cooler out of temp?  (Y/N) Possible reason why: \_\_\_\_\_

If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No NA

**Samples Inspection:** Inspected by: (S) : 7/5/18 @ 1145

All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: T reads

26C-SA container reads Taj 1033,

26C-SB container reads Taj 1031, all samples starting w/ 26C containers

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: read 26C

\_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA

Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA

Comments: \_\_\_\_\_

**Additional Information:** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Labeled by: \_\_\_\_\_ Witness: \_\_\_\_\_ Cooler Inspected by: \_\_\_\_\_ See Project Contact Form: Y

(S) MS Client

unloaded



Apex Laboratories, LLC

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

Wednesday, July 11, 2018

Erik Anderson  
Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

RE: A8G0058 - Northstar - 1503.20

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A8G0058, which was received by the laboratory on 7/3/2018 at 12:18:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: [DAuvil@apex-labs.com](mailto:DAuvil@apex-labs.com), or by phone at 503-718-2323.

---

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.

All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

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Apex Laboratories

A handwritten signature in black ink, appearing to read "Darrell Auvil".

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---

Darrell Auvil For Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

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Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0058 - 07 11 18 1007</b>
---	--	---

**ANALYTICAL REPORT FOR SAMPLES**

**SAMPLE INFORMATION**

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
20D-E-Comp	A8G0058-05	Soil	07/03/18 08:55	07/03/18 12:18
25A-E-Comp	A8G0058-10	Soil	07/03/18 09:14	07/03/18 12:18
25D-E-Comp	A8G0058-15	Soil	07/03/18 09:31	07/03/18 12:18
Pile-1A	A8G0058-16	Soil	07/03/18 10:35	07/03/18 12:18
Pile-1B	A8G0058-17	Soil	07/03/18 10:37	07/03/18 12:18
Pile-1C	A8G0058-18	Soil	07/03/18 10:39	07/03/18 12:18
Pile-1D	A8G0058-19	Soil	07/03/18 10:41	07/03/18 12:18
Pile-1E	A8G0058-20	Soil	07/03/18 10:43	07/03/18 12:18

Apex Laboratories

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Darrell Auvil For Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0058 - 07 11 18 1007</b>
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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>20D-E-Comp (A8G0058-05)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070388</b>				
<b>Dieldrin</b>	<b>15.1</b>	---	1.08	ug/kg dry	1	07/05/18	EPA 8081B	<b>Q-39, Q-42</b>
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 68 %</i>		<i>Limits: 42-129 %</i>	<i>1</i>	<i>07/05/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>		<i>83 %</i>		<i>65-151 %</i>	<i>1</i>	<i>07/05/18</i>	<i>EPA 8081B</i>	
<b>25A-E-Comp (A8G0058-10)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070388</b>				
<b>Dieldrin</b>	<b>4.96</b>	---	1.12	ug/kg dry	1	07/05/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 61 %</i>		<i>Limits: 42-129 %</i>	<i>1</i>	<i>07/05/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>		<i>70 %</i>		<i>65-151 %</i>	<i>1</i>	<i>07/05/18</i>	<i>EPA 8081B</i>	
<b>25D-E-Comp (A8G0058-15)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070388</b>				
<b>Dieldrin</b>	<b>10.3</b>	---	1.17	ug/kg dry	1	07/05/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 64 %</i>		<i>Limits: 42-129 %</i>	<i>1</i>	<i>07/05/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>		<i>81 %</i>		<i>65-151 %</i>	<i>1</i>	<i>07/05/18</i>	<i>EPA 8081B</i>	
<b>Pile-1A (A8G0058-16)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070388</b>				
<b>Dieldrin</b>	<b>30.3</b>	---	1.13	ug/kg dry	1	07/05/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 72 %</i>		<i>Limits: 42-129 %</i>	<i>1</i>	<i>07/05/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>		<i>86 %</i>		<i>65-151 %</i>	<i>1</i>	<i>07/05/18</i>	<i>EPA 8081B</i>	
<b>Pile-1B (A8G0058-17)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070388</b>				
<b>Dieldrin</b>	<b>23.7</b>	---	1.01	ug/kg dry	1	07/05/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 65 %</i>		<i>Limits: 42-129 %</i>	<i>1</i>	<i>07/05/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>		<i>76 %</i>		<i>65-151 %</i>	<i>1</i>	<i>07/05/18</i>	<i>EPA 8081B</i>	
<b>Pile-1C (A8G0058-18)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070388</b>				
<b>Dieldrin</b>	<b>40.2</b>	---	1.03	ug/kg dry	1	07/05/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 59 %</i>		<i>Limits: 42-129 %</i>	<i>1</i>	<i>07/05/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>		<i>68 %</i>		<i>65-151 %</i>	<i>1</i>	<i>07/05/18</i>	<i>EPA 8081B</i>	
<b>Pile-1D (A8G0058-19)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070388</b>				
<b>Dieldrin</b>	<b>43.3</b>	---	1.03	ug/kg dry	1	07/05/18	EPA 8081B	
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 66 %</i>		<i>Limits: 42-129 %</i>	<i>1</i>	<i>07/05/18</i>	<i>EPA 8081B</i>	
<i>Decachlorobiphenyl (Surr)</i>		<i>72 %</i>		<i>65-151 %</i>	<i>1</i>	<i>07/05/18</i>	<i>EPA 8081B</i>	
<b>Pile-1E (A8G0058-20RE1)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070388</b>				
<b>Dieldrin</b>	<b>53.9</b>	---	2.23	ug/kg dry	2	07/06/18	EPA 8081B	

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Darrell Auvil For Darwin Thomas, Business Development Director



**Apex Laboratories, LLC**

12232 S.W. Garden Place  
Tigard, OR 97223  
503-718-2323  
EPA ID: OR01039

<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0058 - 07 11 18 1007</b>
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**ANALYTICAL SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>Pile-1E (A8G0058-20RE1)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070388</b>				
<i>Surrogate: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 83 %</i>	<i>Limits: 42-129 %</i>		2	07/06/18	EPA 8081B	
<i>Decachlorobiphenyl (Surr)</i>		79 %	65-151 %		2	07/06/18	EPA 8081B	

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**ANALYTICAL SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
<b>20D-E-Comp (A8G0058-05)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070433</b>				
% Solids	87.4	---	1.00	% by Weight	1	07/09/18	EPA 8000C	
<b>25A-E-Comp (A8G0058-10)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070433</b>				
% Solids	84.1	---	1.00	% by Weight	1	07/09/18	EPA 8000C	
<b>25D-E-Comp (A8G0058-15)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070433</b>				
% Solids	85.0	---	1.00	% by Weight	1	07/09/18	EPA 8000C	
<b>Pile-1A (A8G0058-16)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070433</b>				
% Solids	86.4	---	1.00	% by Weight	1	07/09/18	EPA 8000C	
<b>Pile-1B (A8G0058-17)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070433</b>				
% Solids	90.8	---	1.00	% by Weight	1	07/09/18	EPA 8000C	
<b>Pile-1C (A8G0058-18)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070433</b>				
% Solids	90.9	---	1.00	% by Weight	1	07/09/18	EPA 8000C	
<b>Pile-1D (A8G0058-19)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070433</b>				
% Solids	88.5	---	1.00	% by Weight	1	07/09/18	EPA 8000C	
<b>Pile-1E (A8G0058-20)</b>		<b>Matrix: Soil</b>		<b>Batch: 8070433</b>				
% Solids	87.3	---	1.00	% by Weight	1	07/09/18	EPA 8000C	

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**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Organochlorine Pesticides by EPA 8081B**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8070388 - EPA 3546</b>						<b>Soil</b>						
<b>Blank (8070388-BLK1)</b>		Prepared: 07/05/18 10:02 Analyzed: 07/05/18 15:29										
<b>EPA 8081B</b>												
Dieldrin	ND	---	0.909	ug/kg wet	1	---	---	---	---	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 78 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>98 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>LCS (8070388-BS1)</b>						Prepared: 07/05/18 10:02 Analyzed: 07/05/18 15:46						
<b>EPA 8081B</b>												
Dieldrin	48.5	---	1.00	ug/kg wet	1	50.0	---	97	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 80 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>95 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Duplicate (8070388-DUP1)</b>						Prepared: 07/05/18 10:02 Analyzed: 07/05/18 16:21						
<b>QC Source Sample: 20D-E-Comp (A8G0058-05)</b>												
<b>EPA 8081B</b>												
Dieldrin	24.9	---	1.07	ug/kg dry	1	---	15.1	---	---	49	30%	Q-01
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 67 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 1x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>84 %</i>		<i>65-151 %</i>		<i>"</i>						
<b>Matrix Spike (8070388-MS2)</b>						Prepared: 07/05/18 10:02 Analyzed: 07/06/18 12:21						
<b>QC Source Sample: Pile-1E (A8G0058-20RE1)</b>												
<b>EPA 8081B</b>												
Dieldrin	116	---	2.22	ug/kg dry	2	55.4	53.9	111	56-136%	---	---	
<i>Surr: 2,4,5,6-TCMX (Surr)</i>		<i>Recovery: 99 %</i>		<i>Limits: 42-129 %</i>		<i>Dilution: 2x</i>						
<i>Decachlorobiphenyl (Surr)</i>		<i>91 %</i>		<i>65-151 %</i>		<i>"</i>						



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<b>Anderson Geological</b>	Project: <b>Northstar</b>	
PO Box 649	Project Number: <b>1503.20</b>	<b>Report ID:</b>
Wilsonville, OR 97070	Project Manager: <b>Erik Anderson</b>	<b>A8G0058 - 07 11 18 1007</b>

**QUALITY CONTROL (QC) SAMPLE RESULTS**

**Percent Dry Weight**

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
<b>Batch 8070433 - Total Solids (Dry Weight)</b>						<b>Soil</b>						
<b>Duplicate (8070433-DUP3)</b>		Prepared: 07/06/18 09:30 Analyzed: 07/09/18 08:22										
<b>QC Source Sample: Pile-1E (A8G0058-20)</b>												
<b>EPA 8000C</b>												
% Solids	87.3	---	1.00	% by Weight	1	---	87.3	---	---	0.06	10%	

No Client related Batch QC samples analyzed for this batch. See notes page for more information.

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**SAMPLE PREPARATION INFORMATION**

**Organochlorine Pesticides by EPA 8081B**

**Prep: EPA 3546**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 8070388</b>							
A8G0058-05	Soil	EPA 8081B	07/03/18 08:55	07/05/18 10:02	10.61g/5mL	10g/5mL	0.94
A8G0058-10	Soil	EPA 8081B	07/03/18 09:14	07/05/18 10:02	10.61g/5mL	10g/5mL	0.94
A8G0058-15	Soil	EPA 8081B	07/03/18 09:31	07/05/18 10:02	10.02g/5mL	10g/5mL	1.00
A8G0058-16	Soil	EPA 8081B	07/03/18 10:35	07/05/18 10:02	10.25g/5mL	10g/5mL	0.98
A8G0058-17	Soil	EPA 8081B	07/03/18 10:37	07/05/18 10:02	10.88g/5mL	10g/5mL	0.92
A8G0058-18	Soil	EPA 8081B	07/03/18 10:39	07/05/18 10:02	10.68g/5mL	10g/5mL	0.94
A8G0058-19	Soil	EPA 8081B	07/03/18 10:41	07/05/18 10:02	10.98g/5mL	10g/5mL	0.91
A8G0058-20RE1	Soil	EPA 8081B	07/03/18 10:43	07/05/18 10:02	10.28g/5mL	10g/5mL	0.97

**Percent Dry Weight**

**Prep: Total Solids (Dry Weight)**

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
<b>Batch: 8070433</b>							
A8G0058-05	Soil	EPA 8000C	07/03/18 08:55	07/06/18 09:30			NA
A8G0058-10	Soil	EPA 8000C	07/03/18 09:14	07/06/18 09:30			NA
A8G0058-15	Soil	EPA 8000C	07/03/18 09:31	07/06/18 09:30			NA
A8G0058-16	Soil	EPA 8000C	07/03/18 10:35	07/06/18 09:30			NA
A8G0058-17	Soil	EPA 8000C	07/03/18 10:37	07/06/18 09:30			NA
A8G0058-18	Soil	EPA 8000C	07/03/18 10:39	07/06/18 09:30			NA
A8G0058-19	Soil	EPA 8000C	07/03/18 10:41	07/06/18 09:30			NA
A8G0058-20	Soil	EPA 8000C	07/03/18 10:43	07/06/18 09:30			NA



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**Anderson Geological**  
PO Box 649  
Wilsonville, OR 97070

Project: **Northstar**  
Project Number: **1503.20**  
Project Manager: **Erik Anderson**

**Report ID:**  
**A8G0058 - 07 11 18 1007**

**QUALIFIER DEFINITIONS**

**Client Sample and Quality Control (QC) Sample Qualifier Definitions:**

**Apex Laboratories**

- Q-01** Spike recovery and/or RPD is outside acceptance limits.
- Q-39** Results for sample duplicate are significantly higher than the sample results. See duplicate results in QC section of the report.
- Q-42** Matrix Spike and/or Duplicate analysis was performed on this sample. % Recovery or RPD for this analyte is outside laboratory control limits. (Refer to the QC Section of Analytical Report.)

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**REPORTING NOTES AND CONVENTIONS:**

**Abbreviations:**

- DET Analyte DETECTED at or above the detection or reporting limit.
- ND Analyte NOT DETECTED at or above the detection or reporting limit.
- NR Result Not Reported
- RPD Relative Percent Difference

**Detection Limits: Limit of Detection (LOD)**

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).  
If no value is listed ('----'), then the data has not been evaluated below the Reporting Limit.

**Reporting Limits: Limit of Quantitation (LOQ)**

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

**Reporting Conventions:**

- Basis: Results for soil samples are generally reported on a 100% dry weight basis.  
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.
- " dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")  
See Percent Solids section for details of dry weight analysis.
- " wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.
- " " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

**QC Source:**

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) are not included in this report. Please request a Full QC report if this data is required.

**Miscellaneous Notes:**

- " --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.
- " \*\*\* " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

**Blanks:**

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to 1/2 the Reporting Limit (RL).  
-For Blank hits falling between 1/2 the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.  
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.  
For further details, please request a copy of this document.

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**REPORTING NOTES AND CONVENTIONS (Cont.):**

**Blanks (Cont.):**

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the blank results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

**Preparation Notes:**

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

**Sampling and Preservation Notes:**

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0058 - 07 11 18 1007</b>
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**LABORATORY ACCREDITATION INFORMATION**

**TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039**

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

**Apex Laboratories**

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Cert?
<u>All reported analytes are included in Apex Laboratories' current ORELAP scope.</u>					

**Secondary Accreditations**

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

**Subcontract Laboratory Accreditations**

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation. Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

**Field Testing Parameters**

Results for Field Tested data are provided by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.



Anderson Geological Project: Northstar  
 PO Box 649 Project Number: 1503.20  
 Wilsonville, OR 97070 Project Manager: Erik Anderson Report ID: A8G0058 - 07 11 18 1007

coc 1 of 2

**CHAIN OF CUSTODY**

APEX LABS Lab # A8G0058 PO# 1503.20

12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Anderson Geological Project Mgr: Erik Anderson Project Name: Northstar

Address: \_\_\_\_\_ Phase: \_\_\_\_\_ Email: \_\_\_\_\_

Sampled by: E. Anderson

Site Location: OR WA  
 Other: \_\_\_\_\_

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST	
						YES	NO
20D-EA		7/15/18	08:47	S	1		
20D-EB			08:49				Hold
20D-EC			08:51				Hold
20D-ED			08:53				Hold
20D-E-COMP			08:55				Hold
25A-EA			09:06				Hold
25A-EB			09:08				Hold
25A-EC			09:10				Hold
25A-ED			09:12				Hold
25A-E-COMP			09:14				Hold

ANALYSIS REQUEST

1200-Z  
 1700-COLS  
 TOTAL DISS TCLP  
 Hg, Pb, Ni, TL, V, Zn  
 Cd, Cr, Cu, Fe, Mn, Zn  
 AL, Sb, As, Ba, Be, Bi, Br, Ca, Pb, Se, Si, Sn, Tl, U, V, W, Zn  
 TCLP Metals (8)  
 RCRA Metals (8)  
 600 TTO  
 8082 PCBs  
 8270 SIM PAHs  
 8270 SVOC  
 8260 BTEX VOCs  
 8260 HVOCS  
 8260 RBDN VOCs  
 8260 VOCs Full List  
 NWTPH-Gx  
 NWTPH-Dx  
 NWTPH-ClD

SPECIAL INSTRUCTIONS:  
 - one-day TAT  
 - five-day TAT

TAT Requested (circle):  
 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: \_\_\_\_\_

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY: E. Anderson Date: 7/19/18 Signature: [Signature] Time: 12:18  
 RECEIVED BY: \_\_\_\_\_ Date: \_\_\_\_\_ Signature: \_\_\_\_\_ Time: \_\_\_\_\_

Company: Apex



Anderson Geological  
PO Box 649  
Wilsonville, OR 97070

Project: Northstar  
Project Number: 1503.20  
Project Manager: Erik Anderson

Report ID:  
A8G0058 - 07 11 18 1007

COC 2 of 2

**CHAIN OF CUSTODY**

APEX LABS  
12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333

Company: Anderson Geological Lab # A8G0058 PO# 1503.20

Address: Anderson Geological Project Mgr: Erik Anderson Project Name: Northstar

Sampled by: E. Anderson Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Site Location:  OR  WA

Other: \_\_\_\_\_

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	ANALYSIS REQUEST			
						AL, SR, AR, BR, CR, CA, CO, CU, FE, NI, PB, PC, PI, PM, PT, SE, SI, SN, SO, ST, T, V, ZN	TOTAL DISS TCTP	1200-COLS	1200-Z
2SD-EA		7/31/09	09:23	S	1				HOLD
2SD-EB		09:25							HOLD
2SD-EC		09:27							HOLD
2SD-ED		09:25							HOLD
2SD-E-COMP		09:31							
PILE-1A		10:35							X
PILE-1B		10:37							X
PILE-1C		10:39							X
PILE-1D		10:41							X
PILE-1E		10:43							X

SPECIAL INSTRUCTIONS:  
 - One day TAT  
 - Five-day TAT

RECEIVED BY: \_\_\_\_\_ RECEIVED BY: \_\_\_\_\_  
 Signature: \_\_\_\_\_ Date: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_  
 Printed Name: Erik Anderson Time: 12:18 Printed Name: \_\_\_\_\_ Time: \_\_\_\_\_  
 Company: Ag1 Company: Anderson Geological

Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Darrell Auvil For Darwin Thomas, Business Development Director



<b>Anderson Geological</b> PO Box 649 Wilsonville, OR 97070	Project: <b>Northstar</b> Project Number: <b>1503.20</b> Project Manager: <b>Erik Anderson</b>	<b>Report ID:</b> <b>A8G0058 - 07 11 18 1007</b>
---	--	---

**APEX LABS COOLER RECEIPT FORM**

Client: Anderson Geological Element WO#: A8 60056  
 Project/Project #: Northstar

**Delivery info:**  
 Date/Time Received: 7/31/18 @ \_\_\_\_\_ By: [Signature]  
 Delivered by: Apex  Client  ESS  FedEx  UPS  Swift  Senvoy  SDS  Other \_\_\_\_\_

**Cooler Inspection** Inspected by: [Signature] : 7/31/18 @ \_\_\_\_\_  
 Chain of Custody Included? Yes  No  Custody Seals? Yes  No   
 Signed/Dated by Client? Yes  No   
 Signed/Dated by Apex? Yes  No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (deg. C)	<u>1.7</u>						
Received on Ice? (Y/N)	<u>(Y)</u>						
Temp. Blanks? (Y/N)	<u>(N)</u>						
Ice Type: (Gel/Real/Other)	<u>(Gel)</u>						
Condition:	<u>good</u>						

Cooler out of temp? (Y/N) Possible reason why: \_\_\_\_\_  
 If some coolers are in temp and some out, were green dot applied to out of temperature samples? Yes/No/NA (NA)

**Samples Inspection:** Inspected by: ACE : 7/31/18 @ 1330  
 All Samples Intact? Yes  No  Comments: \_\_\_\_\_

Bottle Labels/COCs agree? Yes  No  Comments: 25A-EA D on Cont. reads 7/2/18. 25A-EB ID on Cont. reads 25A-EC, matched by ID on lid & T.

Containers/Volumes Received Appropriate for Analysis? Yes  No  Comments: \_\_\_\_\_

Do VOA Vials have Visible Headspace? Yes  No  NA   
 Comments: \_\_\_\_\_

Water Samples: pH Checked and Appropriate (except VOAs): Yes  No  NA   
 Comments: \_\_\_\_\_

**Additional Information:** 25A-ED D on Cont. reads 7/2/18. 20D-E-comp ID on Cont. reads 20D-E(comp).

Labeled by: ACE Witness: [Signature] Cooler Inspected by: Client unloaded See Project Contact Form: Y

**APPENDIX B**  
**Air Monitoring Report (PBS Engineering and Environmental)**



April 10, 2019

Erik Anderson  
Anderson Geological, Inc.  
PO Box 649  
Wilsonville, Oregon 90707

Via email: erik@andersongeo.com

Regarding: Report  
Northstar Dieldrin Cleanup Project  
Kale Street NE  
Salem, Oregon  
PBS Project 25513.000, Phase 0002, Task 001

Dear Mr. Anderson:

From July 16 through July 20 of 2018, PBS Engineering and Environmental Inc. (PBS) provided project oversight during the excavation and stockpiling of soils from the Northstar project located along the north side of Kale Street NE in Salem, Oregon. During the cleanup project, PBS visually monitored dust levels associated with the excavation, hauling, and stockpiling of soil contaminated with dieldrin. During this phase of the project, PBS collected both total airborne dust samples and total airborne dieldrin samples. PBS collected air samples on each of the days we were on site.

Based upon review of the analytical results from these tests, airborne concentrations of dieldrin during the cleanup operations were below the analytical detection limit for the analysis which was 0.004 micrograms per cubic meter. The project specific airborne risk based concentration established by the Oregon DEQ is currently 0.11 micrograms per cubic meter ( $\mu\text{g}/\text{M}^3$ ). Airborne dust concentrations were low as well, ranging from none detected to 1.3 milligrams per cubic meter. Assuming a dieldrin concentration of 1 part per million in the collected dust, the resulting dieldrin concentrations in these airborne dust samples ranged from none detected to 0.0013 micrograms per cubic meter.

### **AIR MONITORING RESULTS**

PBS collected air samples using a combination of high volume and low volume vacuum pumps and both pre-weighed filter cassettes and OSHA OVS sample tubes. The filter cassettes were used to collect total airborne dust samples and the OVS sample tubes were used to collect airborne dieldrin samples.

The samples were collected from downwind of the excavation operations at the property fence lines. One particulate sample was collected from inside the cab of an excavator.

Pre-weighed sample cassettes were shipped under chain of custody controls to RJ Lee Group in Monroeville, Pennsylvania for analysis by NIOSH 500, which is a gravimetric analytical method. OVS samples were submitted under chain-of-custody controls to ALS Environmental in Salt Lake City, Utah for dieldrin analysis by Method NIOSH 5605 GC-ECD.

Table 1 summarizes the analytical results of the airborne dust sampling.

**Table 1. Airborne Dust Monitoring Results**

Sample	Date	Operation/Location	Result
273429	07/16/2018	West Fence Line	<0.063 mg/M <sup>3</sup>
273423	07/16/2018	South Fence Line	0.072 mg/M <sup>3</sup>
273420	07/16/2018	Excavator Cab	1.3 mg/M <sup>3</sup>
273430	07/17/2018	West Fence Line South	<0.062 mg/M <sup>3</sup>
273427	07/17/2018	South Fence Line	0.079 mg/M <sup>3</sup>
273416	07/17/2018	West Fence Line North	<0.062 mg/M <sup>3</sup>
273419	07/18/2018	West Fence Line South	0.14 mg/M <sup>3</sup>
273386	07/18/2018	South Fence Line	0.068 mg/M <sup>3</sup>
273417	07/18/2018	West Fence Line North	0.11 mg/M <sup>3</sup>
273396	07/19/2018	West Fence Line South	<0.056 mg/M <sup>3</sup>
273391	07/19/2018	South Fence Line	<0.058 mg/M <sup>3</sup>
273431	07/19/2018	West Fence Line North	<0.057 mg/M <sup>3</sup>
273406	07/20/2018	West Fence Line South	<0.062 mg/M <sup>3</sup>
273390	07/20/2018	South Fence Line	0.069 mg/M <sup>3</sup>
273401	07/20/2018	West Fence Line North	0.11 mg/M <sup>3</sup>

As can be seen in the table above, the total dust levels were very low. Assuming a dieldrin soil concentration of 1 part per million (ppm) the calculated dieldrin concentrations in these airborne dust samples ranged from non-detected to 0.0013 ug/M<sup>3</sup>.

Table 2 summarizes the analytical results of the airborne dieldrin sampling.

**Table 2. Airborne Dieldrin Monitoring Results**

Sample	Date	Operation/Location	Result	RBC
OVS-0389	07/16/2018	West Fence Line	< 0.0046 ug/M <sup>3</sup>	0.11 ug/M <sup>3</sup>
OVS-0256	07/16/2018	South Fence Line	< 0.0044 ug/M <sup>3</sup>	0.11 ug/M <sup>3</sup>
OVS-0286	07/17/2018	West Fence Line	< 0.0036 ug/M <sup>3</sup>	0.11 ug/M <sup>3</sup>
OVS-0391	07/17/2018	South Fence Line	< 0.0038 ug/M <sup>3</sup>	0.11 ug/M <sup>3</sup>
OVS-0399	07/18/2018	West Fence Line	< 0.0037 ug/M <sup>3</sup>	0.11 ug/M <sup>3</sup>
OVS-0422	07/18/2018	South Fence Line	< 0.0037 ug/M <sup>3</sup>	0.11 ug/M <sup>3</sup>
OVS-0304	07/19/2018	West Fence Line	< 0.0035 ug/M <sup>3</sup>	0.11 ug/M <sup>3</sup>
OVS-0471	07/19/2018	South Fence Line	< 0.0035 ug/M <sup>3</sup>	0.11 ug/M <sup>3</sup>
OVS-0462	07/20/2018	West Fence Line	< 0.0039 ug/M <sup>3</sup>	0.11 ug/M <sup>3</sup>
OVS-0330	07/20/2018	South Fence Line	< 0.0039 ug/M <sup>3</sup>	0.11 ug/M <sup>3</sup>

As can be seen in the table above, the total airborne levels of dieldrin were not detectable at a detection limit that was significantly below the project specific RBC of 0.11 ug/M<sup>3</sup>.

## CONCLUSIONS AND RECOMMENDATIONS

PBS measured airborne concentrations of total dust and dieldrin associated with the excavation dieldrin contaminated soil at the Northstar project located in Salem, Oregon. Both total dust and total dieldrin levels were significantly below the RBC limit developed for this project.

## LIMITATIONS OF SCOPE

This study was limited to the tests and locations as indicated above. The site as a whole may have other environmental concerns that will not be characterized by this study. The findings and conclusions of this work are not scientific certainties but probabilities based on professional judgment concerning the significance of the data gathered during the course of this investigation. PBS is not able to represent conditions on the site or adjoining sites beyond those detected or observed by PBS.

PBS respectfully submits these results of our indoor air quality investigation. Please feel free to contact me at 503.417.7597 or douglas@pbsusa.com with any questions or comments.

Sincerely,



Douglas Hancock CIH CSP  
Senior Project Manager



Attachment(s): Lab Reports

**LABORATORY REPORT**

 PBS Engineering & Environmental  
 4412 Southwest Corbett Ave.  
 Portland, OR 97239

 Attn: Doug Hancock  
 Phone: 503-248-1939  
 Fax: 503-248-0223  
 Email: douglas@pbsusa.com

 RJ Lee Group Job No.: PA250720180003  
 Samples Received: July 25, 2018  
 Report Date: July 26, 2018  
 Client Project: 25513.000  
 Purchase Order No.: N/A  
 Matrix: Air and Emissions  
 Prep/Analysis: NIOSH 0500 / NIOSH 0500-PA

Client Sample ID RJ Lee Group ID	Sampling Date	Sample Volume (L) Sampling Time (min.)	Analyte	Sample Concentration (mg/filter)	Minimum Reporting Limit (mg/filter)	Sample Concentration mg/m <sup>3</sup>	Minimum Reporting Limit (mg/m <sup>3</sup> )	Analysis Date	Q
273429 PA250720180003-001	07/16/2018	1581 L N/A	Total Particulate	< 0.10	0.10	< 0.063	0.063	07/25/2018	A
273423 PA250720180003-002	07/16/2018	1586 L N/A	Total Particulate	0.11	0.10	0.072	0.063	07/25/2018	A
273420 PA250720180003-003	07/16/2018	1599 L N/A	Total Particulate	2.1	0.10	1.3	0.063	07/25/2018	A
273430 PA250720180003-004	07/17/2018	1620 L N/A	Total Particulate	< 0.10	0.10	< 0.062	0.062	07/25/2018	A
273427 PA250720180003-005	07/17/2018	1679 L N/A	Total Particulate	0.13	0.10	0.079	0.060	07/25/2018	A
273416 PA250720180003-006	07/17/2018	1624 L N/A	Total Particulate	< 0.10	0.10	< 0.062	0.062	07/25/2018	A
273419 PA250720180003-007	07/18/2018	1638 L N/A	Total Particulate	0.23	0.10	0.14	0.061	07/25/2018	A
273386 PA250720180003-008	07/18/2018	1659 L N/A	Total Particulate	0.11	0.10	0.068	0.060	07/25/2018	A
273417 PA250720180003-009	07/18/2018	1658 L N/A	Total Particulate	0.18	0.10	0.11	0.060	07/25/2018	A
273396 PA250720180003-010	07/19/2018	1775 L N/A	Total Particulate	< 0.10	0.10	< 0.056	0.056	07/25/2018	A
273391 PA250720180003-011	07/19/2018	1721 L N/A	Total Particulate	< 0.10	0.10	< 0.058	0.058	07/25/2018	A
273431 PA250720180003-012	07/19/2018	1752 L N/A	Total Particulate	< 0.10	0.10	< 0.057	0.057	07/25/2018	A



 Wilson Jack  
 Scientist II

**LABORATORY REPORT**

 PBS Engineering & Environmental  
 4412 Southwest Corbett Ave.  
 Portland, OR 97239

 Attn: Doug Hancock  
 Phone: 503-248-1939  
 Fax: 503-248-0223  
 Email: douglas@pbsusa.com

 RJ Lee Group Job No.: PA250720180003  
 Samples Received: July 25, 2018  
 Report Date: July 26, 2018  
 Client Project: 25513.000  
 Purchase Order No.: N/A  
 Matrix: Air and Emissions  
 Prep/Analysis: NIOSH 0500 / NIOSH 0500-PA

Client Sample ID RJ Lee Group ID	Sampling Date	Sample Volume (L) Sampling Time (min.)	Analyte	Sample Concentration (mg/filter)	Minimum Reporting Limit (mg/filter)	Sample Concentration mg/m <sup>3</sup>	Minimum Reporting Limit (mg/m <sup>3</sup> )	Analysis Date	Q
273406 PA250720180003-013	07/20/2018	1619 L N/A	Total Particulate	< 0.10	0.10	< 0.062	0.062	07/25/2018	A
273390 PA250720180003-014	07/20/2018	1598 L N/A	Total Particulate	0.11	0.10	0.069	0.063	07/25/2018	A
273401 PA250720180003-015	07/20/2018	1622 L N/A	Total Particulate	0.18	0.10	0.11	0.062	07/25/2018	A

## Comments:

## Report Qualifiers (Q):

 H = Holding times for preparation or analysis exceeded  
 A = AIHA-LAP, LLC Accredited (Lab ID 100364)

E = Value above highest calibration standard

J = Value below lowest calibration standard but above MDL (Method Detection Limit)

L = LCS (Laboratory Control Standard)/SRM (Standard Reference Material) recovery outside accepted recovery limits

B = Analyte detected in the associated Method Blank

S = Spike Recovery outside accepted limits

R = RPD (relative percent difference) outside accepted limits

D = RL (reporting limit verification) outside accepted limits

These results are submitted pursuant to RJ Lee Group's current terms and conditions of sale, including the company's standard warranty and limitation of liability provisions. No responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, RJ Lee Group will store the samples for a period of thirty (30) days before discarding. A shipping and handling fee will be assessed for the return of any samples.

This laboratory operates in accord with ISO 17025:2005 guidelines, and holds a limited scope of accreditations under different accrediting agencies; refer to <http://www.rjlg.com/about-us/accreditations/> for more information and current status. Unless it is specifically stated otherwise (under the Q column using the appropriate accrediting agency qualifier(s)) the work contained in this report is performed under RJLG's General Quality System requirements and is not part of any scope of accreditations. This report may not be used to claim product endorsement by any laboratory accrediting agency. The results contained in this report relate only to the items tested or to the sample(s) as received by the laboratory. Any reproduction of this document must be in full for the report to be valid.

Results have not been blank corrected unless otherwise noted. Samples were received in good condition unless otherwise noted. All QC samples are within acceptable established limits unless otherwise noted in the comments section of the report and/or with the appropriate flags under the report qualifiers (Q) column. Quality Control data is available upon request.



 Wilson Jack  
 Scientist II



# ANALYTICAL REPORT

Report Date: July 31, 2018

Douglas Hancock  
PBS Environmental (Portland)  
4412 SW Corbett Ave.  
Portland, OR 97239

Phone: (503) 417-7597

E-mail: douglas@pbsusa.com

Workorder: **34-1820595**

Client Project ID: North Star  
Purchase Order: 25513.000  
Project Manager: Stella Hanis

## Analytical Results

Sample ID: <b>0389</b>		Collected: 07/16/2018		
Lab ID: 1820595001		Received: 07/24/2018		
Method: NIOSH 5605 by GC-ECD		Media: SKC 226-58, Sorbent Tube, XAD-2 OVS, Quartz Filter		Instrument: GCE18
		Sampling Info: Air Volume 438 L		Analyzed: 07/26/2018 (219634)
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Dieldrin	<0.0020	<0.0000046	<0.00000029	0.0020

Sample ID: <b>0256</b>		Collected: 07/16/2018		
Lab ID: 1820595002		Received: 07/24/2018		
Method: NIOSH 5605 by GC-ECD		Media: SKC 226-58, Sorbent Tube, XAD-2 OVS, Quartz Filter		Instrument: GCE18
		Sampling Info: Air Volume 457 L		Analyzed: 07/26/2018 (219634)
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Dieldrin	<0.0020	<0.0000044	<0.00000028	0.0020

Sample ID: <b>0286</b>		Collected: 07/17/2018		
Lab ID: 1820595003		Received: 07/24/2018		
Method: NIOSH 5605 by GC-ECD		Media: SKC 226-58, Sorbent Tube, XAD-2 OVS, Quartz Filter		Instrument: GCE18
		Sampling Info: Air Volume 563 L		Analyzed: 07/26/2018 (219634)
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Dieldrin	<0.0020	<0.0000036	<0.00000023	0.0020

ADDRESS 960 West LeVoy Drive, Salt Lake City, Utah, 84123 USA | PHONE +1 801 266 7700 | FAX +1 801 268 9992

ALS GROUP USA, CORP. An ALS Limited Company

Environmental

[www.alsglobal.com](http://www.alsglobal.com)

RIGHT SOLUTIONS RIGHT PARTNER



# ANALYTICAL REPORT

Workorder: **34-1820595**

Client Project ID: North Star  
Purchase Order: 25513.000  
Project Manager: Stella Hanis

## Analytical Results

Sample ID: <b>0391</b>	Collected: 07/17/2018			
Lab ID: 1820595004	Received: 07/24/2018			
Sampling Location: North Star				
<b>Method: NIOSH 5605 by GC-ECD</b>	<b>Media:</b> SKC 226-58, Sorbent Tube, XAD-2 OVS, Quartz Filter	<b>Instrument:</b> GCE18		
	<b>Sampling Info: Air Volume 523 L</b>	<b>Analyzed:</b> 07/26/2018 (219634)		
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Dieldrin	<0.0020	<0.0000038	<0.0000025	0.0020

Sample ID: <b>0399</b>	Collected: 07/18/2018			
Lab ID: 1820595005	Received: 07/24/2018			
Sampling Location: North Star				
<b>Method: NIOSH 5605 by GC-ECD</b>	<b>Media:</b> SKC 226-58, Sorbent Tube, XAD-2 OVS, Quartz Filter	<b>Instrument:</b> GCE18		
	<b>Sampling Info: Air Volume 539 L</b>	<b>Analyzed:</b> 07/26/2018 (219634)		
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Dieldrin	<0.0020	<0.0000037	<0.0000024	0.0020

Sample ID: <b>0422</b>	Collected: 07/18/2018			
Lab ID: 1820595006	Received: 07/24/2018			
Sampling Location: North Star				
<b>Method: NIOSH 5605 by GC-ECD</b>	<b>Media:</b> SKC 226-58, Sorbent Tube, XAD-2 OVS, Quartz Filter	<b>Instrument:</b> GCE18		
	<b>Sampling Info: Air Volume 547 L</b>	<b>Analyzed:</b> 07/26/2018 (219634)		
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Dieldrin	<0.0020	<0.0000037	<0.0000023	0.0020

Sample ID: <b>0304</b>	Collected: 07/19/2018			
Lab ID: 1820595007	Received: 07/24/2018			
Sampling Location: North Star				
<b>Method: NIOSH 5605 by GC-ECD</b>	<b>Media:</b> SKC 226-58, Sorbent Tube, XAD-2 OVS, Quartz Filter	<b>Instrument:</b> GCE18		
	<b>Sampling Info: Air Volume 569 L</b>	<b>Analyzed:</b> 07/26/2018 (219634)		
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Dieldrin	<0.0020	<0.0000035	<0.0000023	0.0020

Sample ID: <b>0471</b>	Collected: 07/19/2018			
Lab ID: 1820595008	Received: 07/24/2018			
Sampling Location: North Star				
<b>Method: NIOSH 5605 by GC-ECD</b>	<b>Media:</b> SKC 226-58, Sorbent Tube, XAD-2 OVS, Quartz Filter	<b>Instrument:</b> GCE18		
	<b>Sampling Info: Air Volume 566 L</b>	<b>Analyzed:</b> 07/26/2018 (219634)		
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Dieldrin	<0.0020	<0.0000035	<0.0000023	0.0020



# ANALYTICAL REPORT

Workorder: **34-1820595**

Client Project ID: North Star

Purchase Order: 25513.000

Project Manager: Stella Hanis

## Analytical Results

Sample ID: <b>0462</b>		Collected: 07/20/2018		
Lab ID: 1820595009		Sampling Location: North Star		Received: 07/24/2018
<b>Method: NIOSH 5605 by GC-ECD</b>		<b>Media:</b> SKC 226-58, Sorbent Tube, XAD-2 OVS, Quartz Filter		<b>Instrument:</b> GCE18
		<b>Sampling Info: Air Volume 518 L</b>		<b>Analyzed:</b> 07/26/2018 (219634)
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Dieldrin	<0.0020	<0.0000039	<0.00000025	0.0020

Sample ID: <b>0330</b>		Collected: 07/20/2018		
Lab ID: 1820595010		Sampling Location: North Star		Received: 07/24/2018
<b>Method: NIOSH 5605 by GC-ECD</b>		<b>Media:</b> SKC 226-58, Sorbent Tube, XAD-2 OVS, Quartz Filter		<b>Instrument:</b> GCE18
		<b>Sampling Info: Air Volume 518 L</b>		<b>Analyzed:</b> 07/26/2018 (219634)
Analyte	Result (ug/sample)	Result (mg/m <sup>3</sup> )	Result (ppm)	RL (ug/sample)
Dieldrin	<0.0020	<0.0000039	<0.00000025	0.0020

## Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review
NIOSH 5605 by GC-ECD	/S/ Mila V. Potekhin 07/26/2018 11:44	/S/ Lyle Edwards 07/31/2018 09:30

## Laboratory Contact Information

ALS Environmental  
960 W Levoy Drive  
Salt Lake City, Utah 84123

Phone: (801) 266-7700  
Email: [alst.lab@ALSGlobal.com](mailto:alst.lab@ALSGlobal.com)  
Web: [www.alsslc.com](http://www.alsslc.com)



# ANALYTICAL REPORT

Workorder: **34-1820595**

Client Project ID: North Star

Purchase Order: 25513.000

Project Manager: Stella Hanis

## General Lab Comments

The results provided in this report relate only to the items tested.  
Samples were received in acceptable condition unless otherwise noted.  
Samples have not been blank corrected unless otherwise noted.  
This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

Testing Sector	Accreditation Body (Standard)	Certificate Number	Website
Environmental	PJLA (DoD ELAP)	L17-288	<a href="http://www.pjlabs.com">http://www.pjlabs.com</a>
	PJLA (ISO 17025)	L17-291	<a href="http://www.pjlabs.com">http://www.pjlabs.com</a>
	Utah (TNI)	DATA1	<a href="http://health.utah.gov/lab/labimp/">http://health.utah.gov/lab/labimp/</a>
	Nevada	UT00009	<a href="http://ndep.nv.gov/bsdwl/labservice.htm">http://ndep.nv.gov/bsdwl/labservice.htm</a>
	Oklahoma	UT00009	<a href="http://www.deq.state.ok.us/CSDnew/">http://www.deq.state.ok.us/CSDnew/</a>
	Iowa	IA# 376	<a href="http://www.iowadnr.gov/InsideDNR/RegulatoryWater.aspx">http://www.iowadnr.gov/InsideDNR/RegulatoryWater.aspx</a>
	Florida (TNI)	E871067	<a href="http://www.dep.state.fl.us/labs/bars/sas/qa/">http://www.dep.state.fl.us/labs/bars/sas/qa/</a>
Texas (TNI)	T104704456-11-1	<a href="http://www.tceq.texas.gov/field/qa/lab_accred_certif.html">http://www.tceq.texas.gov/field/qa/lab_accred_certif.html</a>	
Industrial Hygiene	AIHA (ISO 17025 & AIHA IHLAP/ELLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
Lead Testing:			
CPSC	PJLA (ISO 17025)	L17-291	<a href="http://www.pjlabs.com">http://www.pjlabs.com</a>
Soil, Dust, Paint	AIHA (ISO 17025, AIHA ELLAP and NLLAP)	101574	<a href="http://www.aihaaccreditedlabs.org">http://www.aihaaccreditedlabs.org</a>
Dietary Supplements	PJLA (ISO 17025)	L17-291	<a href="http://www.pjlabs.com">http://www.pjlabs.com</a>

## Definitions

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity.

LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity.

ND = Not Detected, Testing result not detected above the LOD or LOQ.

NA = Not Applicable.

\*\* No result could be reported, see sample comments for details.

< This testing result is less than the numerical value.

( ) This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.

**Appendix C**  
**Legal Description of Portion of Phase II for Partial NFA Request**

Exhibit "A"

Commencing at a 3" brass cap being the Northwest corner of the J. Martin Donation Land Claim Number 71, located in the Northeast Corner of Section 5, Township 7 South, Range 2 West, of the Willamette Meridian, City of Salem, Marion County, Oregon; thence North 00°19'20" W 34.00 feet to a point on the North right of way of Kale Road being the True Point of Beginning; thence along said right of way North 90°00'00" West 628.42 feet to a 5/8" iron rod; thence North 00°29'19" West 1320.25 feet to a 3/4" iron pipe; thence North 89°45'46" East 1335.44 feet; thence South 00°00'16" East 236.32 feet; thence North 89°59'44" East 4.00 feet; thence South 00°00'16" East 1081.54 feet to the North right of way of Kale Street; thence along said right of way South 89°21'20" West 699.90 feet to the Point of Beginning and containing 40.43 acres more or less.

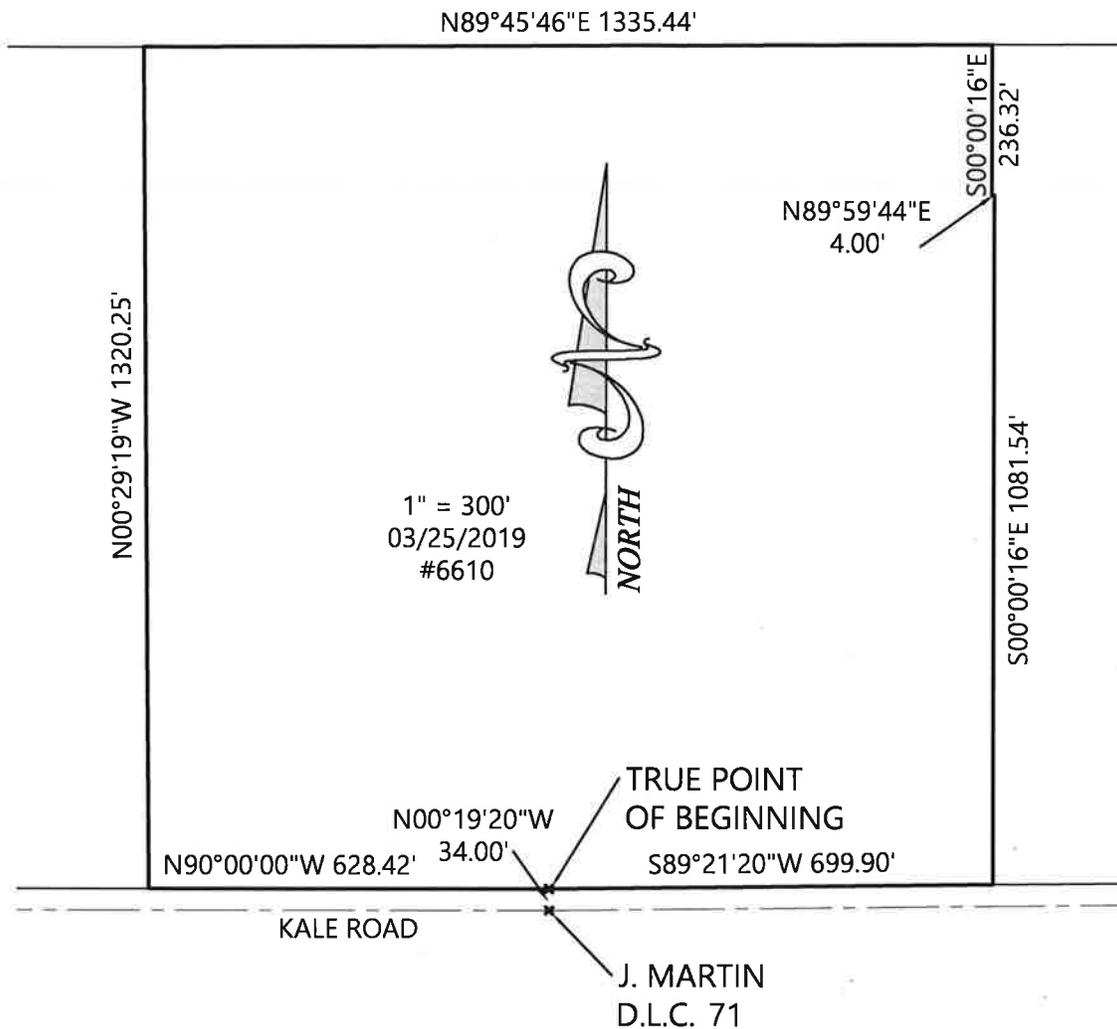
REGISTERED  
PROFESSIONAL  
LAND SURVEYOR



OREGON  
JULY 13, 2004  
ROBERT D. HAMMAN  
64202LS

EXPIRES: 6/30/2019

EXHIBIT "B"



REGISTERED  
PROFESSIONAL  
LAND SURVEYOR

OREGON  
JULY 13, 2004  
ROBERT D. HAMMAN  
64202LS

BY:  
MULTI/TECH ENGINEERING SERVICES, INC.  
1155 13TH ST. S.E. SALEM, OREGON 97302  
503-363-9227

EXPIRES: 6-30-2019

## FIGURES

## **TABLES**