

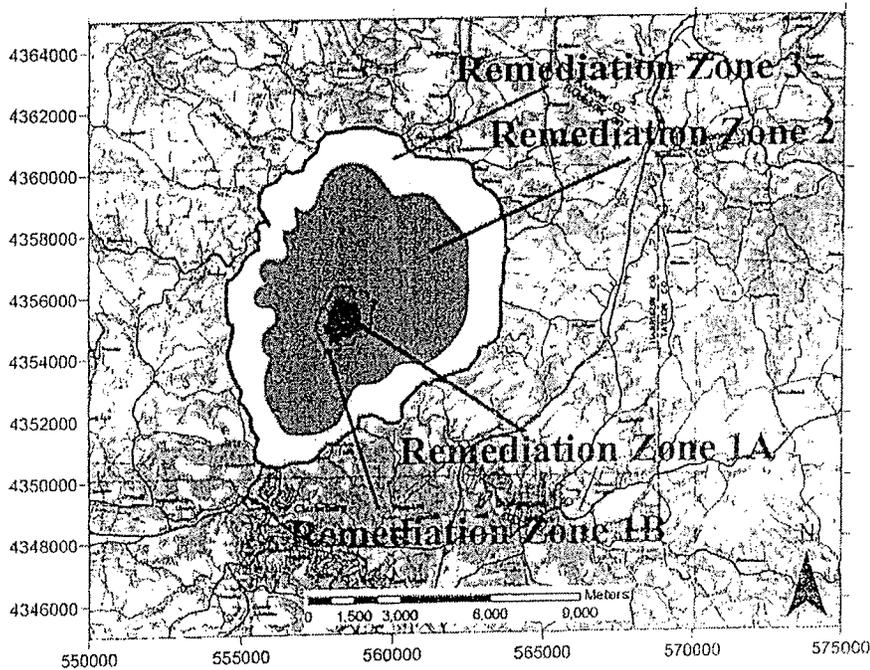
# Perrine DuPont Settlement

## Property Remediation Summary Report

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## ABOUT THE AUTHORS

**Marc Glass, LRS, Principal, Environmental Monitoring and Remediation.** Marc Glass L.R.S., is a principal at Downstream Strategies, LLC where he manages the Environmental Monitoring and Remediation Program. Projects in this program involve re-development and re-use of brownfield sites and field monitoring of surface water, groundwater, soil, and air. Mr. Glass has over fifteen years of experience in environmental consulting and management, including eleven years as a West Virginia Department of Environmental Protection Licensed Remediation Specialist (LRS). Since 2011, he has served as the Court-appointed Remediation Technical Expert for the Perrine-DuPont Settlement Class Area Remediation Program where he provides technical support for soil and interior structure remediation of heavy metals contamination associated with a former zinc smelter sight in West Virginia. He is skilled in the evaluation and remediation of environmental contamination. Mr. Glass' experience includes Phase I and Phase II ESA, petroleum and chlorinated solvent site investigations, design and installation of monitoring well networks, aquifer testing, asbestos and biological remediation and project supervision, preparation of facility spill prevention plans for above ground and underground storage tank facilities, and mold investigation and remediation. Mr. Glass's experience includes management of remediation projects in the West Virginia Voluntary Remediation and Redevelopment Program (VRRP) and Pennsylvania Department of Environmental Protection Land Recycling Program. Mr. Glass has worked extensively within the environmental regulatory programs of Pennsylvania and West Virginia and has served clients throughout the mid-Atlantic region. He provides expert testimony relating to contamination at un-conventional shale gas development sites and other sources of industrial pollution.

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# 1. INTRODUCTION

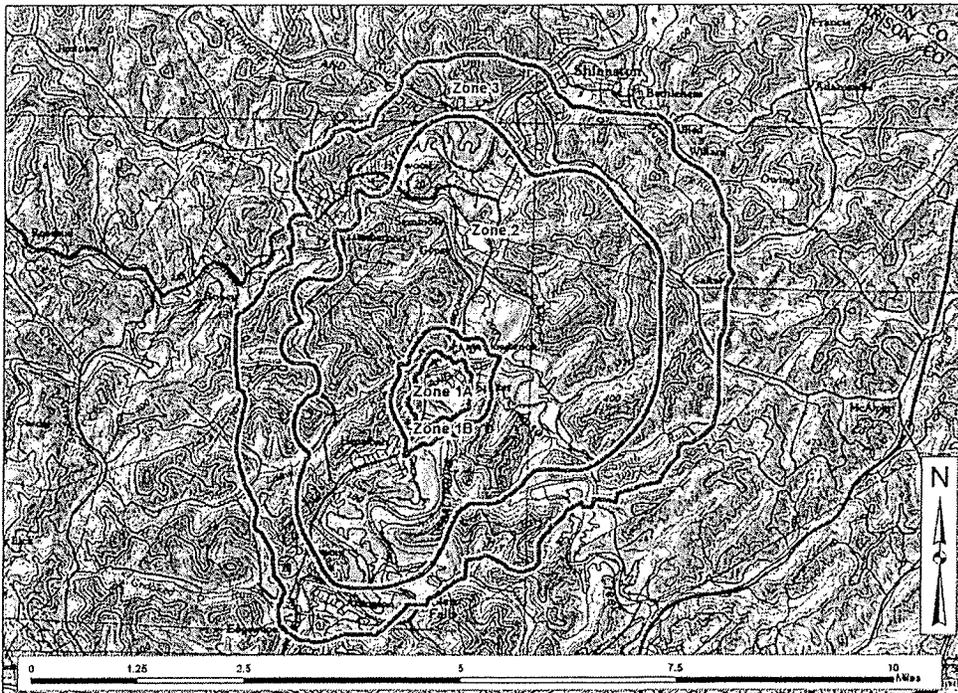
This report presents a summary of remediation activities performed in partial fulfillment of the Final Order Establishing Property Remediation (Clean-up) Program (Final Order) as issued by Thomas A. Bedell, Circuit Judge, Circuit Court of Harrison County on June 27, 2011 in the matter of Lenora Perrine, et al v. E.I DuPont De Nemours and Company, et al (Case No. 04-C-296-2), henceforth referenced as the Perrine DuPont Settlement or "Settlement". Separate Orders issued previously by the Court had established Edgar C. Gentle, III, as the Settlement Claims Administrator and that Marc Glass be retained by the Settlement as the Remediation Technical Advisor.

The Settlement Property Remediation Program was initiated on November 1, 2011. This report provides a general summary of the Settlement Remediation Program and remedial progress through July 28, 2016. Progress statistics referenced in this report were compiled by Settlement staff from the project tracking database maintained by the Claims Administrator.

# 2. BACKGROUND

The final order established that a heavy metals remediation program would be implemented for the Settlement Class area and, recognizing prior testimony of plaintiff expert Dr. Kirk Brown, established that remediation would be performed in a tiered approach based on previous delineated Class Areas (as Zones 1A, 1B, 2, and 3, respectively). The Settlement Class Area is defined as any property (tax parcel) that lies within, or is intersected by the respective remediation zone boundaries show in red below on Error! Reference source not found..

Figure 1: Settlement Class Area Remediation Zones, Harrison County, West Virginia

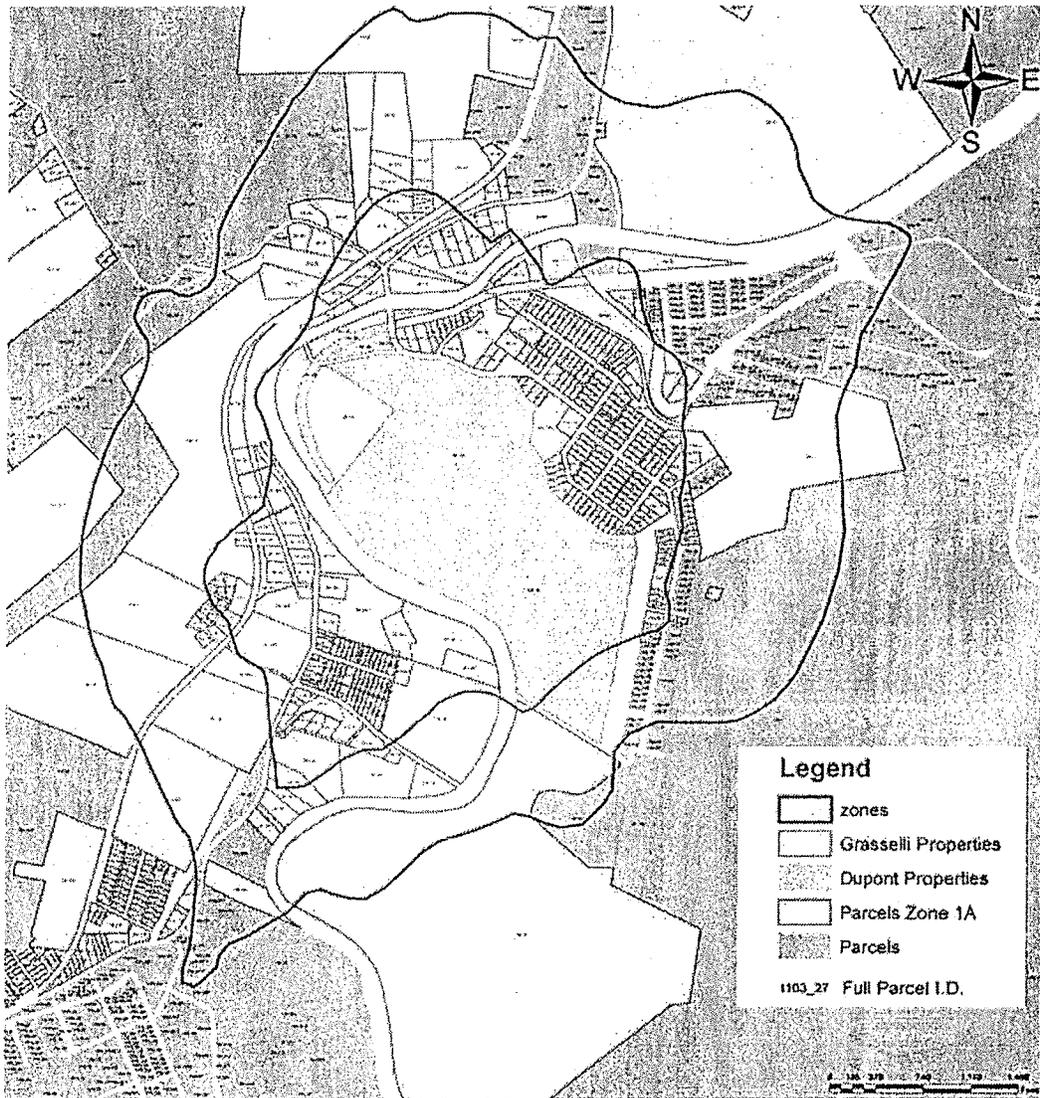


Remediation Zones

Sources: Plaintiff GIS database, Case No. 04-C-296-2., Brown, 2007, Figure 4,

Exceptions and additions to the Class area include exclusion of DuPont-owned properties, and the “Grasselli Properties” based on resolution of a prior legal proceeding with DuPont as Defendants and Grasselli et al, as Plaintiffs, as shown on [Error! Reference source not found.](#) . Additions include a court-approved modification of Zone 1A to be expanded to include several Claimant properties situated along the south and east sides of B Street in Spelter. Referenced as the Zone 1A Bubble Properties, these properties were ordered to be evaluated and, if necessary, remediated in the same manner as Zone 1A Properties.

Figure 2: Remediation Zone 1A eligible Claimant properties and exclusions



Source: Harrison County Tax Parcel Shape Files, Perrine DuPont Settlement Class Area Database, Adapted by MG from MG/DF Version 7/21/11.

Zone 1A properties were to be remediated by soil removal and replacement, as well as intensive interior remediation for all inhabited structures to recover settled and accumulated particulates containing elevated concentrations of heavy metals. All other Zones (1B, 2, and 3) were to receive tiered levels of interior remediation, based on radial distance from the former smelter site, with no soil remediation.

The final order further acknowledged that the remediation approach proposed by Dr. Brown would require a minimum of \$57 million to implement and that only \$34 million in funding would be available to the Settlement to implement the program. Therefore, a prudent, deliberate, and frugal cleanup program was necessitated to make best use of limited funds to achieve the greatest cleanup reasonably achievable.

To implement the remedial approach, separate contractors were retained by the Settlement through a competitive bidding process to perform sampling and remediation services independently.

### 3. SOIL CLEANUP PROGRAM

Properties located within remediation Zone 1A were considered by the Plaintiff expert, Dr. Kirk Brown, to require both exterior soil remediation and interior structural remediation to sufficiently decrease lifetime exposure risk to heavy metals throughout all Settlement Class areas. Due to a number of factors, the most significant being that Settlement funding was insufficient to fully implement the remediation strategy proposed by Dr. Brown, the Claims Administrator and Remediation Technical Advisor developed a delineation strategy to evaluate each Claimant property within Zone 1A individually.

#### 3.1 Pre-remediation soil testing

Prior to remediation, all participating Claimant properties located within Remediation Zone 1A were initially sampled by an independent, third-part soil testing consultant retained by the Settlement, Core Environmental Service, Inc.(CORE) to evaluate if soil remediation was warranted to meet cleanup goals. This approach was implemented to ensure efficient use of limited remediation funds and that only contaminated properties would be remediated. Pre-remediation sampling began during Fall of 2011 and with few exceptions, was largely completed and reported to the Settlement during January 2012.

Property sampling was performed according to a protocol developed by the Settlement. In general, a minimum of two composite samples were collected to evaluate each property consisting of ½-acre or less, while a greater number of composite samples were collected for larger properties according to the protocol developed by the Settlement and the remediation technical advisor.

Each soil sample was collected as a thoroughly mixed composite of five sub-samples from the area being represented and submitted to a West Virginia Department of Environmental Protection-certified analytical laboratory for analysis of total arsenic, cadmium, lead, and zinc by EPA Method 6020. Results were reported to the Settlement for evaluation against the criteria presented below in Table 1

Table 1: Settlement Criteria for heavy metals in soil

Analyte	Settlement Soil screening criteria (mg/kg)*
Arsenic	12.5
Cadmium	39
Lead	400
Zinc	23,000

Notes: mg/kg equals milligrams per kilogram or parts per million (ppm).

If any sample from a Claimant property exceeded any of the Settlement criteria, soil remediation was performed for the entire claimant property according to the Settlement Soil Remediation Protocol. If a Claimant property was document to already be in attainment of Settlement criteria, then a Certificate of Completion was issued to the Claimant.

### **3.2 Overview of Soil Cleanup Program methodology**

Active soil remediation began during Spring 2012. Soil cleanup was performed by excavation and off-site disposal of the upper six inches of soil and sod material within the Claimant property boundary. Small exceptions included limited protective buffer zones adjacent to structures, stationary personal property, or to protect vegetation root zones. After excavation to the desired depth was completed, replacement soils were imported and the topographic elevation was restored as near as possible to pre-remediation conditions. Sod was then imported from an off-site location and maintained until sufficiently established. After the soil and sod replacement, remediated properties were re-tested to confirm attainment of Settlement criteria, as described in the following sub-section. If criteria were not met, remediation and testing was repeated until attainment was demonstrated. Owners of remediated properties received a Certificate of Completion to document that remediation had been completed and to provide Claimants with a record of the post-remediation testing results.

#### **3.2.1 Replacement soil testing**

To determine if replacement fill soils, or any amendments necessary to meet Settlement criteria, were suitable for use in the Settlement remediation program, representative sampling and laboratory analysis was performed prior to use. To demonstrate that the candidate replacement source soil was free of contamination, representative samples were obtained and analyzed for the total heavy metals criteria presented above in Table 1, plus Mercury by Method SW7471B, volatile organic compounds by EPA Method 8260B, Semi-volatile organic compounds by EPA Method 8270D, PCBs by Method SW8082/3550B, and Pesticides by Method SW8081/3550. Only soils or amendment materials, such as sand to adjust soil texture, that met the Settlement criteria for the heavy metals presented in Table 1 and demonstrated non-detectable concentrations or otherwise were in compliance with applicable regulatory health-based concentrations for clean fill designations for the other criteria were used in the Settlement Soil Remediation Program.

### **3.3 Post-remediation soil testing**

After sod and soil replacement were completed, Claimant properties were re-sampled to confirm attainment of the aforementioned Settlement Criteria for the heavy metals arsenic, cadmium, lead, and zinc (Table 1). Soils were also tested in place for texture, pH, and organic matter content. Acceptable soils were required to be classified as loam, silt loam, or sandy loam according to the USDA NRCS soil texture classification system, pH must range between 6.0 to 7.0, and organic matter content must be greater than or equal to 5%. Replacement soils that did not meet these criteria were either amended in place and re-tested, or replaced until criteria were met.

### **3.4 Soil Cleanup Program Results Summary**

Initially, a total of 218 eligible Claimant properties were identified in Remediation Zone 1A and were tested to determine if soil remediation was required. Of these, 166 (76%) were determined to require remediation and 52 (24%) were confirmed to already meet Settlement criteria and did not require remediation.

Of the 166 properties requiring remediation, one property was inaccessible to remediation equipment and soil excavation could not be performed. Two additional Claimants opted out of voluntary participation in the Settlement remediation program, or were determined to be administratively or legally ineligible. Therefore, a total of three Zone 1A properties (1%) that were tested and found to exceed Settlement criteria were not remediated. However, all of the remaining 166 (99%) Claimant properties that originally exceeded Settlement criteria were successfully remediated and the Claimants received Certificates of Completion. This indicates voluntary participation and successful cleanup for 99% of the originally contaminated properties in Remediation Zone 1A.

### 3.4.1 Contaminated soil volume removed

Based on the initial pre-remediation soil testing results and calculations of the typical lot size (0.33-acres) to be remediated, an estimated soil volume of 268.6 cubic yards or 40,300 tons of contaminated soil was anticipated for removal. This estimate was referenced in contractor bid documents. However, the actual soil volume removed was approximated at 45,000 tons based on Settlement records. All excavated soils and associated construction debris were transported to Meadowfill Landfill in Harrison County, West Virginia for disposal.

## 4. INHABITABLE STRUCTURE INTERIOR REMEDIATION PROGRAM

In the same manner that soils for eligible Claimant properties in Zone 1A were tested to determine if soil remediation was warranted, the interior of eligible Claimant inhabitable structures (houses, mobile homes) for all remediation zones (Zone 1A, 1B, 2, and 3) were also tested to determine if interior remediation was warranted. As with the Soil Remediation Program, participation for eligible Class members was voluntary.

Relocation and pet agreements

### 4.1 Pre-remediation inhabitable structure testing

In the same manner that soils for eligible Claimant properties in Zone 1A were tested to determine if soil remediation was warranted, the interior of eligible Claimant inhabitable structures (houses, mobile homes) for all remediation zones (Zone 1A, 1B, 2, and 3) were also tested to determine if interior remediation was warranted. As with the Soil Remediation Program, participation for eligible Class members was voluntary.

Testing of the interior of habitable structures was performed for attics and interior functional living spaces by independent, third-party consultants retained by the Settlement under a competitive bidding process. To achieve representative results in a timely manner, a wipe sampling protocol was developed to evaluate interior settled and accumulated dust from interior locations not typically subject to routine household cleaning. Dust samples were submitted to a West Virginia Department of Environmental Protection-certified analytical laboratory for digestion and analysis of total arsenic, cadmium, lead, and zinc concentrations by EPA Method 6020. Results were reported in micrograms per square foot ( $\mu\text{g}/\text{ft}^2$ ) for comparison to the Settlement Criteria for interior dust as presented below in Table 2.

Table 2: Settlement Criteria for interior dust sampling

Analyte	Settlement interior Dust criteria ( $\mu\text{g}/\text{ft}^2$ )
Arsenic	35.95
Cadmium	144.65
Lead	40
Zinc	43,695

As with the pre-remediation soil testing protocol, a conservative approach was used and if any sample from the interior of the habitable structure failed to meet Settlement Criteria, an interior remediation was performed. For eligible Claimant properties that were evaluated and found to already be in attainment of Settlement Criteria, a Certification of Completion and documentation of the sampling results was provided to the Claimant.

## **4.2 Overview of Interior Structure Remediation Program methodology**

The Interior Remediation Program began shortly after the Soil Remediation Program was underway during the spring of 2012. The Interior Remediation Protocol developed by the Settlement Claims Administrator and Remediation Technical Advisor was in general accordance with the original recommendations of Dr. Brown.

Prior to remediation, Settlement staff and the remediation contractor coordinated with Claimants to make temporary lodging accommodations for occupants and household pets at the Settlement expense. Interior remediation typically required between five and seven days, although longer durations occurred if initial confirmatory post-remediation sampling results, discussed in the following sub-section, did not demonstrate attainment of Settlement criteria. The cleaning protocol was repeated as necessary until all samples demonstrated attainment of Settlement criteria and normal occupancy could be resumed.

For all Remediation Zones, interior cleanup consisted of removal and replacement of attic insulation materials that tended to serve as a long-term reservoir for dust and to provide access for cleaning and sealing of the construction materials beneath insulation. After removal, cleaning, sealing (encapsulating), and collecting confirmatory testing samples, rolled fiberglass or blown-in insulation was restored to a minimum of R-19 value or consistent with pre-remediation conditions, whichever was greater. After the attic was remediated, interior functional living spaces were also thoroughly cleaned by high-efficiency particulate air (HEPA) vacuuming, followed by damp detergent wiping and an additional HEPA vacuuming for all accessible interior surfaces, furniture, finishings, and personal property. Special attention was paid to thoroughly recover dust from ceilings, walls, floors, baseboards, stairs and railings, light fixture and ceiling fans, HVAC vents, doors and windows, electrical outlets, sinks, stoves, and appliances. After cleanup of functional living spaces, the HVAC duct system and furnaces were cleaned or, if flexible duct work was present, replaced. Remediation Zone 1A, carpets were replaced and in all other Zones, carpets were thoroughly cleaned.

## **4.3 Post-remediation interior testing**

Post-remediation verification sampling and analysis was required prior to restoring structures to normal occupancy. The same dust-wipe protocol and criteria were used for post-remediation sampling and demonstration that Settlement Cleanup Criteria were met before allowing occupants back into the structure. Once compliance with Settlement Cleanup Criteria was demonstrated and the Claimants completed inspection and a sign-off form indicating their approval, a Certificate of Completion and documentation of the post-remediation sampling results was provided to the Claimant.

## **4.4 Interior Cleanup Program Results Summary**

Interior cleanup was performed for all eligible Claimant properties that testing indicated remediation to be necessary, with exceptions for Claimants that were later found to be administratively or legally ineligible, or that voluntarily declined to participate in the cleanup program. The net result is that for all Remediation Zones, interior remediation was successfully completed for a total of 583 Claimant properties.

## **5. VALUE ADDED TO THE COMMUNITY**

The greatest benefit of the Settlement Property Remediation program, and indeed it's primary objective, was to achieve a reduction in potential health risks from increased exposure to heavy metals throughout the Class Area by contaminant source removal. By substantially reducing the mass of heavy metals from within the Class Area, particularly from the close living environment of residents, this benefit is realized and health risk from exposure to heavy metals is reduced. It is noted that this benefit is realized not only by participating Claimants, but for the entire Class Area and beyond, and for future generations.

To document this achievement, the Settlement issued Certificates of Completion for all properties that were assessed and found to be in attainment, or successfully remediated. The Certificate of Completion provides permanent documentation for Claimants and should provide improved confidence for any Claimants formerly concerned about potential health implications of increased exposure to heavy metals from their living environment. Confidence should also be improved for prospective purchasers during future real estate transactions and help to dispel any adverse public perceptions generated by the legal proceedings or knowledge of area history. It is reasonably presumed that the effects of the Remediation Program should act favorably on the local real estate market over the long-term.

### 5.1 Community road improvement program

With approval of the Court, the Settlement Claims Administrator maintained a budget for local road improvements to mitigate impacts from the operation of heavy equipment during the Soil Remediation Program. As a result, the Settlement will coordinate repaving all roads in the towns of Spelter and Erie (Remediation Zone 1A) at an estimated cost of \$243,348.70. A list of roads to be resurfaced is provided in Table 3.

Table 3: Settlement road re-surfacing projects for Zone 1A

Town of Spelter	Town of Erie
1st St - CR 19/90	Maple Ave - CR 19/32
2nd St - CR 19/91	Rose/Poplar St - CR 19/34
3rd St - CR 119/10	River Rd - 19/34
4th St - CR 119/9	
5th St - CR 119/10	
6th St - CR 24/12	
A St - CR 119/11	
B St - CR 19/33	

Additional infrastructure improvements, estimated at a value between \$200,000-\$250,000, will include installation of new drains, drop inlets, and repair of existing drains; cleaning of existing ditch lines; paving or re-surfacing of several alley-ways; and sidewalk repairs. These improvements will significantly enhance the accessibility and enjoyment of the community.

### 5.2 Distribution of Remediation Fund Surplus

After completion of remaining repairs to Claimant properties, approved road repairs, and other community infrastructure improvements the Claims Administrator estimates a surplus in the Qualified Settlement Remediation Fund of \$4 million. The funds will be distributed to Claimants equitably according to a July 13, 2016 Order issued by Judge Bedell.

## 6. SUMMARY AND CONCLUSIONS

The Settlement Property Remediation Program is near completion with successful cleanup of soil from 163 Claimant properties and the interior of 583 habitable structures throughout the Settlement Class Area. In total, 1,227 Property Remediation claims (soil and structures combined) were filed with the Claims Administrator. Of these, approximately 992 properties were included by the voluntary participation of their Claimant owners, and 235 declined to participate in remediation. It is anticipated that remaining repairs to Claimant properties, approved road repairs, and other community infrastructure improvements will be completed by late 2016 or early 2017.

The removal of environmental media and personal property contaminated with heavy metals will substantially reduce potential health risk that would have otherwise remained a persistent component of the Spelter community and larger Class Area. In large part due to the frugal management of limited funds available for remediation by the Claims Administrator, and as requested by Judge Bedell in the June 2011, Final Order Establishing Property Remediation Program, additional community enhancements will be implemented and a surplus in the Property Remediation Qualified Settlement Fund of approximately \$4 million will be equitably distributed to Claimants.