KLEINFELDER
An employee owned company

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Ms. Delight Saxton
Vice President
McGrath RentCorp
2500 Grant Avenue
San Lorenzo, California 94580

SUBJECT: **Final - Environmental Assessment Report**
McGrath RentCorp
2500 Grant Avenue
San Lorenzo, California

Dear Ms. Saxton:

1.0 INTRODUCTION

Kleinfelder, Inc. (Kleinfelder) is pleased to submit this screening environmental assessment report for McGrath RentCorp (McGrath), which is located at 2500 Grant Avenue in the City of San Lorenzo, Alameda County, California. The assessment was prepared as a facet of the Final Report - Site Investigation and Remediation, dated July 3, 1996, prepared by Kleinfelder ("Report").

1.1 Environmental Setting

McGrath is located within a light industrial area within The City of San Lorenzo, Alameda County, California. The site is located approximately 2500 feet east of San Francisco Bay. The McGrath facility operation includes painting, construction, and restoration of modular mobile offices. The site is for the most part paved and surrounded by industry on the north and east and vacant fields on the south and west.

Storm drains transect the site. These drains empty into an outlet on the southern boundary of the property which connects to a man-made drainage ditch just southwest of the property boundary. The man-made drainage ditch is approximately 150 feet long along the southwest boundary of the property trending east to west. The ditch is less than four feet across at the top and less than three feet wide at the base of the ditch. The drainage ditch is approximately two to three feet deep.

The sidewalls of the ditch were densely covered with non-native grasses and patches of fennel. Several dense patches of cattail occurred within the bottom of the drainage ditch. This man-made habitat appeared to be a limited resource for waterfowl, shorebirds and small mammals.

The man-made ditch may discharge into a small isolated structurally impacted wetland area during heavy rain events. The vegetative patterns of the wetland patch appear to have been historically impacted by past construction practices including railroad tracks southwest and adjacent to the drainage ditch, power line construction, and historical fill and disposal practices.

2.0 ENVIRONMENTAL SITE INVESTIGATION

An Environmental Site Investigation, completed in December, 1995 by others on the McGrath site, indicated several areas of potential environmental concern, including: facility drum storage, paint storage areas and stormwater drains. As a facet of that investigation, Kleinfelder conducted soil sampling and stormwater drain sampling in the areas of concern.

Soil, sludge and surface water samples were analyzed for metals, semivolatile organic compounds, Total Petroleum Hydrocarbons-motor oil (TPH-mo) and TPH-diesel (TPH-d). Analyses indicated elevated concentrations of zinc within the soil, sludge and water samples. The reported highest concentration of zinc, 2,900 milligrams per kilogram (mg/kg), was found in the sludge samples within the storm drains and near the outlet south of the site (*Kleinfelder Site Investigation Report, 1996*).

Further sampling was subsequently conducted south of the subject site on Oro Loma Sanitary District property, within the man-made drainage ditch, to assess both the nature and extent of the zinc contamination. Analytical results indicated zinc concentrations ranging from 69 to 2,900 mg/kg as shown in Table 4 of our Report. The concentration of zinc ranged from highs of 2,800 mg/kg zinc, 10 feet west of the storm drain outfall, then decreased to a concentration of 130 mg/kg at 150 feet west of the storm drain outlet.

2.1 Site Remediation

As a result of our investigation, the on-site storm drains were hydraulically cleaned, and sludge and rinse water collected for off-site disposal. With the cessation of on-site painting operations, the cleaning of the drains has removed the source of the zinc contamination.

The man-made drainage ditch which parallels the southwestern boundary of the site was subsequently excavated from the storm drain outlet to 120 feet west of the outlet. Soil and plant material were removed to a level of approximately one to two feet below the surface. After the man-made drainage ditch was excavated, only remnants of the vegetative cover remained on the upper sidewalls of the ditch. The removal was performed to reduce the potential impact of zinc to the surrounding biological resources.

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Subsequent confirmatory post-excavation zinc analyses were conducted within the sidewalls and bottom of the drainage ditch. Samples were collected at no more than 30 foot intervals along the trench. The results of these analyses indicated an average concentration of 103 mg/kg of zinc within the bottom and sidewalls of the ditch. No other contaminants were indicated to represent a threat to human health or the environment. An account of these surveys, the excavation, and sampling procedures appears within the Report.

3.0 ENVIRONMENTAL ASSESSMENT

This environmental assessment was performed to assess the potential impact of elevated concentrations of zinc within the soil and sediment to the area's biological resources within the man-made drainage ditch and adjacent wetland areas west of the study area. The results of that assessment follow.

3.1 Zinc

Zinc is a naturally occurring element that is found in the earth's crust, rocks, minerals and within carbonate sediments. The industrial uses of zinc include: electroplating, ore processing, and as a component of paints, rubber, bronze and brass. The most significant release of zinc to water has been reported to occur as the result of erosion. Zinc may also enter waterbodies such as estuaries from both natural and man-made sources.

3.1.1 Chemical and Physical Properties

The mobility of zinc within the soil and sediment media is indicated to be dependent upon zinc speciation, soil and/or sediment pH, and iron, manganese and complexing ligands concentrations present within sediment and/or soil.

Zinc is reported to be soluble in species such as zinc sulfate. However, most land disposed zinc occurs as an insoluble species such as elemental zinc. The mobility of these insoluble species is therefore limited.

Studies by Saeed and Fox (1977) have indicated that soils with a pH of <7 exhibit a linear relationship between pH and the amount of zinc in solution. The linear relation has been reported to be impacted by soils rich in organic content and chelating agents. The concentration of zinc in solution generally increases when soils have a pH>7 and high concentration of organic matter (Saeed, 1977). The increased solubility is reported to occur as the result of (1) release of "organically complexed zinc" attributed to reduced zinc adsorption at an elevated pH (2) and/or an increase of concentrations of chelating agents in the soil (Saeed, 1977).

3.1.2 Uptake and Transport

Zinc is an essential nutrient that is found in all living organisms. Zinc is readily bioaccumulated by all biota, but is not indicated to bioconcentrate within the food chain. Studies have indicated that

the uptake of zinc decreases with increasing trophic levels. Bioconcentration of zinc is reported to be greater within the herbivore subject and lesser within the piscivore subjects such as the green-backed heron (Niethammer, K.R. et al, 1985).
While an essential element to plants, zinc concentrations have been reported to be somewhat localized, slightly retained within the root of plants at an estimated root: shoot ratio of 3 to 6 in some plants (Fitter, A.H. et al, 1981). The resultant concentration (uptake) of zinc within plants is indicated to be dependent upon the plant species, soil pH, and soil composition.

4.0 ANALYSES

As a facet of the remedial investigation and the environmental assessment, analyses were conducted on the soil samples collected within the drainage ditch prior to the excavation of the man-made ditch. Analyses were selected to focus on zinc's potential mobility and bioavailability. Analyses included: pH of the soil, zinc speciation, zinc distribution and particle size. These data were used to focus the proposed site remedial actions and to assess zinc's potential for environmental impact to off-site and site biological resources.

4.1 Zinc Solubility Study

A SPLP (unbuffered deionized water pH 5.0) extraction study was conducted to assess zinc solubility within the soil medium. The results of that assessment (Sample KB-W300 5/28/96: TTLC Extraction - Zinc concentration 750 mg/kg) indicated a zinc concentration of 87 micrograms per liter (ug/L) (Hamilton, 1996).

4.2 Low Power Microscopic Examination

A qualitative microscopic examination was conducted of two pre-excavation zinc rich samples. Sample CB-1 (2,700 mg/kg zinc) located within the storm drain outlet contained solid strips of paint. A similar zinc rich sample (KB-W30) located 30 feet west of the storm drain outlet within the man-made ditch contained 2,200 mg/kg zinc, with abundant plant material intermixed with sediment (Hamilton, 1996). A description of the methodology appears within our Report.

4.3 Zinc Speciation

A qualitative zinc speciation assessment was performed by McCampbell Analytical, Inc. (McCampbell) using a deionized water extraction technique (pH adjustment to 4.0). The results of these analyses indicated that zinc appears to be present unchanged (ZnO) within the sediment or incorporated interstitially within the plant material (Hamilton, 1996).

4.4 Zinc Distribution

Sample (KB-W30 TTLC extraction) was separated under a low power microscope. Results of that examination performed by McCampbell indicated that 74 percent (%) of the zinc remained in sediment, and 26% of the zinc resided in the plant material.

4.5 Soil pH

Soil pHs were conducted within the drainage ditch. Ten soil samples from the man-made drainage ditch were analyzed from 30 to 300 feet west of the outlet. The results indicate a pH range of 6.6 to 7.1 for the soil.

4.6 Summary

Assessment of the man-made drainage ditch soil analytical data suggests available zinc is for the most part elemental zinc, in some instances coating materials particles (solid) which are not indicated to be either remarkably soluble or mobile in the environment of the drainage ditch and the adjacent wetland environment.

The pH of the soil samples collected within the drainage ditch ranged between 6.6 and 7.1, a pH at which elemental zinc is not readily soluble (Dean, J.A. ed., 1992). The solubility study performed by McCampbell indicated the limited solubility of the site's zinc. The reported available zinc was 87 micrograms per liter (ug/L) in pre-excavation samples, a concentration that is comparable to California *Enclosed Bays and Estuaries Plan Water Quality Objectives for Inorganics* of 95 ug/L for one hour.

Zinc appears to be retained in the sediment, with 74% distributed in the soil and 26% translocated to plant material. These values appear to indicate that the mobility and potential bioavailabilty of the zinc is limited.

5.0 TOXICITY

Table 1 summarizes the available literature on the toxicity of zinc to species that have the potential to be impacted by zinc in surface water, soil, and sediment media. The NOAELs (No Observable Adverse Effect Levels) which are protective of wildlife, appear to be comparable in qualitative terms to the reported residual post-excavation zinc soil concentrations of 103 mg/kg (average) values within the drainage ditch soil. The LOAELs (Lowest Observable Adverse Effect Levels) are greater than 103 mg/kg. The post-excavation residual zinc within the drainage ditch soil therefore does not appear to represent a risk to the biological resources on and near the site.

Table 1 Summary Of Biological Effect Data

Species	Substance	Exposure	Route	Effect	Reference
Terrestrial Effects					
Rat	Zn Nitrate	once	oral	LD50 293 mg/kg	Domingo, 1988 (a)
Rat	Zn Chloride	once	oral	LD50 528 mg/kg	Domingo, 1988 (a)
Mouse	Zn Nitrate	once	oral	LD50 204 mg/kg	Domingo, 1988 (a)
Mouse	Zn Chloride	once	oral	LD50 605 mg/kg	Domingo, 1988 (a)
Rat	ZnC03	5 weeks	Feeding	LOAEL (Blood) 500 mg/kg	Smith, 1946
Mouse	ZnS04	13 weeks	Feeding	NOAEL (Sys) 104 mg/kg	Maita, 1981
Rat	Zn0	36 days	Feeding	NOAEL (Repo) 100 mg/kg	Schlicker, 1968
Aquatic Effects					
Saltwater Fish	Zn	--------	Sediments	LC50s (Range) 192 ppm or greater	USEPA, 1986
Marine mysids	Zn	---------	Sediments	Chronic effects 120 ppm	USEPA, 1986
Dapnia magna	Zn	---------	Water	Threshold toxicity value 46.7 ug/L	USEPA, 1986

Elemental zinc is slightly mobile and therefore not readily bioavailable to the predominantly herbivore receptors (birds and small mammals) who utilize the drainage ditch. This assumption is supported by the qualitative assessment performed by McCampbell indicating that approximately 26% of the reported zinc concentration resided in plant material. Assuming that the aforementioned sampling ratio is constant, the potential zinc exposure would be less than 30 mg/kg. Assuming a one-to-one uptake which is highly unlikely in a real-world scenario, the reported exposure would be almost 400 fold less than the reported NOAEL value for rodents. These conservative assumptions indicate that the residual post-excavation zinc soil concentrations of 103 mg/kg do not represent an impact to the terrestrial biological resources utilizing the study area.

The solubility study performed by McCampbell indicated a zinc concentration of 87 ug/L, a concentration somewhat elevated above the toxicity threshold value of 46.7 ug/L for the *Dapnia magna* within an aqueous medium. The probability of this exposure, however, appears to be limited and infrequent, occurring only during severe rain events.

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6.0 CONCLUSIONS

Elevated concentrations of zinc were found within sludge, soil, and surface water on site. Elevated zinc concentrations ranged from 470 mg/kg to 2,900 mg/kg within soil and sludge. As a result of our preliminary findings, Kleinfelder conducted further sampling and analyses to assess the nature and the extent of the zinc concentration within the man-made drainage ditch and adjacent wetland areas.

As a result of our initial findings, site storm drains were hydraulically cleaned, and soils and sludge collected and disposed of off-site. The man-made ditch was also subsequently excavated from the storm drain outlet to 120 feet west of the outlet. Soil and vegetative matter were removed from the bottom and sidewalls of the ditch.

The man-made ditch habitat appeared to be a limited resource for waterfowl, shorebirds and small mammals. The ditch may, however, discharge into a small isolated, structurally impacted wetland area during heavy rain events. Therefore the excavation appeared to be appropriate and protective of wildlife resources within this impacted wetland area.

Post-excavation soil analyses conducted to assess both the nature and the extent of the residual zinc concentrations within the ditch indicated an average zinc concentration of 103 mg/kg. These residual concentrations do not appear to represent a potential impact to the biological resources as indicated by the toxicity data and appear comparable to the NOAEL toxicity values for zinc that are believed to be protective of wildlife.

The cleaning of the storm drains on-site and the excavation of the soil within the man-made drainage ditch appears to have eliminated the potential impact of zinc to the environment on-site and to the off-site wetland resources. Kleinfelder, therefore, feels no further investigations or studies are warranted.

LIMITATIONS

This report was prepared in general accordance with the accepted standard of practice which exists in Northern California at the time the investigation was performed. It should be recognized that definition and evaluation of environmental conditions is a difficult and inexact art. Judgments leading to conclusions and recommendations are generally made with an incomplete knowledge of the conditions present. More extensive studies, including additional environmental investigations, can tend to reduce the inherent uncertainties associated with such studies. If the Client wishes to reduce the uncertainty beyond the level associated with this study, Kleinfelder should be notified for additional consultation.

Our firm has prepared this report for the Clients exclusive use for this particular project and in accordance with generally accepted engineering practices within the area at the time of our investigation. No other representations, expressed or implied, and no warranty or guarantee is included or intended.

This report may be used only by the client and only for the purposes stated, within a reasonable time from its issuance. Any party other than the client who wishes to use this report shall notify Kleinfelder of such intended use. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party.

If you have any questions, please call the undersigned at (510) 484-1700.

Sincerely,

KLEINFELDER, INC.

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ADG:RB:ks

cc: Mr. Mark Johnson - Regional Quality Water Control Board
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Mr. Mike Cortez - Oro Loma Sanitary District
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