George L. Hagan Jr.

Remediation Manager

OFFICE LOCATION

Auburn, WA

YEARS WITH FIRM

1

TOTAL YEARS OF RELEVANT EXPERIENCE

23

EDUCATION

TMCC, AS – Environmental Science

California State University Northridge (CSUN), Business Management

CERTIFICATIONS

Nevada Certified Environmental Manager (CEM), #1824

OSHA Annual 8-hour Hazardous Waste Operations Refresher Training, 2016

OSHA Confined Space Entry Training, 2015

UST Owner/Operator Training Certification, 2011

Dexil Petro Flag Soil Analysis Kit Operation, 2000

Nevada Certified Environmental Manager, 1997

OSHA Confined Space Entry Training, 1997

OSHA 40-Hour Health and Safety at Hazardous Waste Sites, 1993

Sensidyne/Haztech HAZCAT Kit Certification, format

Washington, Certified Erosion and Sediment Control Lead (CESCL), 2017

Qualifications Summary

George Hagan has over 23 years of experience in site resource investigations and environmental consulting, serving multiple government and business sectors throughout Washington, Nevada, and California. He has proven experience in environmental business development, having participated in several Nevada Association of Counties (NACO), and Nevada League of Cities & Municipalities conferences, providing outreach/information for the State of Nevada Brownfields program, preparing, submitting, and obtaining Brownfields funding for the City of Wells, NV blight remedy and redevelopment efforts. Additionally, he has extensive experience in managing projects, personnel, contracts, and subcontractors, having supervised the installation of over 90 soil, groundwater, free phase product removal and phyto remediation systems. He is experienced in field technical operations including treatment system OM&M, groundwater sampling, vapor sampling, soil sampling and field pilot tests as well as maintenance of field equipment and troubleshooting on active systems, specializing in problematic remedial processes. George has extensive operational expertise involving the following remedial technologies: Air Sparging, In-Situ Oxygen (O_2) injections, In-Situ Ozone (O_3) injections, Soil Vapor Vacuum Extraction, Dual Phase Extraction, In-Situ Oxidation, pump and treat, VOC abatement, Hydrogen Peroxide (H_2O_2) injection, Enhanced Bioremediation, Bio-Venting, Free Phase Product Removal, Phyto Remediation, and Groundwater Reinjection for plume control and soils rinsing. George is a Certified Erosion and Sediment Control Lead (CESCL) in Washington State and also a Certified Environmental Manager (CEM) in Nevada.

George has significant expertise and experience in the following:

- Project Management & Coordination
- Health and Safety
- Soil Vapor Surveys and Sample Collection
- Soil Vapor Extraction Treatment- Installation, Operation, Monitoring and Maintenance
- Dual Phase Extraction Treatment - Installation, Operation, Monitoring and Maintenance
- Groundwater Extraction Treatment - Installation, Operation, Monitoring and Maintenance
- Groundwater, Soil Vapor, Air Sparge Pilot Studies
- Groundwater Monitoring
- In-Situ Enhanced Bioremediation
- Dynamic Underground Stripping
- In-Situ Thermal Desorption
- Vapor and Liquid Phase Carbon Treatment
- Air Strippers
- Free Product Recovery
- Thermal and Catalytic Oxidizers
- Internal Combustion Engine Treatment
- Air Sparging
- Injection and Circulation Wells
- Advance Oxidation Process (AO)
- In-situ Ozone Injection
- Business Development
- Environmental Consulting
- Compliance

Key Project Experience

Radiant Laundry & Dry Cleaning Facility Torrance, Ca. 2017

George provided supervisory oversight and participated with the installation of the SVE remediation system for the remediation of the onsite perchloroethylene/tetrachloroethylene (PERC) soils and groundwater plume. The SVE system was completed and activated August 2017.

The Boeing Company, Palomino Valley, Nevada (NV) - Former Nevada Field Laboratories (NFL), Areas-B, C, D & D53A. 1996 to 2015.

George was responsible for operations, maintenance, and monitoring of four onsite Groundwater Extraction and Treatment (GETS) remediation systems. The remediation systems were installed to mitigate trichloroethene (TCE), 1,1,1, trichloroethane (TCA), tetrachloroethene (PCE), Perchlorate, and other dissolved phase groundwater contaminates released during the lunar rocket engine and missile propellant testing that was performed onsite by the previous property owner, Rocketdyne. The remedial technologies utilized were ground water extraction, shallow tray air stripping, carbon abatement, groundwater reinjection for plume control, and upgradient groundwater reinjection for soil's rinsing. George personally performed shallow tray-air stripper disassembly cleaning and maintenance on a quarterly, bi-annual and as needed basis. George also performed maintenance, repair, troubleshooting on all other GETS components including vendor repair supervisory oversight. Area's-B, C, D, & D53A of the Former NFL sites incorporated more than 50 groundwater extraction wells, all Area-D extraction wells were Telemetry-Programable Logic Control (T-PLC), and Supervisory Control and Data Accusation (SCADA), controlled systems that allowed for remote and on-site operations, trouble-shooting, and data acquisition operations. Problematic wells were alarm capable via T-PLC, SCADA systems, and were trouble shoot with 24-hrs then repaired and reactivated in a timely manner as to maintain operational matrixes, reducing remedial time as a cost savings measure to the client. **Area-B's** remedial system encompassed three shallow creek seep extraction galleries that fed a groundwater treatment system. The influent water was captured in a 1000-gallon sediment tank, then processed through a shallow tray air stripping tower, filtered, then processed through three Granular Activated Carbon (GAC) vessels meeting the effluent discharge water parameters. Area-B's treated effluent process was unique in such that it discharged to a wild animal watering system, daylighting below grade, that then gradually filtered below ground meeting the NPDES permit requirements. **Area-C's** groundwater extraction remedial system consisted of a shallow tray air stripper, filtration vessels, two resin beds, four GAC vessels. Treated effluent was reinjected into the shallow aquifer for plume control, soils rinsing, also to replenish the localized water table. Area-C was unique in being the first trichloroethene (TCE), 1,1,1, trichloroethane (TCA), tetrachloroethene (PCE), Perchlorate groundwater contaminated site aquifer remediated to closure in Nevada (under environmental covenant). **Area-D and Area-D53A**, Groundwater Extraction Treatment System (GETS) consisted of multiple source wells spread over a several mile area, a 2000-gallon pre-sedimentation capture tank, filtration vessels, a shallow tray air stripper tower, GAC vessel's. Treated effluent was reinjected into the shallow aquifer for plume control, soils rinsing, also to replenish the localized aquifer.

Travel Centers of America (TCA)-Petro Stopping Centers, Las Vegas, Sparks, Wells, NV. 2011 to 2015.

George provided oversight for several sights where petroleum contaminated soils were excavated for offsite treatment, the shake down, and operation of the Wells, NV remediation system. **Las Vegas, Nevada Petro Stopping Center**, due to surface water runoff into a capture basin, high levels of petroleum impacted soils were discovered, George provided the supervision of several hundred tons of petroleum impacted soils. Directing the excavation, conducting onsite soil sampling and analyses via "Petroflag Soil Sampling Analysis Kit". Providing a cost saving measure to the client, the onsite soil screening reduced the number of soil samples captured and submitted for laboratory analysis, this expediting the excavation and removal process, reducing multiple mobilizations to the site. **Wells, Nevada Petro Stopping Center,** George provided the supervision of a several thousand-gallon accidental petroleum release into an AST containment area where petroleum overspray and soils contamination were present. George directed the excavation activities, conducting onsite soil sampling and analyses via "Petroflag Soil Sampling Analysis Kit". Providing a cost saving measure to the client, the onsite soil screening reduced the number of soil samples captured and submitted for laboratory analysis, this expediting the excavation and removal process, reducing multiple mobilizations to the site, ultimately obtaining a No Further Action (NFA) determination for the client. Additionally, he performed the shake down of an existing non-operational remediation system, successfully implementing remedies to achieve full remedial operations. Operation Monitoring & Maintenance (OM&M) of the onsite GETS. COC's were

petroleum based hydrocarbons. Remediation technologies utilized during clean up included, T-PLC monitoring systems, GETS, Duel Phase Extraction (DPE) Soil Vapor Extraction (SVE). The remedial process consisted of a 2000-gallon sedimentation capture tank, filtration, two 1000-gallon GAC vessels, two 1000-lb Vapor Granular Active Carbon (VGAC) capture vessels.

Stead Solvent Site, Stead Airport, Stead, NV. 2009 to 2015.

George performed OM&M for two onsite remediation systems within a several mile plume footprint. The remediation systems were installed to mitigate the release of TCE, PCE, and Petroleum contaminated soils and groundwater. The remedial technologies applied were GETS, DPE, SVE, and Phyto Remediation. Phyto Remediation; a series of popular trees with deep root systems were planted along the western perimeter of the contaminant plume, creating a false gradient to the root systems of the trees. The Phyto system also captured and removed dissolved phase contaminants from the groundwater creating a containment curtain. Operations were monitored via T-PLC, SCADA alarmed systems. Contaminated groundwater's were treated via, GETS, Sand Oil Water Separator (SOWS), sequestering agent added via metering pump to reduce mineral fallout, shallow tray air stripping tower, treated water effluent discharged to the sewer system. Vapor abatement via two 2000-lb VGAC vessels.

Al Park Petroleum (APP), Battle Mountain, Crescent Valley, Elko, NV. 2010 to 2015.

George performed OM&M for three of the onsite remediation systems located at Crescent Valley, Battle Mountain, and Elko Nevada. **Battle Mountain, NV;** OM&M of the onsite DPE (10-wells) and Air Sparge (AS) (12-AS wells) remediation system, including T-PLC monitoring. The contaminated groundwater was captured, containerized, then shipped off site for disposal. Vapor abatement via two 2000-lb VGAC vessels. COC's were petroleum based hydrocarbons. **Crescent Valley, NV;** OM&M of the onsite DPE 14-well remediation system, including T-PLC monitoring. The contaminated groundwater was captured, containerized, then shipped off site for disposal. No vapor VOC abatement required as the annual VOC discharge limits were not exceeded. **Elko, NV**; OM&M of the onsite SVE 8-well remediation system, including T-PLC monitoring. No vapor VOC abatement required as the annual VOC discharge limits were not exceeded. COC's were petroleum based hydrocarbons.

TCN Company, Former Dry Cleaning Facility, Tahoe City, CA. 2005 to 2012.

George performed OM&M of the onsite remediation system. The remediation system was installed to clean up the TCE contaminated soil and groundwater. Operations were monitored via T-PLC, alarmed systems, the GETS, and DPE systems were in two different structures due to limited space. Contaminated groundwater's were treated via, GETS, 100-gallon sediment capture vessel, three 55-gallon GAC vessels. Vapor abatement via DPE (8-wells) and two 2000-lb VGAC vessels, AS system (16-AS wells) remediation system.

Berry Hinckley Industries (BHI), various sites, CA and NV. 1994 to 2014.

George performed OM&M of the onsite remediation systems across 22 sites, performing services in conjunction with petroleum product release from historical and current petro chemical storage and delivery systems. The sites were located across Northern and Central Nevada (Reno, Sparks, Stead, Carson City, Fallon, Fernley, Border Town), and Northern California (Truckee, Quincy, Susanville). The remedial technologies utilized at various sites were GETS; incorporating various sized SOWS, filtration, low profile air stripping units, GAC vessels for final polish of treated water, and reinjection for soil rinsing, and plume control. SVE technologies included catalytic, and thermal oxidization units, regenerative, positive displacement blowers, and VGAC vessels. AS systems consisted of rotary vain, scroll, and positive displacement blowers. In-situ chemical oxidation; concentrated & diluted hydrogen peroxide (H2O2) circulation, and direct injection. Enhanced bioremediation; concentrated & diluted nitrate (NO3) circulation, and direct injection. Ozone (O3) remedial systems treatment, and in-situ AS-well direct injection.

Gold Ranch Casino, Verdi, NV. 2004 to 2012.

George performed OM&M of the onsite remediation system from former petro chemical releases of the onsite fuel storage and deliver systems. The remedial technologies utilized onsite were SVE technologies included catalytic, and thermal oxidization units, regenerative, positive displacement blowers, and VGAC vessels from 26 SVE wells. AS-system consisted of rotary vain, and scroll, blowers to 30 AS-wells.

University of Nevada Reno, Reno, Stead, Fallon, Carlin, NV. 1998 to 2014

George performed OM&M for several of the onsite remediation system from former petro chemical releases associated with the fuel delivery systems and from the fire suppression firefighting training activities at their Stead, and Carlin, Nevada facilities. The remedial technologies utilized onsite were SVE, including catalytic, and thermal oxidization units, regenerative, positive displacement blowers, and VGAC vessels from the SVE wells. AS-system consisted of rotary vain, and scroll, blowers to the AS-wells.

Sierra Pacific Power Company Yerington, Elko, NV. 1996 to 2004.

George performed OM&M for two onsite remediation associated with petro chemical releases in Yerington, and Elko Nevada. The remedial technologies utilized during clean up included bioventing and ex-situ enhanced bioremediation incorporating NO3, and soil pile mixing. SVE technologies included catalytic, and thermal oxidization units, regenerative, positive displacement blowers, and VGAC vessels from the 13 SVE-wells.

Squaw Valley Ski Corporation, Squaw Valley, CA. 1996 to 2005.

George supervised the removal of over 30 onsite underground storage tanks (UST's) from the Belmont remote refueling area 10,000 feet above sea level, upper vehicle maintenance facility, Opera House building, and the lower vehicle maintenance facility, oversite for the removal of petroleum impacted soils for offsite treatment and disposal. Installation of three on site remediation systems. OM&M for three onsite remediation systems associated with petro chemical releases at the Belmont remote refueling facility, upper vehicle maintenance facility, and the Opera House building. The remedial technologies incorporated onsite were GETS; incorporating various sized SOWS, filtration, low profile air stripping units, GAC vessels for final polish of treated water. SVE technologies included catalytic, and thermal oxidization units, regenerative, positive displacement blowers, and VGAC vessels. AS systems consisted of rotary vain, scroll, and positive displacement blowers. DPE-VGAC vessels abatement, AS injection system. In-situ chemical oxidation; concentrated & diluted hydrogen peroxide (H2O2) direct injection. Enhanced bioremediation; diluted nitrate (NO3), direct injection.

Hansen Electric Sparks, NV. 1994 to 2001.

George provided supervisor oversite of the onsite remediation system installation, OM&M of the onsite remediation system from former petro chemical releases of the onsite fuel storage and deliver systems. The remedial technologies utilized onsite were GETS; SOWS, filtration, low profile air stripping unit, GAC vessels for final polish of treated water, and reinjection for soil rinsing. SVE technologies included catalytic, and thermal oxidization units, regenerative, positive displacement blowers, and VGAC vessels. AS systems consisted of rotary vain, scroll, and positive displacement blowers.

PDQ Food Store, Sparks, NV. 1994 to 2000.

George provided supervisor oversite of the onsite remediation system installation, OM&M of the onsite remediation system from former petro chemical releases of the onsite fuel storage and deliver systems. The remedial technologies utilized onsite were GETS; SOWS, filtration, low profile air stripping unit, GAC vessels for final polish of treated water, and reinjection for soil rinsing. SVE technologies included catalytic, and thermal oxidization units, regenerative, positive displacement blowers, and VGAC vessels. AS systems consisted of rotary vain, scroll, and positive displacement blowers.