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HUNTERS POINT
SSIC NO. 5090.3

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Ser 1811RP/00297

06 APR 1990

Mr. Howard Hatayama
Department of Health Services
State of California
Toxic Substances Control Division
Region 2
700 Heinz Avenue, Bldg. F, Suite 200
Berkeley, CA 94710

Dear Mr. Hatayama:

In accordance with the Remedial Action Order (Docket No. HSA87/88-134RA) for Naval Station, Treasure Island, Hunters Point Annex, the following report is provided as enclosure (1):

Summary of March 2, 1990 Sandblast Grit Fixation Meeting

Should you have any questions regarding this matter, the point of contact is Commander, Western Division, Naval Facilities Engineering Command (Attn: Louise T. Lew, Code 1811, (415) 877-7502).

Sincerely,

original signed by:

L. A. MICHLIN
Commander, CEC, USN
Director, Office of Environmental Management

Encl:
(1) Summary of March 2, 1990 Sandblast Grit Fixation Meeting

Copy to:
Department of Health Services, Technical Support Unit (Attn: William Owen)
Regional Water Quality Control Board (Attn: Steve Ritchie)
Bay Area Air Quality Management District (Attn: Scott Lutz)
U.S. Environmental Protection Agency (Attn: Jerry Clifford)
California Dept. of Fish & Game (Attn: Mike Rugg)
U.S. Fish & Wildlife Service (Attn: Steve Schwarzback)
National Oceanic & Atmospheric Administration (Attn: Chip Demarest)
Hunters Point Technical Review Committee Public Member (Attn: Rev. Arelious Walker)
City and County of San Francisco (Attn: David Wells)
San Francisco District Attorney (Attn: Steve Castleman)
Blind copy to: (w/o encl) 09C9, 202, 09A2A.20, 18A2PW, 181, 1811, 1811RP, 1811JC
Harding Lawson Associates (Attn: Mary Lucas)
(w/ encl) Admin. Record COMNAVBASE S.F., PWC S.F. BAY (Code 420)
COMNAVSEASYSCOM (Attn: Robert Milner), OIC Treasure Island, HPA
NAVSTA Treasure Island FILE: HP/DOHS

TRIP REPORT 8 March 1990

DATE OF TRAVEL: 2 March 1990

TRAVELERS: JEFFERY C. HEATH, P. E., NAVAL CIVIL ENGINEERING LABORATORY

PURPOSE OF VISIT: MEET WITH REGULATORY AGENCIES TO IDENTIFY AND DISCUSS REQUIREMENTS TO TREAT WASTE SAND BLAST GRIT AT HUNTERS POINT ANNEX, NAVAL STATION TREASURE ISLAND, CA

PERSONS PRESENT AT MEETING:

WESTERN DIVISION, NAVAL FACILITIES ENGINEERING COMMAND (WESTDIV) San Bruno:
Richard Powell, Code 1811

HUNTERS POINT ANNEX, NAVAL STATION TREASURE ISLAND, San Francisco, CA:
Kam Tung

STATE DEPARTMENT OF HEALTH SERVICES, Emeryville, CA:
Mark Malinowski, Emeryville, CA office
Ken Smarkel, Alternative Technology Division, Sacramento, CA

US ENVIRONMENTAL PROTECTION AGENCY, REGION IX, San Francisco, CA:
Chuck Flippo

MINUTES OF THE MEETING

1. On March 2, 1990, representatives of the Navy, Environmental Protection Agency (EPA), and the California State Department of Health Services (DOHS) met to discuss the status of the Waste Sandblast Grit Treatment Project at Naval Station Treasure Island, Hunters Point Annex (HPA) and to identify and discuss requirements to initiate treatment of the grit. A list of attendees is included as attachment (1) and the agenda of the meeting is included as attachment (2). The Naval Civil Engineering Laboratory (NCEL) has been tasked by Western Division, Naval Facilities Engineering Command (WESTDIV) to treat the approx. 3000 cubic yards of grit which is a hazardous waste in California due to excessive levels of leachable copper and lead. The waste grit was abandoned on-site by a former lessee of HPA. HPA is on the National Priorities List for cleanup under SUPERFUND. NCEL has contracted with Battelle to treat the waste and to evaluate the effectiveness of the treatment process.

To date, benchscale testing showed sulfide treatment to be effective and work plans were developed to perform on-site treatment. On-site treatment was initiated in December, 1989, but discontinued after about 600 cubic yards was treated. Attachment (3), a status report by Battelle, discusses the status of the project and proposes changes to make the process effective in the field.

DOHS is concerned how the grit treatment project will impact the schedule and management resources for other remedial actions and feasibility studies being performed by the Navy at HPA. The grit and treatment equipment sit atop of a landfill scheduled to be investigated. The Navy indicated that they plan to sample the landfill in mid to late summer or fall. The treatment

process will need to be completed and the treated grit removed from atop of the site or they may have difficulties in sampling the landfill. WESTDIV will need to see the revised estimate for the grit treatment process before they decide to continue with the project. NCEL indicated that the new on-site pilot treatment could start in June or July, with full scale treatment in July or August.

WESTDIV asked if the Navy can haul the grit away as a hazardous waste instead of treating it. DOHS said the Navy needs to treat the grit to make it non-hazardous, or store it until it can be treated, as it is the intent of CERCLA to discourage the redisposal of hazardous waste at a Class I site. The EPA said, legally, the Navy can probably haul the grit away as a hazardous waste, but the Navy could be challenged by various parties such as citizen groups.

NCEL asked DOHS to identify what other options are available if we find that the sulfide treatment technology is not effective on this waste or DOHS does not accept the process. Can the waste be hauled to Reed & Graham and be solidified into asphalt? Can it be made into concrete on-site and used for paving or other construction? Ken Smarkel agreed to check with other people at DOHS Alternative Technology Section to see if these options can be further considered. Also, he indicated that section 66305(e) of Title 22, California Administrative Code, allows DOHS to approve the management of a hazardous waste as non-hazardous waste because the waste has other characteristics, such as it being a concrete monolith. Some waste generators have been in this approval process for four years, but Ken Smarkel thought he could expedite. DOHS suggested that since the metals appear so readily leachable from the waste, that we should look into soil washing. NCEL agreed to investigate that option further.

The EPA explained that there is a difference between the Federal EP-Tox requirements and the State TTLCs/STLCs in that the EP-Tox measures only total chrome, not hexavalent. Based on the data provided by the Navy on the untreated grit, and discussions with the State concerning the treatment process, the EPA determined that it could interpret the data as satisfying the requirements for an exemption in the Federal regulations which address waste which is "nearly exclusively trivalent chromium" under certain conditions. However, the EPA feels the treated grit should be tested for EP-Tox just to be sure the conditions still apply after treatment. In the next proposal, the Navy will make sure that additional testing is performed to better document the characteristics of the waste.

DOHS wanted the roles of the Navy and contractor personnel and their authority clarified before we start any more field work. The group discussed this and identified several solutions, including placing provisions in the contract with Battelle to address DOHS and other requested work stoppages.

The inadequacies of the previous work plan was discussed. The Navy and DOHS agreed that the flow of work, the decision points, and approval requirements need to be addressed in revised or new work plans for the project. DOHS wants a new work plan before we resume treatment on-site. NCEL stated that depending on the option chose, we would submit either a revised work plan or a new work plan that addresses all of DOHS's concerns.

The number of types of plans were discussed. The group agreed that NCEL would prepare first an Interim Status report. The Interim Status report would build on the attached Battelle report and include descriptions of the bench scale tests, the results of the tests, the recipes used on-site, problems encountered on-site, mass flow of grit and chemicals, and results of boundary air and other monitoring. If we are concerned about trade secrets and proprietary recipes, the Navy should mark each page confidential. Ken Smarkel would also have his legal person call Dr. Means, Battelle, to further discuss proprietary disclosures.

A Sampling, Analysis, and Benchscale Testing plan would developed before going on-site to sample and initiating benchscale testing. We agreed that the partially treated grit does not need to be completely characterized. Three samples at three different depths would be collected from six borings for a total of 18 samples. Several of the samples would be analyzed for all EP-Tox metals and Wet metals and the rest of the samples would be analyzed for Wet lead, Wet copper, pH, and reactive sulfides. We may also want to look at total sulfides to help determine the fate of the sulfides. The plan will identify sampling protocol, health and safety, sample analysis, processes that will be tested, and address issues such as curing time and curing methods. Benchscale testing will be performed on both the untreated and partially treated grit. The plan will be available for review and comments before it is finalized.

The results of the site sampling and benchscale testing will be included in a mini-report, available for review and comment. The report will recommend which treatment processes and recipes for the untreated and partially treated grit, subject to regulatory agency approval.

DOHS wants a higher degree of confidence that the process works before initiating on-site treatment.

A New/Revised work plan will be developed for the approved process(es). The work plan will address the issues described earlier as well as the need for the filtering of untreated sand through a separate grisly, replacement of broken paddles in the pug mill, leaking pumps, leachate from the treated grit, and site maintenance and housekeeping. If a container is needed to cure the treated material, secondary containment may be required. A pilot scale test will need to be run on the untreated and partially treated grit. Each batch should be about 25-30 cubic yards and multiple batches and recipes can be run. About three untreated samples will be collected per 100 cubic yards. Sampling of the treated material will need to address stratification. About 12 samples per batch should be taken and analyzed for Wet lead and copper, pH, and sulfides (if appropriate), and several samples should be analyzed for all EP-Tox metals and Wet metals. The draft work plan will be available during a 30 day period for comment and regulatory approval.

Once the on-site pilot test is completed, a mini-report will need to be developed showing the raw results and recipes. The report will be available for 30 days for the regulatory agencies to review/comment/discuss. The selected recipe needs to be approved by the regulatory agencies prior to entering limited full scale production.

Limited full scale production would consist of treating about 300 cubic yards using the approved recipe(s). 30 samples will be taken and analyzed for parameters of concern and several will include full spectrum analysis for all EP-Tox and WET metals. This requirement may be relaxed depending on results of pilot test. A mini-report will be developed, reviewed, and approved as discussed above for the pilot test.

Once limited full scale production is approved by the regulatory agencies, full scale production can be initiated. Sampling requirements will be reduced to less than 1 sample per 100 cubic yards, based on statistics.

DOHS again expressed their concerns with sulfide treatment. Long term stability has not been proven. DOHS indicated that Section 25117 of the California Health and Safety Code allows DOHS to classify a waste as hazardous if it is treated, stored, or disposed in a manner that threatens the environment. This means they can impose requirements exceeding Title 22 criteria before declaring the sulfide treated waste as non-hazardous. NCEL wanted to know what tests we need to do to determine long-term stability of sulfides in a sanitary landfill. Ken Smarkel didn't know of a specific approved test; it would need to be developed and approved, which may take several months at a minimum. The test might look at ferro oxidants and thio-bacteria incubated in the material to see if the treated material is attacked. Ken Smarkel was also concerned that the Regional Water Quality Control Board (RWQCB) should be aware of the sulfides in the waste and may not approve disposal at a sanitary landfill. Both Jeff Heath, NCEL, and Mark Malinowski, DOHS, have contacted RWQCB and confirmed it is not an issue with them.

The long term stability issue was resolved by NCEL agreeing to look into the issue as part of additional work they are doing with sandblast grit at other sites and DOHS agreeing to allow the Navy to go ahead with the concluding the treatment project at HPA as outlined above.

cc:
Kam Tung, Treasure Island, HPA
Richard Powell, WESTDIV
Chuck Flippo, EPA Region IX
Ken Smarkel, DOHS Sacramento
Mark Malinowski, DOHS Emeryville
Jeff Means, Battelle
Johanna Moore, DESC

JOHeath

HPA Sandblast Grit Mtg
2 March 1990 1000 hrs

Name	Organization	Phone
Mark Malinowski	DHS - Region 2	415 54-3816
KAM F. TUNG	NAVST T1	(415) 822-4229
RICHARD POWELL	WESDIV	(415) 877-7502
Jeff Heath	NCEL	805 - ~~877~~ 982-1657
Ken Smankel	DHS/ATD	(916) 324-1942
CHUCK FLIPPO	EPA Region 9	(415) 865-7630

Attachment 1

HPA Sandblast Grit Meeting
2 March 1990 1000 hrs

Impacts on HPA RI/FS -

- OSC Impacts
- WESTDIV Impacts
- RI Field Work Impacts

Proposed Schedule

Organization/Authority Discussion

Previous Work Plan

Bench Scale Testing Proposal

- raw results
- Report, comments, meeting, discussion, evaluation

Field Work Proposal

- Mixing control standards, i.e. weight of material, fly ash, volume of sulfide solution and water
- Filtering untreated sand, removal of rags, metal etc.

  -- Broken Paddles, Leaking Pumps
- Health and Safety

Recipe Pilot Test

- Approx. 25-30 yds.
- How many different recipes, previously treated and/or untreated material, sample curing times (set), sampling protocol, # of samples, EP-Tox and WET, include chromium?
- Raw results w/ recipes, mini-report wi/ 30 days, comments, meeting, discussion, evaluation
- Selection of Recipe and DHS/EPA approval

Attachment 2

Limited Production, Full Scale Pilot Test

- Approx. 100-200 yds. using single approved recipe. Set/established curing time.
- Thorough sampling (30-50) and analysis for method check and characterization.
- Raw results w/ recipe, mini-report wi/ 30 days, comments, meeting, discussion, evaluation
- DHS/EPA approval to proceed with full production treatment.

What if.....

- Bench scale does not work out?
- Recipe pilot test fails?
- Ltd Production, Full scale fails?

- In all cases HPA is responsible for everything related to this process. i.e. Ensure the untreated sandblast grit is properly covered to prevent fugitive dust and water infiltration; no sulfide leachate discharges to the bay, etc.

Hunters Point Field Demonstration

Analytical and Testing Results

Status Report

as of February 16, 1989

ToxCo has been analyzing samples and conducting several lab treatability tests to clarify the situation with the grit that was treated in December. Analytical data have been compiled in a series of tables. These analyses lead to the following observations and conclusions.

20-yard Pilot Runs of December 8, 1989

Three pilot tests were conducted on December 8, 1989 to evaluate three different variations of the stabilization formulation and select the most suitable formulation for full-scale treatment. The pilot runs were coded P1, P2, and P3 and were conducted on approximately 20-cubic yard batches of sandblasting grit. Samples were taken both on the untreated and treated materials. The principal variable was the sulfide additive concentration, which was increased from pilot test 1 to pilot test 3. One other observation of note is that the pilot tests ran fairly smoothly after the second sample of the second test. However, before then, plastic and other debris in the waste caused blockage in the pugmill, and the aqueous chemical delivery rate had to be reduced. Also, we believe that the manner in which the sulfide was delivered to the mixing tank during the first pilot test caused a density gradient to form. This lead to an uneven application of sulfide as a function of time during pilot test 1, with more sulfide delivered during the first half of the test and less during the latter half. Both of these problems (pugmill plugging and uneven distribution of the sulfide) were alleviated during the later tests.

The three 20-cubic yard pilot piles of treated waste were analyzed twice - first on samples collected immediately after treatment, and then on samples collected several days later. When analyzed early on (Table 2), the STLCs for Cu and Pb were very low, pH was below 12.5, but reactive sulfide was very high, over 10,000 ppm in most cases. When sampled initially the material

Attachment 3

was predominantly black and very wet. The grit was put in jars and then sealed. When opened in the analytical lab the next day, there was free standing liquid and a strong sulfide odor.

When sampled several days later (Table 3) the top foot or so of treated material had turned brown. The bottom foot or so was very black and saturated with yellow/green leachate, which was excess sulfide reagent. The brown material had a pH ~ 10-11 and low reactive sulfide, but Cu and Pb now exceeded their STLCs. The black material at the bottom of the pile was analyzed by two different laboratories. In both cases, STLC Cu and Pb were well below their STLCs, one laboratory reported high reactive sulfide, the other reported very low. These results may not actually be discrepant, as the laboratory reporting the low reactive sulfide analyzed the sample several days later than the other laboratory. The excess sulfide may have been consumed by reaction with the grit and fly ash during that time period.

What appears to be occurring is that the treated grit is curing differently in the field than it is in the sample jars. In the jars, the sulfide stabilization reagent is held in close contact with the grit and reacts for a longer period of time. The theory that we are testing is that in the field, some of the stabilization reagent drains away from the higher locations of the grit piles before the chemical reaction between the sulfide and the metal ions can come to completion. The reaction is hypothesized to be slow in the Hunters Point waste grit because the Cu and Pb are encased in antifouling compounds and paint pigments, which have to be penetrated before the reaction can come to completion. We are in the process of attempting to extract and analyze these organic polymers to provide physical evidence of their existence.

This hypothesis would also explain the disparity between the results of the field work and the lab treatability study, where well stabilized Cu and Pb were observed. The free liquid in the samples from the lab treatability study is consumed by the fly ash over time and eventually completely dries out. Also, when analyzed months after lab treatability studies, metals in sulfide-treated samples have been shown to be well stabilized and below the STLCs.

800-yard Treated Piles of December 13-15, 1989

Several samples of treated waste from the approximately 800-cubic yard pile generated from December 13-15, 1989 have been analyzed (Table 4). All of the samples were relatively shallow, within approximately the top 12 inches of the pile. The results of the first three samplings (6 samples total) showed that Cu failed the WET test in 3 of 6 samples and Pb failed in 5 of 6. The late January samples (2 samples) were collected slightly deeper in the treated pile. Cu passed the STLC in both cases. Pb passed in one case. Clearly, some degree of Cu and Pb stabilization is evident. The soluble Cu and Pb levels are lower than what can be accounted for by the small amount of dilution that occurs from the stabilization chemicals and water. However, the degree of stabilization is not adequate, especially in the upper parts of the treated waste pile.

ToxCo is in the process of collecting samples from greater depths to determine if a greater degree of stabilization occurred there. If these prove to be better stabilized, it will support our theory that reaction time between the sulfide reagent and the grit is the problem.

Laboratory Treatability Studies Conducted Since December 15, 1989

Two different lab treatability studies were conducted in the past month - the first to compare the effect of the fly ash that was used in the successful benchscale test of June, 1989 (which was the basis for the formulation used in the field demonstration) with that of the fly ash that was used in the field demonstration. ToxCo was unable to secure for the field demonstration the exact fly ash that was used in the benchscale treatability study. We wanted to determine if using a different fly ash could account for the lower degree of stabilization observed in the field.

The result (Table 8) was that there was no difference in the effect of the two fly ashes. Both resulted in satisfactory STLC Cu and Pb levels, pH, and reactive sulfide - as observed in our benchscale test of June, 1989. Incidentally, both were cured in the jar. The pHs of the two fly ashes were

measured and were found to be within several tenths of a pH unit of each other.

The second treatability test evaluated the effect of curing the test samples on a gentle incline in the open air, to better simulate field conditions. Some excess stabilization reagent was observed draining off the incline, and the treated samples had a lighter color than the samples that cured in the jar. The results were WET Cu and Pb levels that were over a factor of 10 higher than the jar-cured samples for both samples and both metals (Table 8). This supports the idea that field curing is the cause of the problem.

Effect of Aging and Stability of Metal-Sulfides

As indicated above, several sulfide-treated (low STLC) samples from other sites have been reanalyzed months after generation and found to be unchanged in metal-leaching characteristics. This would tend to rule out "aging" or in otherwords the reversibility of the setting reaction as an explanation for the unsatisfactory degree of stabilization that occurred during the field demonstration. This is being verified for Hunters Point sandblasting grit samples stabilized in lab treatability tests last June. The results should be available in late February.

Summary

The leading hypothesis for the higher-than-expected STLC-soluble Cu and Pb contents in some of the field-treated grit is that the reaction between sulfide and metal ions was prevented from going to completion because various environmental conditions cause the treated grit to cure differently in the field than in a jar. One of the principal factors appears to be the drainage of the dense sulfide reagent away from the upper parts of the treated pile. This effectively stops the stabilization reaction before completion.

In the lab the samples were cured in the restricted environment of the sample jar, and a more complete degree of chemical reaction resulted. An

important complicating factor is that Cu and Pb are believed to be encapsulated in organic polymeric antifouling compounds and pigments, which must be penetrated before the reaction between ionic metal species and sulfide can occur. From the benchscale data, the caustic sulfide setting reagent appears to be capable of slowly doing this, but the reaction stops when the reagent drains away. Note also that soluble silicate binder was incapable of stabilizing the grit in benchscale studies last year. This is a commonly used binder, but was not applicable to Hunters Point grit because of its chemical complexities.

We are in the process of collecting analytical data from additional field and lab samples that should confirm or refute this theory. If the theory proves to be correct, the problem might be remedied in the field by holding the treated grit in contact with the setting agent for a longer time by curing it in a restricted environment. If this proves to be the case, ToxCo intends to look at engineering options to contain the treated waste and recommend a pilot field test in the near future.

If this hypothesis proves to be incorrect and no other viable explanations for the results come to the surface in the next several weeks, then we will begin discussing other types of removal/treatment alternatives for the Hunters Point sandblasting grit with the Navy.

Recommendations

If the data from the outstanding analyses continue to support the hypothesis on field curing, then we offer the following as a possible course of action:

1) Conduct a randomized, statistically-designed sampling of the 800-yard treated pile; approximately 9 samples to be analyzed for STLC Cu and Pb, pH, and reactive sulfide. This will provide a firmer basis for the characterization of the waste pile. The samplings to date have been informative but have not been statistically-designed.

2) Conduct benchscale testing to design a field treatment system based on curing in the open air. A sulfide-based system is anticipated. Part if not all of the 800-yard pile will have to be retreated. The stabilization formulation for the treated pile

will likely be different than for the approximately 2,200 yards of untreated grit.

3) Field testing on small (20 cubic yard) batches. At least two different pilot tests, one for the treated material and another for the untreated material, will be carried out. Analytical data will be collected to determine process effectiveness, after an appropriate curing period.

4) Full-scale field demonstration, as described in the original work plan, followed by off-site disposal to an approved disposal site.

Implicit in the above is that there will be decision points after each step for evaluating whether to proceed with the next step or modify the course of action.

ANALYTICAL DATA TABLES

TABLE 1. DATA ON UNTREATED SANDBLASTING GRIT USED IN 20-YARD PILOT TESTS

TABLE 2. DATA ON 20-YARD PILOT PILES, SAMPLES COLLECTED DECEMBER 8, 1989 IMMEDIATELY AFTER TREATMENT

TABLE 3. DATA ON 20-YARD PILOT PILES, SAMPLES COLLECTED DECEMBER 12, 1989 SEVERAL DAYS AFTER TREATMENT

TABLE 4. DATA ON THE 800-YARD TREATED PILE

TABLE 5. CAM METALS DATA ON THE FLY ASH USED IN THE LAB AND FIELD TREATABILITY STUDIES. TOTAL (TTLC) LEVELS IN mg/kg AND SOLUBLE (STLC) LEVELS IN mg/L

TABLE 6. CAM METALS DATA ON BACKGROUND SOIL SAMPLES IN THE VICINITY OF THE 3,000-YARD PILE OF GRIT: TOTAL (TTLC) LEVELS IN mg/kg AND SOLUBLE (STLC) LEVELS IN mg/L

TABLE 7. ORGANIC PRIORITY POLLUTANT DATA ON BACKGROUND SOIL SAMPLES IN THE VICINITY OF THE 3,000-YARD PILE OF GRIT

TABLE 8. DATA FROM LAB TREATABILITY STUDIES CONDUCTED SINCE DECEMBER 15, 1989

TABLE 9. CAM METAL LIMITS, CALIFORNIA ADMINISTRATIVE CODE, TITLE 22, SECTION 66699