7/22/92

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

BEFORE THE ADMINISTRATOR

In the Matter of	
Tri-State Mint, Inc., **Von Hoff International, Inc.,** **Tri-State Professional Recovery, Inc.,** **Robert W. Hoff and** **Connie K. Hoff,**	**Docket Nos. EPCRA-VIII-89-05 and CEPC-VIII-89-01**
Respondents	

<u>Comprehensive Environmental Response, Compensation and Liability Act - Emergency Planning and Community Right-To-Know Act - Reportable Quantities - Manufacturing Process Wastes</u>

Where releases of a cyanide solution, which had been made up by adding sodium cyanide to water and which had been used in a leaching process for the extraction of silver, were not "F & K" listed wastes under 40 CFR §§ 261.31 and 261.32 and were not shown to be characteristic, reactive wastes in accordance with 40 CFR § 261.23, Agency could not use total weight of releases to support claim that reportable quantity (RQ) under § 302.4 had been equalled or exceeded. Because listing for sodium cyanide in § 302.4 applies only to the solid form and sodium cyanide disassociates when mixed with water to form sodium and cyanide ions, and there is no RQ in § 302.4 for total cyanide and the hazardous substances in § 302.4 are not additive for the purposes of determining reportable quantities, tests for total cyanide on samples of the solution did not show that the RQ of ten pounds for sodium cyanide had been equalled or exceeded. Complaints alleging violations of CERCLA and EPCRA reporting requirements were, accordingly, dismissed.

Appearance for Complainant:

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Appearance for Respondents:

Joseph M. Butler, Esq.
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INITIAL DECISION

These proceedings under section 325 of the Emergency Planning and Community Right-To-Know Act of 1986 (EPCRA), 42 U.S.C. § 11045, and section 109 of the Comprehensive Environmental Response, Compensation and Liability Act, as amended (CERCLA), 42 U.S.C. § 9609, were commenced by complaints, dated June 28 and June 29, 1989, respectively, charging Respondents, Tri-State Mint, Inc., Von Hoff International, Inc. and Robert W. Hoff and Connie K. Hoff, collectively Tri-State, with violations of the cited Acts.

The CERCLA complaint, Docket No. 89-01, alleged, inter alia, that at all times relevant to the complaint Respondents owned or operated a warehouse facility located at 1408 C Avenue, Sioux Falls, South Dakota, which was used in part for storage of materials related to metal extraction processes, that Respondents were, at all relevant times, "persons in charge" of the mentioned facility within the meaning of section 103(a) of the Act and that on at least one occasion during the month of January 1989, there was a release from said facility of a cyanide solution containing over ten pounds (calculated at approximately 90 pounds) of sodium cyanide. The complaint further alleged that the mentioned release was of a hazardous substance the Reportable Quantity (RQ) of which is ten pounds, that Respondents had knowledge of the release at least as early as January 28, 1989, and failed to immediately notify the National Response Center (NRC) of the release as required by section 103(a). For this alleged violation, it was proposed to assess Respondents a penalty of $25,000.

The EPCRA complaint, Docket No. 89-05, alleged the same basic facts as the CERCLA complaint including the release of a cyanide solution containing over ten pounds (calculated at approximately 90 pounds) of sodium cyanide, which is allegedly an extremely hazardous substance and the failure of Respondents to immediately notify the Community Emergency Coordinator for the Minnehaha County Hazardous Materials Committee (Local Emergency Planning Committee or LEPC) and the South Dakota Emergency Response Commission (State Emergency Response Commission or SERC) of the release as required by section 304(a) of the Act. Count II alleged the failure of Respondents to provide, as soon as practicable, a written follow-up notice of the release to the LEPC and to the SERC as required by section 304(b) of the Act. For these alleged violations, it was proposed to assess Respondents a penalty of $50,000.

The corporate and individual Respondents filed separate answers admitting there was a release of a cyanide solution, but denying any obligation to report and any violation of the cited statutes. The corporate answer alleged that the facility commonly known as 1408 "C" Avenue, Sioux Falls was leased by Tri-State Professional Recovery and subleased to Tri-State Mint, Inc. Von Hoff International, Inc. allegedly had no connection with the "C" Avenue facility or with any metal recovery process. All Respondents contested the amount of the penalty as inappropriate and excessive and requested a hearing.

The complaint was amended to include Tri-State Professional Recovery, Inc. as a Respondent. By an order, dated September 6, 1989, the proceedings were consolidated pursuant to 40 CFR § 22.12.

Less than a week prior to the commencement of the hearing, Complainant moved to amend the complaint so as to allege that the release of an extremely hazardous substance equal to or exceeding the RQ included not only "sodium cyanide," but also "cyanides (soluble cyanide salts), not elsewhere specified." Unsurprisingly, this amendment was opposed by counsel for Respondents as prejudicial. The ALJ, considering that the proposed amendment did not fundamentally alter the nature of the charges in the complaints, deferred ruling on the motion until the evidence was heard, specifying that Respondents would be given a continuance, if they considered it necessary to meet allegedly new evidence. Respondents did not move for such a continuance.[1/] On brief, however, Respondents argue that the motion should be denied, because it is not supported by the evidence and is contrary to reportable quantity regulations applicable to a cyanide-bearing waste (Response Brief at 10, 11). Because it is concluded that Complainant has not proved the amended complaint, the motion will be denied.

A hearing on this matter was held in Lakewood, Colorado.

[1/] This apparently is the basis for Complainant's assertion that Respondents waived their objections to the amendment at the conclusion of the hearing (Post-hearing Brief at 2).

Based on the entire record, including the briefs and proposed findings of the parties,[2] I make the following:

FINDINGS OF FACT

1. Robert W. Hoff and Connie K. Hoff, the individual Respondents, are husband and wife and sole stockholders of the corporate Respondents (D-Vol.II-189-91). Von Hoff International, Inc. is a leasing company which owns property at 1600 "A" Avenue, Sioux Falls and leases that property to Tri-State Mint, Inc. (Mint). Von Hoff International also leases equipment to Mint.
2. Mint is a precious metal manufacturer, which prior to May of 1989 also refined precious metals. Professional Recovery, Inc.'s primary function was to purchase x-ray films and similar materials from hospitals which were sold to Mint for refining and recovery of precious metals. Professional Recovery leased the C Avenue facility from a firm known as General Properties and, in turn, subleased the property to Mint.
3. An operation performed by Mint at the C Avenue facility was leaching silver from crushed crucible material by means of a cyanide solution.[3] Because of their ability to withstand

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[2] Proposed findings of the parties not adopted are either rejected or considered unnecessary to the decision. Because the transcript is not numbered consecutively, references thereto will be by the letters A, B, C or D, followed by the volume and page numbers.

[3] Facts concerning operation of the system are taken primarily from a letter, dated October 24, 1989, from Joseph M. Butler, Esq. to Circuit Judge Gene Paul Kean concerning an (continued...)

high temperatures, clay and graphite crucibles are used in the minting of silver coins and bars. Worn out and discarded crucibles and refractory materials from the ovens used to melt silver were collected by Mint, because these materials contain recoverable amounts of silver. The leaching operation was set up and became operational at the C Avenue facility in May 1988. In the process, the crucibles and refractory materials were crushed to a fine, granular state, placed in leaching tanks and subjected to a continuous flow of a solution made of water and one-half percent sodium cyanide. False bottoms in the leaching tanks collected the solution after it flowed through the granular material. The solution was then pumped to an electro-recovery tank where an electric current precipitated the silver onto stainless steel anode and cathode plates. The process would then be repeated until all recoverable silver was removed from the granular material, at which time the system would be shut down, the leached material removed and unleached material placed in the tanks to begin the process anew. According to Mr. Marty (note 3 supra), the system was operated constantly until after the first heavy freeze in November of 1988. The system was shut down, because

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[3] (...continued)
indictment of Respondents arising from the events leading to the instant proceedings (C's Exh AA), hereinafter "Butler letter." The facts so stated are substantially confirmed by the report of an interview of Mark Marty, a metallurgical engineer employed by Mint (Attorney General's Office, Division of Criminal Investigation (DCI), C's Exh N). The indictment was subsequently dismissed.

the C Avenue facility was unheated and the material in the system had been fully leached.

4. When the leaching operation was shut down, the cyanide solution was pumped into a tank approximately 4′ x 4′ x 10′, which Mr. Marty described as a water storage tank. This tank is a component of the leaching system. He assumed the solution would be preserved for reuse at a later date. Accord, Charles "Chuck" Nilsson, a chemist formerly employed by Mint, who testified that it was his understanding the equipment would remain at the C Avenue facility over the winter and that the system would be reactivated when the solution thawed in the spring.[6] In December of 1988, however, Mint was informed that rent at the C Avenue facility was going to double or triple. Accordingly, Mint made plans to move by the end of January 1989.

5. In preparation for moving, Mr. Nilsson was asked to neutralize the cyanide solution in the storage tank. A recognized and acceptable method of neutralizing cyanide solutions is by the addition of calcium hypochlorite (CCH). Mr. Nilsson placed 20 pounds of CCH in the storage tank on January 18, another 20 pounds on January 19 and 30 pounds into the tank on January 20, 1989 (Deposition at 35, 36, 41, 53, 63, 64). The

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[6] Deposition of Charles Nilsson taken at St. Paul, Minnesota on May 1, 1990, in a civil action entitled "State Of South Dakota, Department of Water and Natural Resources v. Tri-State Mint, Inc., Von Hoff International, Inc., f/k/a (sic) Tri-State Refining and Investment Company, and Robert W. Hoff" (Rs′ Exh 4 at 33). The record does not disclose the outcome of this civil action.

CCH was in the form of a dry, white powder, except for the first 20 pounds which Mr. Nilsson mixed with hot water in order to facilitate dissolution. He testified that CCH dissolves very slowly in water which is only slightly above freezing (Id. at 39, 40). Mr. Nilsson took samples of the solution prior to each addition of CCH. The ten-foot high tank was open only at the top and it was necessary to use a ladder in order to add CCH or take samples.

6. Mr. Nilsson estimated that the tank contained approximately 800 gallons of solution, that the level of the solution was approximately three feet from the top and that he was only able to draw samples from the top six inches of the liquid (Deposition at 37, 40, 46). He described the liquid as having roughly the color of "light tea" (Id. at 45). Although the tank did not have a mechanical agitator, a blower apparatus with a timer had been hooked up which forced air into the tank through a hose. The blower was supposed to operate for three minutes at a time after a pause of two minutes on 15-minute cycles, but was not operating when Mr. Nilsson returned to the facility the next day. He didn't know how long the blower was running during each 24-hour period (Id. 43, 44). In a statement to the DCI he estimated the end of the air hose was within a couple feet from the bottom of the tank (C's Exh N).

7. Although he didn't calculate a precise concentration from tests on the first sample, Mr. Nilsson's rough estimate of the initial cyanide concentration was 2,000 ppm (Deposition at 49,

50). His tests were all for free cyanide concentrations rather than composite or total cyanide levels (Id. 62). He returned to the C Avenue facility on Saturday, January 21, 1989, and drew another sample from the storage tank (Id. 71, 72). Although his calculations indicated that five pounds more of CCH were needed, he added 12 more pounds. The sample drawn prior to this addition tested 8.3 ppm free cyanide (Id. 76, 78, 132). Mr. Nilsson reported these results to Mr. Robert Hoff, expressing some reservations about whether the sample was representative as he was unable to sample the bottom of the tank. Mr. Hoff reportedly inquired whether the aeration system was working and inquired as to the pH of the solution (Id. 79, 80). He (Nilsson) reported that the system operated while he was in the building, but stopped sometime during the 24-hour period until his return. He testified that the system operated on Saturday and that he could see the solution bubbling vigorously (Id. 90, 134). Mr. Nilsson's initial determination indicated that the solution had a high pH of above 12. He added phosphoric acid and hydrochloric acid to the storage tank solution in order to reduce the pH, and, upon further testing, ascertained that the pH was 6.6 (Id. 95).

8. Being reasonably satisfied that he had neutralized the cyanide solution and that the pH was at or near neutral, Mr. Nilsson proceeded to rig up a hose to siphon the solution out of the tank (Deposition at 96-98, 140). For this purpose, he used a

standard garden hose and siphoned the solution out the front door next to the loading dock area where it flowed into a ditch in front of the C Avenue facility. After the siphoning was completed, he estimated, by tapping the tank, the level of liquid therein at two and a half to three feet (Id. 116). Interestingly, while he informed Mr. Hoff that he had started the siphoning, he did not recall receiving any specific order to siphon the solution onto the ground (Id. 80, 104, 108, 122-23). Instead, he received the impression the solution was to be disposed of in that manner through conversations with Mr. Darrell Tolefson, maintenance supervisor/manager employed by Mint (Id. 32, 67, 68, 80, 86, 118-19). He (Nilsson) assumed that instructions to siphon the solution onto the ground had come from Mr. Hoff (Id. 123). After informing Mr. Hoff that the siphoning had started, Nilsson closed the door at the C Avenue facility and went home.

9. Although Mr. Nilsson was satisfied with the technical accuracy of his testing, he continued to be concerned about whether the samples he drew were representative of the solution in the bottom of the tank (Deposition at 102-03, 112-13, 127, 129). In further testimony, however, he expressed the belief he had neutralized the solution to a level where it would not be hazardous (Id. 131-32). He opined that if the cyanide concentration in the tank had been as high as 1,000 to 2,000 ppm when he added acid on January 21, there would have been a violent reaction, resulting in the emission of hydrogen

cyanide gas (Id. 141-42). He stated, however, that there was no visible reaction and that he did not smell any hydrogen cyanide (Id. 147-48).

10. On Saturday, January 28, 1989, Darrell Tolefson, identified finding 8, undertook to move the tank which had been siphoned by Chuck Nilsson out of the C Avenue warehouse (C's Exh N). For this purpose, Mr. Tolefson placed a chain around the tank and fastened the chain to the fork of a forklift truck. He stated that he had to tip the tank in order to get it out the door and then turn to avoid the [loading] dock and that in the process, the chain slipped off of the end of the fork and the "tank got away on me and went down" (C's Exh N at 2). He estimated that the tank had about two feet of liquid and sludge in it which were spilled on the ground.[5] He described the material as "red stuff" and thought it was rust.

11. On January 30, 1989, an employee of the City sewer department noticed a greenish liquid ponded in the ditch in front of the C Avenue warehouse ("Butler letter" at 7). The record does not disclose the sequence of events thereafter in terms of notification of the Hoffs, notification of the Fire Department or emergency response teams, etc. Mr. Timothy L. Kenyon,

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[5] The estimate of the liquid level in the tank is in substantial agreement with that of Mr. Nilsson (finding 8). Although there is some indication that 300 gallons may have been siphoned from the tank and 400 to 500 gallons spilled, it seems unlikely that an attempt to move the tank would have been made while it contained that much liquid. It is therefore concluded that the great majority of the liquid was siphoned in the first release on January 21, 1989.

Project Manager of the Sioux Falls Office of Twin City Testing Corporation testified, however, that on January 30, 1989, his firm received a call from General Properties, the firm managing the C Avenue facility, and was asked to come to the site and render some advice as to a spill of an unknown liquid (C-Vol.I-5, 6). Mr. Kenyon, accompanied by an assistant, arrived at the site at 5:45 p.m. on January 30. He observed a pond of greenish liquid approximately 300 feet in length, 30 to 40 feet wide and of an unknown depth, which he thought was ethylene glycol or anti-freeze (C-Vol.I-7, 16). He sketched the approximate location and extent of the pond on a map.[6] In order to determine what was in the pond three samples were drawn, one for total petroleum hydrocarbons, the second for volatile organic compounds (VOCs) and the third sample for metallics (Id. at 13). No samples were drawn or tests performed for cyanide, because Mr. Kenyon had no idea that cyanide was present (Id. at 14). Apparently only the metallics sample was tested for a Twin City Testing Metal Analysis report, dated March 9, 1989, indicates 0.005 mg/l (5 ppb) selenium and 0.08 mg/l (80 ppb) silver (Rs' Exh 10).

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[6] C's Exh V. What Mr. Kenyon described as a "final copy" of this map is in evidence as Respondents' Exh 9. The map shows the results of cyanide tests on soil samples collected during the period February 23 to February 28, 1989, from the area formerly covered by the pond (C-Vol.I-23). Of 67 samples collected, the majority indicated cyanide was not detected, ten indicated cyanide was detected, but that the concentration was below the practical detectable limit and 15 samples showed a cyanide concentration of one to ten ppm. Location No. 209, described as an ice sample, indicated a cyanide concentration of from 10 to 30 ppm.

12. When Mr. Kenyon arrived at the C Avenue site on January 30, 1989, a firm known as Krueger Construction Company was engaged in pumping the ponded liquid into a 4,000 gallon capacity tank.[7] A second tank of 2,000-gallon capacity was brought to the site by Krueger into which the balance of the ponded liquid in the ditch was pumped. Mr. Kenyon testified that, for this purpose, a gasoline-powered diaphragm pump was used and that workmen, wearing rubber boots and gloves, were wading around in the pond, placing the end of the hose in the liquid. He stated that they were using shovels to dig low places or sumps in which the liquid would accumulate. Because of snow melt, the approximate 700 to 800 gallons of solution involved in the syphoning on January 21 and the spill on January 28 had increased to over 6,000 gallons (Butler letter at 8). Other evidence, detailed below (finding 20) indicates that the two tanks contained approximately 5,000 gallons. According to the Butler letter, the larger tank had previously contained unleaded gasoline and the smaller tank had, within the past 30 days, contained a mixture of oil and water. Neither tank had been cleaned.

13. At a date in early February not precisely determinable from the record, the C Avenue site was sealed off, because of a perceived danger to the public and because of a criminal

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[7] C-Vol.I-14, 15. Although the Butler letter states that Krueger was employed by General Properties, Ms. Connie Hoff, one of the individual Respondents, testified that "we," that is, herself and her husband, hired Krueger (D-Vol.II-209).

investigation undertaken by the State. At the same time, the weather which had been relatively mild, turned bitterly cold. For example, the highest temperature at the nearby Sioux Falls Airport on January 31 was 56°F, the low was 6°F and the average temperature on that date was 31°F (Climatological Data, Rs' Exh 12). In contrast, the highest temperature during the first five days of February was 6°F, the low temperature during that period was 21 below zero and the average daily temperatures during that period were below zero (Id.).

14. On February 10, 1989, the South Dakota Department of Water Quality and Natural Resources (DWQNR) employed Reidel Environmental Services of Chesterfield, Missouri to conduct a cyanide sampling investigation at the site. Ms. Juliette Travous and Mr. Richard Newnham, Reidel employees assigned to the project, flew to Sioux Falls on Monday, February 13 (DWQNR, Cyanide Sampling, Avenue A and Avenue C, Final Report, C's Exh D, written by Ms. Travous, hereinafter Final Report). Ms. Travous, an environmental scientist and Project Manager had been employed at the time by Reidel for three and a half years (B-Vol.II-143-44). Arriving at the C Avenue site, Ms. Travous used glass bottles furnished by the State to draw samples.[8] The 4,000-gallon tank was lying on the ground,

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[8] B-Vol.II-188. Because of a mix-up, the sampling jars Ms. Travous was to bring with her "did not make it onto the airplane" (Id. at 186).

while the 2,000-gallon tank was on a trailer or flatbed (B-Vol.II-152-54; Photo, Rs' Exh 7).

15. Liquid in the larger tank had frozen, bursting a seam. Ms. Travous took a sample from this tank, designated SDT1, by chipping ice at the exposed seam into a sample pan and placing the ice in a sample jar (Final Report). Describing the taking of this sample, Ms. Travous testified that "(w)e took it from waist-high, about three feet off the ground towards the middle of the split" (B-Vol.II-154). This is illustrated by a photo (Rs' Exh 6) showing the split seam with a quantity of the liquid appearing to have frozen as it flowed from the tank. She explained that she tried to "stay away from the edge or what would be considered the outside contamination of the tank" (Id.). In other testimony, she described SDT1 as an "ice sample" and stated that, although there was a reddish tint, which she presumed was rust from the tank itself, and a greenish tint in the ice, her sample did not contain either of those [contaminants] (Id. at 155).

16. Although the Final Report describes both the 4,000-gallon and the 2,000-gallon tanks as being frozen, Ms. Travous was able to draw a sample from the smaller tank by simply opening a spigot at the base of the tank (B-Vol.II-156; Final Report). She testified that she did not know whether the larger tank was full prior to freezing. Likewise, she did not know the

level of liquid in the 2,000-gallon tank.[9] She described the samples as "grab" and acknowledged that the samples were not representative of the entire contents of either tank (B-Vol.II-156-57, 165, 169, 170-71, 172). Ms. Travous also drew a sample (SDV1) from a vat inside the warehouse at Avenue A.[10] This "vat" was formerly used as a cyanide leaching tank and contained very little liquid. The liquid had not been neutralized and was described as having a dark gray color in which some type of sedimentation was suspended (B-Vol.II-185-86; Final Report at 352).

17. Ms. Travous also collected soil samples from the ditch along the east side of C Avenue between Nos. 1408 and 1410, designated SDTH 1 through 6, soil samples from outside the area of known contamination, designated SDBG1 through 4 and soil samples from an area near the loading dock, designated SD1 and 2. Locations where these samples were taken are shown on a map (Final Report at 351). She did not have or follow a written sampling plan, but collected the samples in a manner

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[9] Id. Complainant, relying on the "Butler letter," insists that the smaller tank was also full. Complainant would disregard Mr. Enquist's testimony (infra, finding 20) upon the ground his measurement was made in late March, when cleanup activities were underway (Reply Brief at 12). The fact that seams on the 2,000-gallon tank did not rupture would, however, support an inference that it was less than full, allowing the ice to expand, and if the tanks were frozen as late as April, it is unlikely any liquid was removed in the interim. Moreover, there is no evidence of any shipments or disposal of the cyanide solution until April.

[10] Avenue A is the location of Respondents' offices and of the warehouse into which the equipment from C Avenue was moved.

she referred to as "common sense" (Id. at 174, 193-94, 219). The ditch was frozen, and she used a stainless steel pick to collect those samples. Including samples from the tanks, Ms. Travous collected 26 samples. Each of the sample jars used to collect liquid samples from the tanks contained two or three white tablets (B-Vol.II-189-90, 195, 200). Although Ms. Travous indicated that she may have been told at the time what the tablets were, she was unable to identify the tablets.[11]

18. The unsealed sample jars were placed in one-gallon paint cans (B-Vol.II-162). Because neither Federal Express nor any airline would accept the samples for shipment as packaged and local testing firms were determined to be too expensive, Ms. Travous rented a car and delivered the samples in person to Suburban Laboratories, Hillside, Illinois, which is near Chicago (Id. 161, 163; Final Report at 431). The samples were delivered to Suburban at 11:55 a.m. on February 15, 1989 (Chain of Custody record, C's Exh K). Curiously, the Final Report is silent as to the tests Suburban was asked to perform. The "Butler letter," however, states at 27 that [Suburban] was asked to analyze for corrosivity, EP toxicity and free and total cyanide.

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[11] It is probable, but not established, that the tablets were sodium hydroxide. It is accepted procedure to preserve cyanide samples with sodium hydroxide in order to give accurate test results.

19. Suburban's reports, issued on February 22, 1989, showed for Sample SDT1 (Suburban Sample 1709) total cyanide of 526 ppm, free cyanide of 226 ppm; for SDT2 (Suburban Sample 1710), 1810 ppm of total cyanide, 1011 ppm of free cyanide and for Sample SDV1 (Suburban Sample 1700) total cyanide of 1.84 percent (18,400 ppb) and free cyanide of 0.76 percent. Silver and selenium results for these samples, respectively, were 1.10 mg/l and 1.37 mg/l, 21.9 mg/l and less than 0.10 mg/l. In a letter, dated April 10, 1990 (C's Exh E), Suburban stated there had been a transposition of figures and that the actual cyanide content of Sample SDT2 (Suburban Sample 1710) was 4810 ppm. Soil samples from the contaminated area (SDTH 1 through 6) show total cyanide concentration ranging from 19 ppm to 1032 ppm. There is little background cyanide in the area, because the soil samples taken from outside the contaminated area (SDBG1 through 4) show total cyanide concentrations ranging from 0.02 ppm to 0.50 ppm.

20. Mr. Martin Enquist was employed by Tri-State Mint as Sales Manager on February 6, 1989 (D-Vol.II-166-67). His previous experience included employment as general manager of a galvanizing plant for Boyles Galvanizing, Inc. and he was generally acquainted with hazardous waste regulations and CERCLA and EPCRA reporting requirements (Id. at 171). He quickly became Mint's coordinator for regulatory and cleanup activities. In this capacity, he was at the C Avenue site on a daily basis, after February 21, when the State lifted its

prohibition on entry to the property. He described the larger tank as "completely frozen" and testified that he measured how much ice was in the 2,000-gallon tank by inserting a measuring stick through a bung hole in the top of the tank (Id. at 172-73). He determined that the tank was approximately half full. This measurement was taken toward the end of March when he was trying to determine how fast the ice was melting (Id. at 185). The tanks had thawed or were artificially thawed by mid-April[12] and their contents were shipped to an approved disposal facility, Envirite Corp., Harvey, Illinois, on April 18 and 20, 1989 (Hazardous Waste Manifests, Rs' Exh 3). The shipments included additional liquids because the quantities shown on the manifests total 10,600 gallons.[13] A sample taken in connection with the acceptance of this material for disposal shows a cyanide concentration of 92 ppm and a pH of 7.5 (Envirite Analytical Report, dated April 19, 1989, Rs' Exh 3).

21. Ms. Carol Hoopes Way, who has a degree in biology and is an EPA Environmental Protection Specialist, was primarily responsible for developing the complaints herein and

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[12] The site was cleaned up by Reidel Environmental Services, Inc. under a contract awarded by EPA.

[13] Although the circumstances leading to the quantity of cyanide solution more than doubling are not fully explained on the record, the substantial rupture at the seam at one end of the larger tank would allow the material to leak as it thawed. If the material leaked, it is probable that it was augmented by additional rain water and/or snow melt. Ms. Way so testified (A-Vol.II-174).

calculating the proposed penalties. From investigative reports and other information, she determined that there was at least one release of a cyanide solution, that the quantity was in excess of the RQ of ten pounds and that Respondents had failed to notify the NRC, the LEPC and the SERC of the release (A-Vol.I-37, 41, 46, 50, 52). Additionally, no follow-up written notices of the release to the LEPC and the SERC were provided. Using the reported Suburban Laboratory test results of 526 mg/l total cyanide for SDT1 and 1810 mg/l for SDT2 and assuming that the larger of the two tanks contained 4,000 gallons and that the second tank contained 2,000 gallons, Ms. Way used the molecular weight of sodium cyanide as distinguished from cyanide to calculate the pounds of what she thought was sodium cyanide in the two tanks (Id. 56-61). She determined that there were 33.09 pounds of sodium cyanide in the larger tank and 56.93 pounds in the smaller tank for a total of 90.02 pounds of sodium cyanide (C's Exh F). Apart from the question of whether this calculation was chemically valid,[14] the calculation for the smaller tank was erroneous, because the actual total cyanide content in this

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[14] There are grounds for questioning this calculation as a matter of simple logic. The evidence is that the solution consisted of water and .5% sodium cyanide. On a simple weight basis, the 800 gallons of solution would have contained approximately 32 pounds of sodium and cyanide (6,400# x .005). Yet under Complainant's theory, the amount of cyanide has increased by a factor of approximately three, notwithstanding dilution of over sixfold. This, of course, makes no allowance for the neutralization performed by Chuck Nilsson.

tank was 4810 mg/l and the volume in the tank was approximately 1,000 rather than 2,000 gallons (finding 20).

22. Under cross-examination, Ms. Way affirmed that her calculations were based on the assumption sodium cyanide was released (A-Vol.II-123, 134-36). She explained that the release was of a cyanide solution containing sodium ions and cyanide ions (Id. at 124). She acknowledged that it could have contained metal ions in addition and that an analysis for total cyanide would show most of the cyanide complexes in the solution as well. Asked whether the release was of sodium cyanide or of cyanide soluble salts, not elsewhere specified, as alleged in the amended complaint, Ms. Way replied that it could be either. She stated that specific [cyanide] complexes were not testable [detectable] in a test for total cyanide. Disregarding the results of SDT2, because being the last to freeze, the contaminants may have been concentrated and thus the sample would not be representative, and using the free cyanide result of 227 mg/l reported by Suburban for SDT1, Ms. Way calculated for illustrative purposes 21.4 pounds of sodium cyanide--11.3 pounds of cyanide--in the two tanks (Id. at 140). This calculation assumed that the two tanks contained 6,000 gallons and made no allowance for the fact that the RQ would apply separately to each of the two spills (Id. 141-44). She testified that she was advised by all of

the [Agency] chemists that the cyanide came from sodium cyanide and that total cyanide was the figure to use.[15]

23. Mr. Charles Ramsey, a chemist employed at the EPA National Enforcement Investigation Center (NEIC), qualified as an expert in sampling and sampling procedures (C-Vol.I, Part 2-49). Defining a representative sample, he emphasized that it varied for different situations and different conditions and that one needed to know what you were trying to prove. For example, he pointed out that if you were merely screening for the presence of cyanide, accuracy [of the sampling] would not be a great concern (Id. at 57). Referring to a summary of the results of sampling and testing at the C Avenue site (Rs' Exh 11), Mr. Ramsey testified that he would rely on the samples taken from the tanks by Reidel, Nos. SDT1 and SDT2, to determine what was in the solution at the time of the spills (C-Vol.I, Part II-60). He opined that the material in the tank from which SDT1 was taken would have been fairly homogeneous and mixed from the suction and pumping action (Id. at 62). He explained that as water freezes, it tends to cleanse itself and the contaminants collect in the unfrozen

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[15] A-Vol.II-145-165. A Travis Laboratory analytical report showing total and free cyanide of 2275 mg/l and 1025 mg/l, respectively, on a sample purportedly drawn from the ruptured tank by a representative of the State on February 6, 1989, is in evidence (C's Exh M). There is, however, no evidence other than hearsay, as to how this sample was drawn and no chain of custody or other evidence as to the handling of this sample. The report was admitted solely as a background document relied upon by Ms. Way, as its validity has not been established (A-Vol.II-197-99).

part. Because the tank would have frozen from the outside in, he stated that a sample collected from the ice on the outer edge would represent a minimum value. Regarding SDT2, he opined that sample represented the upper end of the contamination and that there was the same amount [concentration] of cyanide in the two tanks. Mr. Ramsey concurred with Ms. Way's calculations, testifying that what she did, essentially averaging a sample of minimum value with a sample of a higher but not of a maximum value, was entirely appropriate (Id. 73, 74). According to Mr. Ramsey, no matter how you did it, the quantity of cyanide was over the threshold of ten pounds.

24. Under cross-examination, Mr. Ramsey acknowledged that he was not an expert in cyanide chemistry (C-Vol.I, Part II-75). He stated that for sampling purposes, ice is considered a liquid (Id. at 77). He reiterated that the last water to freeze would be the most contaminated and that SDT1 taken by Ms. Travous from the larger tank represented a minimum value (Id. at 75, 85). Nevertheless, referring to a picture of this tank taken on February 6, which shows the ruptured seam with a quantity of the liquid appearing to have frozen as it flowed from the tank (Rs' Exh 6), he opined that it, the liquid, had to have all frozen before the tank split (Id. at 83). Referring to two water samples, identified as SW-01 and SW-02, which were apparently taken by EPA on January 31, 1989, from two puddles in front of the loading dock and which showed

total cyanide of 75.6 ppm and 179 ppm, respectively, Mr. Ramsey testified that these were minimal values, because of additional dilution from snow melt since the spills (Id. 86-90). Likewise, Mr. Ramsey disregarded the 8.3 ppm cyanide value obtained by Mr. Nilsson prior to the syphoning and spill, because he claimed most of the neutralization was taking place at the top of the tank where Nilsson drew his samples (Id. 91-94).

25. Dr. Michael E. Ketterer, a chemist for the NEIC, qualified as an expert in inorganic, analytical and electrochemistry (D-Vol.I-11). Relying on Mr. Ramsey's opinion as to Samples SDT1 and SDT2 being representative of the contents of the tanks, Dr. Ketterer testified that he would rely on the tests of these samples to determine whether there was a release by Respondents in excess of the RQ (Id. at 12-13). Describing an experiment involving the freezing of seven containers of a solution of silver and cyanide, he asserted that in every case the silver and cyanide concentrations were lower in the ice phase than in the original samples (Id. at 14-18; C's Exh Y). He cited this experiment to buttress his opinion that Sample SDT1, reportedly taken from ice toward the outer side of the tank, would represent a conservative or minimum value (Id. at 19, 20). Assuming that the quantity in gallons used by Ms. Way was correct, he agreed with the calculations she used (C's Exh F) in determining that the RQ had been exceeded (Id. at 20-22). Acknowledging that the analyses reported by

Suburban Laboratories measured all forms of cyanide in the samples, i.e., total cyanide, he testified that all or practically all of the cyanide introduced into the environment by Respondents [represented by the samples] came from sodium cyanide and that, therefore, use of the total cyanide number was proper. Regarding the use of preservatives on cyanide samples, he explained that the only purpose of the preservative was to fix the concentration so that the [cyanide] concentration was the same when analyzed in the laboratory as when the sample was drawn (Id. at 23-25).

26. On cross-examination, Dr. Ketterer acknowledged that, although there were no analytical results showing the presence of iron cyanide in the 526 ppm total cyanide reported by Suburban for Sample SDT1, it was highly likely that iron cyanide was present (D-Vol.I-32). He agreed that a rough approximation of iron cyanide in the sample would be obtained by subtracting reported free cyanide of 227 ppm from total cyanide of 526 ppm, which equals 299 ppm (Id.). Within the 227 ppm of free cyanide in SDT1, he acknowledged that there would be concentrations of nickel, silver and copper cyanide. He further acknowledged that there were separate RQs in the regulation for nickel cyanide, copper cyanide and silver cyanide (40 CFR § 302.4). At a pH of 6.6, the pH determined by Chuck Nilsson prior to the siphoning, Dr. Ketterer testified that there should also be a hydrogen cyanide (HCN) component, if there were free cyanide (Id. at 35). There is

a separate RQ of ten pounds for HCN in 40 CFR § 302.4. Dr. Ketterer agreed that once sodium cyanide was placed in water, it was no longer sodium cyanide and that there was no sodium cyanide in terms of a solid substance in the releases by Respondents (Id. at 33, 34, 38, 39). Referring to an experiment wherein he placed calcium hypochlorite in water, Dr. Ketterer stated that some of it sinks to the bottom while a large amount floats on top. He acknowledged that as a solid, the calcium hypochlorite would dissolve and there would be treatment taking place at the bottom of the tank (Id. at 39, 40).

27. Regarding the proposed amended complaint, Dr. Ketterer adhered to the view that the spill was of sodium cyanide (D-Vol.I-52-53). He claimed, however, not to have an opinion as to whether the release was sodium cyanide or "cyanides (soluble cyanide salts), not elsewhere specified" and not to know whether it could be both. The latter listing has a Chemical Abstracts Service Registry Number (CASRN) of 57-12-5. Although he was aware that CASRN 57-12-5 listed all of the substances included in the category cyanide soluble salts not elsewhere specified, he had never seen the CASRN listing for that number until it was produced by Respondents at the hearing (D-Vol.I-53, 54). The mentioned listing includes cyanide, cyanide ion, hydro-cyanic acid ion, cyanide anion and carbon nitride ion. Dr. Ketterer stated that these appeared to be anionic forms of cyanide (Id. at 55). He testified

that, depending upon the pH that the solution is adjusted to, there were varying proportions of HCN and the mentioned anionic forms of cyanide as free cyanide. He answered in the affirmative a question as to whether there were reportable quantities of free cyanide as HCN or CN minus under the designation "cyanide (soluble cyanide salts), not elsewhere specified" (Id. at 55, 56).

28. Dr. Adrian Smith, a consulting hydrogeochemist employed by Respondents, has an impressive resume (Rs' Exh 17) and is an expert in cyanide chemistry (C-Vol.II-4-7). He defined a hydrogeochemist as an individual who looks at the interaction between chemicals and the environment, liquids and solids. He defined cyanide simply as a CN minus, as an anion (Id. at 9, 10). He explained that cyanide in solution is an anion, which is a simple form of cyanide, called "free cyanide." He pointed out, however, that cyanide exists in a number of different forms and that depending on the pH or relative acidity of the solution, free cyanide (CN^-), would become hydrogen cyanide (HCN). He stated that HCN is normally found as a gas and that as the pH of a solution is decreased, the amount of cyanide ion also decreases as it forms HCN, which is volatized as a gas. This relationship between pH and HCN is illustrated by a graph which shows the amount of HCN increasing as the pH decreases (Id. 11, 12; Figure 3.1, Rs' Exh 13). So-called "free cyanide" refers to the fact that, under normal conditions, HCN is volatized and lost.

29. Continuing his exposition of cyanide, Dr. Smith testified that cyanide is reactive and that it reacts with metals to form complexes or a combination of a metal (C-Vol.II-12). He pointed out that in this case, a complex is a combination of a metal and cyanide which has a distinct behavior or signature. These complexes act as units and behave chemically on their own. The complexes are discrete and can be identified (Id.). Metal cyanide compounds are distinguished for many purposes by their stability and Dr. Smith stated that weak acid dissociable complexes (WAD) are those that under weak acidic conditions are unstable and breakdown to their constituent parts. He produced a table (Table 3.1, Rs' Exh 13) listing stability constants of illustrative metal cyanide complex ions. The larger the value, the more stable the complex. For example, the table shows two chromium cyanide ions, $Cr(CN)_6^{-3}$ and $Cr(CN)_6^{-4}$, having stability constants of 33 and 21, respectively; one iron cyanide ion, $Fe(CN)_6^{-4}$, having a stability constant of either 35.4 or 47 and three copper cyanide ions, $Cu(CN)_2^{-1}$, $Cu(CN)_3^{-2}$ and $Cu(CN)_4^{-2}$, having stability constants of 23.9, 29.2 and 30.7, respectively, Dr. Smith emphasized that the table was by no means a complete list of metal cyanide ions, pointing out that there were a vast number of ferro and ferri cyanide complexes (C-Vol.II-16). He indicated that the free cyanides were the most dangerous, while what he referred to as complex cyanides, such as iron or cobalt cyanide, were less toxic (Id. at 19, 20).

30. Dr. Smith testified that the regulations concerning reportable quantities appeared to recognize the complex chemistry of cyanide, because the regulations contained a number of different categories of cyanide, indicating an intended differentiation on a chemical basis of groups of cyanide species (C-Vol.II-22). He understood that these compounds were treated individually and were not additive for the purpose of the RQ rules (Id. at 24, 25). He disagreed with Ms. Way's calculations on Exhibit F (finding 21), wherein sodium cyanide in the release was expressed in pounds of total cyanide, because when sodium cyanide is placed in water, it disassociates to form sodium, and cyanide ions (Id. at 26). He pointed out that total cyanide analysis is not an analysis for sodium cyanide and that total cyanide analysis would include iron cyanide, all the strong and weak complexes and free cyanide, if it were there (Id. at 39, 38). He testified that cyanide complexes were formed [when sodium cyanide was added to leach water at the C Avenue facility], which is exactly what would be expected, if sodium cyanide were placed in a complex mixture containing metallic ions. He emphasized that cyanide was very reactive and would react with the metal ions, to form complexes, weak ones and strong ones.

31. Attempting to explain the rationale of the RQ regulations, Dr. Smith pointed out that while some cyanide complexes were specifically listed, certain complexes were notable by their absence. He characterized these as strong complexes, i.e.,

those that are difficult to breakdown and which do not easily free up cyanide (Id. at 28). As examples, of cyanide complexes which do not have reportable quantities, he cited iron cyanide and cobalt cyanide. Asked whether iron cyanide would be included in "cyanides (soluble cyanide salts), not elsewhere specified" (Hazardous Waste No. P030), Dr. Smith referred to CASRN 57-12-5 (Rs' Exh 14) and answered in the negative.[16] He pointed out that all of the species under that listing were effectively CN minus or free cyanide species. He testified that from a technical point of view, the apparent intent of the regulation was to require reporting of [complexes] that may produce or have available free cyanide.

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[16] Id. at 29. This is contrary to the history of the P030 listing, because Hazardous Waste No. P055 "Ferric cyanide" was deleted as duplicative of the P030 listing (45 Fed. Reg. 78534, November 25, 1980). Dr. Smith is, however, supported by the "Listing Background Document, Spent Waste Cyanide Solutions and Sludges" (Rs' Exh 16), which states at 174:

> 2. A number of comments suggested that the definition of cyanide bearing waste should distinguish between "free cyanide" and "ferro cyanide", since the latter would not be available to generate hydrogen cyanide under mild, acidic, or basic conditions.
>
> * The Agency agrees that only cyanide salt-containing wastes pose a reactivity hazard, and the listing descriptions reflect this distinction, since no complex cyanide wastes are listed for reactivity.

32. Dr. Terry Mudder a consultant and engineer employed by Respondents, is an expert in the treatment of cyanides (D-Vol.I-63-67; Curriculum Vitae, Rs' Exh 18). Dr. Mudder explained the difference between his expertise and that of Dr. Smith by pointing out that Dr. Smith deals primarily with solutions and such matters as the interrelationship of groundwater and soils, while he (Mudder) works more with the treatment of solutions prior to discharge. He agreed with Dr. Smith that Ms. Way's calculations on Exhibit F showing sodium cyanide as total cyanide were incorrect, because total cyanide includes both free and complex cyanide (Id. at 69, 70). As examples of the latter, he referred to nickel cyanide, copper cyanide, silver and iron cyanide. Using reported Suburban Laboratory test data on Sample SDT1, Dr. Mudder calculated reportable quantities for copper, nickel and silver cyanide and for "free cyanide" (Id. at 73-77; Rs' Exh 19). He characterized the mentioned metal cyanide complexes as "weak acid dissociable cyanides" and, using molecular weights, calculated a concentration of 12.3 mg/l for cyanide bound to copper, 22.7 mg/l for cyanide bound to nickel and 0.5 mg/l for cyanide bound to silver. Where there were two forms of cyanides such as copper, $Cu(CN)_2$ or $Cu(CN)_3$, Dr. Mudder testified that he used the higher molecular weight (Id. at 76). Then using a volume of 5,000 gallons,[17] he

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[17] This figure includes 1,000 gallons in the smaller tank, SDT2.

calculated weights in pounds in that volume of 0.97 for copper, 1.54 for nickel and 0.07 for silver. These quantities are to be compared with RQs in the regulation (40 CFR § 302.4) of ten pounds for copper and one pound for nickel cyanide and silver cyanide. These calculations make no allowance for the fact there were two releases.

33. Dr. Mudder also calculated the reportable quantity of free cyanide or HCN in Sample SDT1, assuming a volume of 5,000 gallons of solution (D-Vol.I-78-81; Rs' Exh 19). The first calculation was based on the 227 ppm "free cyanide" reported by Suburban Laboratories on SDT1. According to Dr. Mudder, Suburban Laboratories used a method, which he described as Metropolitan Sanitary District [Cincinnati] (MSD) for free cyanide. This form of cyanide was also described as WAD. This calculation resulted in determination of 9.8 pounds of HCN as compared to a RQ of 10 pounds. This calculation made no allowance for the fact there were two releases. He pointed out that this method overestimated the amount of free cyanide present, because there would be cyanides attached to the copper, nickel and silver metals present. Relying on the pH of less than seven reportedly determined by Chuck Nilsson prior to the siphoning, Dr. Mudder testified that at such a pH all of the free cyanide would be in the form of HCN (Id. at 81). Dr. Mudder's next calculation of "free cyanide" in the 5,000 gallons of solution was performed by subtracting calculated values of cyanide in or bound to the metal

complexes for copper, nickel and silver of 12.3 mg/l, 22.7 mg/l and 0.5 mg/l, respectively, from the 227 ppm free cyanide reported by Suburban Laboratories. This resulted in a concentration of 191 mg/l, which computed to 8.3 pounds of HCN. This computation also did not account for the fact there were two releases (Id. at 82).

34. Dr. Mudder's next calculation of the weight of HCN in the 5,000 gallons of solution was by a method referred to as cyanide amenable to chlorination without distillation (CACD). He testified that in his experience, this "short-cut" method overestimated the free cyanide concentration, because there were other things in solution that will report as cyanide (D-Vol.I-83). Using the concentration of 10.7 mg/l free cyanide in Sample SDT1 reported by Suburban Laboratories under the CACD method, Dr. Mudder calculated a total weight of HCN as 0.46 pounds.[18] Lastly, Dr. Mudder used the free cyanide concentration of 8.3 mg/l reported by Chuck Nilsson and the estimated total quantity of solution in the releases of 800 gallons and determined the weight of HCN in that volume as 0.06 pounds. These quantities are to be compared with the HCN RQ of ten pounds.

35. On cross-examination, Dr. Mudder acknowledged that the cyanide in the process solution at the C Avenue facility was derived

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[18] Id. at 84; Rs' Exh 19. Suburban reported the results of CACD as 2960 mg/l for SDV1, 10.7 mg/l for SDT1 and 276 mg/l for SDT2 (letter, dated March 6, 1989, C's Exh D at 398). Complainant would disregard these results, because they were made out of time.

from sodium cyanide (D-Vol.II-103). He stated that once the cyanide was dissolved in the solution, the cyanide formed complexes with the metals present in the solution such as iron cyanides and silver cyanides. Asked to explain the difference between the 227 ppm free cyanide reported by Suburban, which he regarded as similar to the weak acid dissociable test (WAD), and the CACD test of 10.7 mg/l on this sample, Dr. Mudder replied that he would rely primarily on the copper, nickel and silver complexes (Id. at 106-08). He had previously calculated the cyanide portion of these complexes as 12.3 mg/l, 22.7 mg/l and 0.5 mg/l, respectively (finding 33), and he could not account for the fact that these concentrations added to the 10.7 mg/l CACD reported by Suburban totaled only 46.2 mg/l. He pointed out that clearly there wasn't enough metal to account for all of the 227 mg/l free cyanide and that this illustrated some of the problems with the data.

36. Using the CACD value of 276 ppm HCN on Sample SDT2 as reported by Suburban (supra, note 18), Dr. Mudder calculated at the hearing the weight of HCN assuming this was the concentration in 5,000 gallons of solution (D-Vol.I-86-88; Rs' Exh 20). The mentioned calculation resulted in a determination of 11.5 pounds of CN minus and 11.9 pounds HCN. He opined that, because the reported pH was below seven, the value for HCN would be appropriate. This determination also did not account for the fact there were two releases.

37. Asked what the CASRN for sodium cyanide, 143-33-9 (Rs' Exh 21) included, Dr. Mudder replied "HCN solid" or the solid form of sodium cyanide compounds (D-Vol.II-140-41, 161-62). Asked the same question with respect to the listing for "cyanides (soluble cyanide salts), not elsewhere specified," 57-12-5 (Rs' Exh 14), he answered that it was his impression the listing included the anion CN minus 1 (Id. at 143-44). His definition of free cyanide included HCN and CN minus, the distribution of which was dependent upon the pH of the solution. He opined that CASRN 57-12-5 would not include forms of free cyanide for which there were a specific reportable quantity. He pointed out that there was a specific RQ for anions, CN minus of ten pounds [CASRN 57-12-5] and also a RQ of ten pounds for the molecular form of HCN (Id. at 146-48). He indicated that the mentioned listing would include a solution containing CN minus and reiterated that, if Mr. Nilsson's pH measurement were correct, all of the free cyanide would have been in the form of HCN. Dr. Mudder testified that once sodium cyanide is put into a solution, you had sodium and cyanide anions, that is, CN minus (Id. at 162).

38. Suburban Laboratories report on SDV1, the sample taken from the electrowinning vat of untreated material, showed dissolved nickel of 1.90 mg/l, EP Tox of 2.23 mg/l; dissolved selenium of 0.96 mg/l, EP Tox of 1.02 mg/l and dissolved silver of 2.33 mg/l, EP Tox of 3.09 mg/l (C's Exh D at 452). These concentrations are to be compared with the Suburban

report for SDT1 showing concentrations for dissolved nickel of 12.8 mg/l, EP Tox of 12.9 mg/l, Selenium concentration of 1.37 mg/l and 1.39 mg/l and dissolved silver of 1.10 mg/l, EP Tox of 1.12 mg/l. Dr. Mudder testified that a possible explanation for these differences, notwithstanding the fact that SDT1 represented dilution of fivefold or more, was that this sample in fact represented a concentration of metals due to the fact the tank was frozen (D-Vol.II-157-60).

39. Ms. Connie Hoff's (finding 1) best recollection was that she first learned of a spill at the C Avenue facility on Tuesday, January 31, 1989 (D-Vol.II-192-93). She testified that she inquired of Chuck Nilsson whether there was cyanide in the solution and that he assured her, the solution had been neutralized and consisted of chlorine and water. She asserted that she didn't believe at the time they had any [releases] of reportable quantities of hazardous wastes or substances and after consulting with experts, still did not believe so (Id. at 194-95). Ms. Hoff testified that neither she nor her husband were chemists by education and that they relied completely on Chuck for chemical processes such as neutralization (Id. at 202-03).

CONCLUSIONS

1. The listing for sodium cyanide in 40 CFR § 302.4 includes only the manufactured or solid form of sodium cyanide compounds.
2. There is no listing in section 302.4 for total cyanide and total cyanide analysis does not establish that the reportable quantity (RQ) of ten pounds for a single release of either "sodium cyanide" or "cyanides (soluble cyanide salts), not elsewhere specified" has been exceeded.
3. The cyanide solution at issue here is a manufacturing process waste and not a hazardous waste listed in 40 CFR Part 261, Subpart D and has not been shown to be a characteristic hazardous waste in accordance with Subpart C.
4. Complainant has not shown that either of the releases of cyanide solution at issue here equalled or exceeded the RQ and the complaints will be dismissed.

DISCUSSION

At the outset, it should be emphasized that these proceedings are solely concerned with the question of whether Respondents, by failing to notify designated agencies or officials of the releases at issue, violated CERCLA and EPCRA and that no issue of Respondents' liability for costs of cleanup or whether Respondents violated RCRA or other environmental statute is before me.

CERCLA RQ listings along with the statutory basis for the listing of the substances are contained in 40 CFR § 302.4 (1988). The statutory basis for the listing of "sodium cyanide" (Hazardous

Waste No. P106) is section 311(b)(4) of the Clean Water Act and section 3001 of RCRA.[19] The statutory basis for the listing of "cyanides (soluble cyanide salts), not otherwise specified" (Hazardous Waste No. P030) is section 3001 of RCRA. The RCRA designations or descriptions are considered to control. Sodium cyanide and "cyanides (soluble cyanide salts), not elsewhere specified" are listed in 40 CFR § 261.33 entitled "Discarded commercial chemical products, off-specification species, container residues and spill residues thereof." This strongly supports Respondents' contention that the listing for sodium cyanide was intended to cover only the manufacturered or solid form which is available commercially.[20] Whatever the listing "cyanides (soluble cyanide salts), not elsewhere specified" may have been

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[19] Because the listings of hazardous substances in 40 CFR Part 116 were promulgated pursuant to CWA §§ 311(b)(2)(A) and 501 and apply only to discharges to navigable waters, Complainant's contention these listings apply here (Post-hearing Brief at 8, 9) is erroneous and is rejected.

[20] The Agency explained the basis for the § 261.33 listings in the preamble to the RCRA regulations, 45 Fed. Reg. 33116, May 19, 1980, providing in part:

> Applying this criterion to the proposed lists of chemicals products has led the Agency to list 122 substances in § 261.33(e). As with the substances listed in § 261.33(f), the regulatory language has been clarified to restrict the application of this section to chemical products, or their off-specification species, and not to wastes which contain these materials as a constituents. Because of their acutely hazardous nature, however, containers and inner liners which contained these materials and spill cleanup debris and residues resulting from spill of these materials are also included.

intended to include, its inclusion in § 261.33 indicates it did not include cyanide solutions, or manufacturing process wastes, such as are at issue here.

The table at section 302.4 reflects that the Chemical Abstracts Service Registry Number (CASRN) for sodium cyanide is 143-33-9 and that the CASRN for "cyanides (soluble cyanide salts), not elsewhere specified" is 57-12-5. CASRN 143-33-9 includes only the solid form of sodium cyanide compounds (finding 37).

In the preamble to the final rule establishing Notification Requirements and Reportable Quantity Adjustments pursuant to CERCLA sections 103(a) and 103(b), the Agency specified that the CASRN, when available, uniquely identifies the designated hazardous substance.[21] That the listing of sodium cyanide refers only to the solid form is supported by the CERCLA listing of Extremely Hazardous Substances And Their Threshold Planning Quantities, 40

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[21] 50 Fed. Reg. 13456-474 (April 4, 1985). The preamble provides in pertinent part at 13461:

> The names of the CERCLA hazardous substances that appeared in Table 302.4 are those that are already familiar to the regulated community under other statutes. The Agency has therefore determined that in today's final rule, Table 302.4 will contain the same names as were listed in the NPRM, plus any other names not previously discovered by which a substance is identified in the other statutes listed in section 101(14) and their implementing regulations. Several commenters suggested that in addition to the list of names in Table 302.4, a supplementary list in CAS Registry Number order be provided. EPA has adopted this suggestion. The CAS Registry Number, when available, uniquely identifies the designated hazardous substance. Such a list appears as an appendix to the rule as a convenience to the regulated community.

CFR Part 355, which describes sodium cyanide as a "reactive solid."[22]

All the experts at the hearing and Ms. Way agreed that sodium cyanide when mixed with water is no longer sodium cyanide, but disassociates to form sodium and cyanide ions. Complainant's expert, Dr. Ketterer, agreed that there was no sodium cyanide in terms of a solid in the releases by Respondents (finding 26). There is no RQ for "total cyanide" and the preamble to the regulation makes it clear that the RQs of different substances are not additive under the mixture rule.[23] Under these

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[22] The table at Part 355, Appendix A, Note b, describes sodium cyanide as follows:

> b This material is a reactive solid. The TPQ does not default to $10,000 pounds for non-powder, non-molten, non-solution form.

Complainant's assertion that this footnote is included to show that solids are included in the Part 355 listings (Reply Brief at 11), does not negate the description of the material as a solid.

[23] See the preamble to regulation 50 Fed. Reg. 13463 providing in part:

> b. Mixtures of Hazardous Substances. When determining if notification is required for releases of mixtures and solutions containing hazardous substances, the Agency intends to apply the mixture rule developed in connection with the CWA section 311 regulations. This rule provides that "[d]ischarges of mixtures and solutions are subject to these regulations only where a component hazardous substance of the mixture or solution is discharged in a quantity equal to or greater than its RQ" (44 FR 50767, August 29, 1979). RQs of different substances are not additive under the mixture rule, so that spilling a mixture containing half an RQ of one hazardous substance and half an RQ of another hazardous substance does not require a report.

circumstances, the Suburban Laboratory tests for total cyanide, even assuming the samples were representative,[24] do not establish that either or both of the releases at issue contained sodium cyanide equal to or in excess of the RQ.

Although Complainant's evidence at the hearing was concerned solely with establishing that releases of either sodium cyanide or "cyanides (soluble cyanide salts), not elsewhere specified" exceeded the RQ of ten pounds, it asserts for the first time on Post-hearing Brief that the RQ is the weight of the 800 gallons of solution involved in the two releases (Id. at 10, 11). Complainant reaches this conclusion, notwithstanding the "mixture rule, 40 CFR § 302.6(b),"[25] because, under its view, the mixture rule does not apply unless the amounts or weights of the individual hazardous substance are known. Complainant implies that Respondents should have tested the solution for total cyanide [so that the component

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[24] Freezing concentrates contaminates and the last to freeze is the most contaminated (findings 20, 21, and 23). That such concentration occurred here is at least inferentially supported by the fact Suburban Laboratory test results for silver and selenium were manyfold those reported by Twin City Testing (findings 10 and 17). Twin City Testing samples were drawn prior to the more than sixfold dilution shown here and prior to the solution having frozen. See also Mudder, finding 38.

[25] Section 302.6, "Notification requirements," provides in part:

> (b) Releases of mixtures and solutions are subject to these notification requirements only where a component hazardous substance of the mixture or solution is released in a quantity equal to or greater than its reportable quantity.

hazardous substances and quantities would be known] or must regard the entire weight of the solution as the RQ. This contention overlooks the fact that the mentioned exception to the section 302.6(b) "mixture rule" applies only to listed wastes and to unlisted, characteristic or "ICRE" wastes.[26] There is no listing

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[26] 50 Fed. Reg. 13463 provides in part:

> Several commenters were uncertain when to apply the mixture rule to the various RCRA regulated wastes (F and K lists) and to the unlisted ICRE wastes. The Agency emphasizes that, for CERCLA purposes, the CWA mixture rule applies to ICRE wastes and to the RCRA F and K waste streams all of which tend to be mixtures), if the concentrations of all the hazardous substances in the waste are known. If the concentrations of the substances are unknown, the RQ of the waste stream or unlisted waste applies. In addition, if the person in charge knows that an RQ of a hazardous constituent of a waste has been released before the RQ for the waste stream or unlisted waste has been exceeded, he or she must report the release. However, CERCLA does not itself impose any testing requirements.
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> Some commenters object to application of the CWA mixture rule to waste streams, arguing that under-reporting could result if the components of the waste were incorrectly identified. The Agency, however, maintains that if the concentrations of the hazardous substances contained in the mixture are known, waste streams should be treated like any other mixture. If the releaser does not know the composition of the listed waste stream, EPA agrees that applying the RQ of the entire waste stream is the only reasonably conservative alternative.
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> For example, a mixture of spent (used) cresols and nitrobenzene is identified in the RCRA regulations (40 CFR 261.31) as a hazardous waste from a non-specific source, F004. F004 has an RQ of 100 pounds, because the RQ for cresols is 100 pounds, and the lowest RQ for any of the hazardous substances in the mixture applies. If the person in charge knows only that a waste material contains unspecified amounts of cresols and nitrobenzene, then he or she would have to report if 100 pounds or more of the waste were released. The person in charge may,

(continued...)

in section 302.4 for total cyanide[27] and, as Respondents point out Complainant's position is tantamount to assigning a reportable quantity to the generic class of cyanide compounds. This is so, because Complainant is ignoring the different cyanide components of the solution at issue here, which have separate RQs in section 302.4, and arguing that, because the solution was derived from sodium cyanide, it may still be regarded as such. The Agency has expressly disclaimed assigning an RQ to generic classes.[28].

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[26] (...continued)
however, if sufficient data are available, apply the CWA mixture rule. If he or she knows that the F004 waste contains 50 percent cresols and 50 percent nitrobenzene, the releaser would have to report only when the total release equalled or exceeded 200 pounds, but at that point the 100-pound RQ of the cresol component would be equalled or exceeded. Because the concentrations of the hazardous substances in the waste stream are known, there is no reason to restrict the releaser to the F004 waste RQ of 100 pounds. In this case, for notification purposes, the waste stream is no different than a known mixture of pure substances.

[27] The listing for cyanides in the table at § 302.4 is double asterisked in the RQ column and the footnote provides: "* * indicates that no RQ is being assigned to the generic or broad class."

[28] The Agency's reasons for not assigning RQs to generic classes of organic and metallic compounds were stated in the preamble to the regulation (50 Fed. Reg. 13461) as follows:

> e. Generic Classes of Organic and Metallic Compounds. EPA decided not to establish RQs for the many broad generic classes of organic and metallic compounds designated as toxic pollutants under section 307(a) of the Clean Water Act, such as "chlorinated phenols," "phthalate esters," "polynuclear aromatic hydrocarbons," and "zinc and compounds." The majority of the commenters who addressed this issue understood and supported this decision. It was recognized that to establish a single
> (continued...)

EPA, but not the State, initially took the position that the cyanide solution here concerned was an F007 listed hazardous waste (40 CFR § 261.31), because it was considered to meet the description of a "spent cyanide plating bath solution from electroplating operations." This position has since been abandoned.[29] The cyanide solution at issue is not within the

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[28] (...continued)
RQ for broad classes of hazardous substances would be inappropriate for many of the compounds within each class. Many of the generic classes of compounds encompass hundreds or even thousands of specific compounds. It would be virtually impossible for the Agency to develop a reportable quantity for a generic class of compounds that would take into account the varying characteristics of all of the specific compounds in the class. To establish reportable quantities for generic groups of chemicals would conflict with existing knowledge of individual chemicals and their properties.

Several commenters were unaware of the Agency's position on reporting and liability for generic classes. These commenters believed that if no other RQ is established for a generic class, then they must still use the statutory one pound RQ established under CERCLA section 102(b). EPA has determined that the notification requirements need apply only to those specific compounds for which RQs are listed in Table 302.4, rather than to the generic classes of compounds. However, as the Agency indicated in the NPRM preamble, this does not preclude liability with respect to releases of specific compounds which are within one of these generic listings but which are not listed in Table 302.4. In other words, a releaser is liable for the cleanup of releases of hazardous substances which fall under any of the broad, generic classes, but does not have to report such releases when the specific compounds, and hence the RQs, are not listed in Table 302.4.

[29] Letter, dated July 6, 1989, from Jeffrey Denit, Deputy Director, Office of Solid Waste to Kenneth A. Rubin, Esq., Morgan, Lewis and Bockius. The letter indicates that EPA then considered the waste would be hazardous, only if shown to be a characteristic waste or if it were designated a listed waste by the State. This,
(continued...)

section 261.33 listings, because it is not a commercial product. Instead, it is within the comment at section 261.33(d) as a manufacturing process waste, which has not been listed in either sections 261.31 or 261.32.[30] Accordingly, the solution is a characteristic waste only if shown to be reactive in accordance with section 261.23(a)(5). The RQ for a characteristic waste, except for those having EP toxicity characteristics identified in section 261.24, is 100 pounds.[31]

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[29] (...continued) of course, is the conclusion reached here.

[30] The comment at § 261.33(d) provides:

> [Comment: The phrase "commercial chemical product or manufacturing chemical intermediate having the generic name listed in . . ." refers to a chemical substance which is manufactured or formulated for commercial or manufacturing use which consists of the commercially pure grade of the chemical, any technical grades of the chemical that are produced or marketed, and all formulations in which the chemical is the sole active ingredient. It does not refer to a material, such as a manufacturing process waste, that contains any of the substances listed in paragraph (e) or (f). Where a manufacturing process waste is deemed to be a hazardous waste because it contains a substance listed in paragraph (e) or (f), such waste will be listed in either § 261.31 or § 261.32 or will be identified as a hazardous waste by the characteristics set forth in Subpart C of this part.]

[31] Section 302.5(b) provides:

> (b) Unlisted hazardous substances. Unlisted hazardous substances designated by 40 CFR 302.4(b) have the reportable quantity of 100 pounds, except for those unlisted hazardous wastes which exhibit extraction procedure (EP) toxicity identified in 40 CFR 261.24. Unlisted hazardous wastes which exhibit EP toxicity have the reportable quantities listed in Table 302.4 for the contaminant on which the characteristic of EP toxicity is

(continued...)

Complainant has, however, made no attempt to demonstrate, and there is no evidence, that the cyanide solution was a characteristic hazardous waste. It follows that the section 302.6(b) "mixture rule" is applicable. It also follows that Complainant may not use tests for total cyanides and may not add the various cyanide hazardous substances in section 302.4 for the purpose of demonstrating the RQ has been equalled or exceeded.

Although Complainant is correct that the listing "cyanides (soluble cyanide salts), not elsewhere specified" includes solutions, this adds nothing to its case. As pointed out previously, whatever this listing was intended to cover, its inclusion in section 261.33 reflects it was intended to cover commercial products, not waste solutions such as are at isue here. This being so and the waste not being an "F & K" listed waste and not having been shown to be a characteristic waste, the RQ is not the weight of the solution.[32] Therefore, the section 302.6(b)

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[31] (...continued)
based. The reportable quantity applies to the waste itself, not merely to the toxic contaminant. If an unlisted hazardous waste exhibits EP toxicity on the basis of more than one contaminant, the reportable quantity for that waste shall be the lowest of the reportable quantities listed in Table 302.4 for those contaminants. If an unlisted hazardous waste exhibits the characteristic of EP toxicity and one or more of the other characteristics referenced in 40 CFR 302.4(b), the reportable quantity for that waste shall be the lowest of the applicable reportable quantities.

[32] Having proceeded on the theory that the RQ is that for sodium cyanide or "cyanides (cyanide soluble salts), not elsewhere specified," Complainant may not, consistent with due process, shift ground and claim that the RQ is the weight of the solution. See, (continued...)

"mixture rule" applies and concentrations of the various cyanide derivatives or substances which were in the solution as shown by the Suburban Laboratory tests may not be added for the purpose of determining whether the RQ has been equalled or exceeded. The testimony and calculations of Dr. Mudder (findings 32, 33, and 34) establish that, if the releases are treated separately as they must be,[33] none of the separate cyanide hazardous substances approach the RQ. Complainant has failed to prove the proposed amended complaint and the motion for leave to file it will be denied.

Complainant's contention that the position advocated by Respondents and adopted here, i.e., that the section 302.4 listing for sodium cyanide applies only to the solid form and that the mixture rule applies, opens a gaping hole in the regulatory scheme illustrates a misunderstanding of the regulation and is misplaced. Firstly, a release equalling ten or more pounds of sodium cyanide crystals or powder into any medium is required to be reported.

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[32] (...continued)
e.g., Yellow Freight System, Inc. v. Martin, 954 F.2d 353 (6th Cir. 1992). The claim that the RQ is the weight of the solution is, of course, erroneous.

[33] The regulation, 40 CFR § 302.6, Notification requirements, provides:

> (a) Any person in charge of a vessel or an offshore or an onshore facility shall, as soon as he has knowledge of any release (other than a federally permitted release or application of a pesticide) of a hazardous substance from such vessel or facility in a quantity equal to or exceeding the reportable quantity determined by this part in any 24-hour period, immediately notify the National Response Center (800) 424-8802; in Washington, D.C. (202) 426-2675).

Secondly, the release would have to be reported, if it were an "F & K" listed waste and the weight of the release equalled or exceeded the RQ, unless the weight of the individual hazardous substances were known to be less than the RQ. Thirdly, the release would have to be reported, if the solution or mixture were shown to be a characteristic, reactive waste and the weight of the solution equalled or exceeded 100 pounds.

Nothing in the cases cited by Complainant requires or even suggests a different result. U.S. v. McDonald & Watson Waste Oil Co., 935 F.2d 35 (1st Cir. 1991), cited by Complainant, is distinguishable, because in that case commercially pure grade toluene had leaked from a tank and contaminated the soil. The discarded toluene mixed with soil was clearly a hazardous waste and the concentration of toluene being unknown, the exception to the mixture rule (note 26 supra) applied and the rule was inapplicable.[34] Here, by contrast, the solution released was a manufacturing process waste containing cyanide which is not listed in §§ 261.31 or 261.32.

Because the standards for determining "reportable quantities" under CERCLA are different than those used in determining responsibility for cleanup costs under the Act (supra note 28), cases such as United States v. Carolawn Co., 21 ERC 2124 (D.C. S.C. 1984), cited by Complainant, are inapposite.

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[34] The court appeared untroubled by the fact the exception to the mixture rule appeared only in the preamble to the regulation.

The cyanide solution at issue here has been referred to previously as a "waste" and as a "manufacturing process waste." Once the decision to discard the solution in preparation for the move had been made there would seem to be no room for doubt that the solution met the definition of a solid waste in 40 CFR § 261.2(a) (1988) as a "discarded material" which is "abandoned" by being § 261.2(b) "(1) (d)isposed of; or . . . (3) (a)ccumulated, stored, or treated (but not recycled) before or in lieu of being abandoned by being disposed of . . . ."[35/] The cyanide solution was made up by adding sodium cyanide to water and the solution was used to leach silver from crushed crucible and refractory material. Thus, prima facie the solution, when discarded or intended to be discarded, was a manufacturing process waste within the meaning of the comment at section 261.33(d) (supra note 30). The solution was not a commercial product and thus "not a formulation in which the chemical is the sole active ingredient" within the meaning of the mentioned comment.[36/] This fact distinguishes Hines Wholesale Nurseries, Inc., Docket No. IX-81-RCRA-079 (Initial Decision, November 9, 1981), wherein mixing pesticide, water and surfactant to make an application strength pesticide was held to be a

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[35/] Curiously, Complainant asserts that the purpose of [Nilsson's] treatment was not preparation for disposal (Reply Brief at 16).

[36/] Although, in supplemental briefing submitted at the request of the ALJ (Order, dated April 2, 1992), Complainant argues that the solution here was formulated from sodium cyanide as the sole active ingredient and retained its identity as cyanide, it has not argued that the solution was a commercial product.

processing activity incident to using the commercial product as intended, rather than manufacturing, and thus, pesticide residues were listed section 261.33 hazardous wastes when discarded or intended to be discarded. The application strength pesticide in Hines was the product in contrast to the situation here where the cyanide solution was used to produce or obtain another product, i.e., silver from crushed crucible and refractory material.

Complainant has failed to prove that either or both of the releases of cyanide solution at issue here equalled or exceeded the RQ for a cyanide solution and has failed to prove that any other applicable RQ for cyanide substances or constituents were equalled or exceeded.[37] The complaints will be dismissed.[38]

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[37] Although the conclusion reached herein makes it unnecessary to decide the question, it is by no means clear that Respondents have been shown to have had an obligation to report the releases even if an applicable RQ had been reached. See Thoro Products Co., CERCLA/EPCRA, Docket No. EPCRA-VIII-90-04 (Initial Decision, May 19, 1992) (knowledge of a release of an RQ or more is a condition precedent to CERCLA and EPCRA requirements for immediate notification).

[38] Von Hoff International, Inc. as the mere lessor of equipment at the C Avenue facility has not been shown to be a person in charge of an "onshore" facility within the meaning of CERCLA section 103 or an "owner or operator" of a facility within the meaning of EPCRA section 11004. The same observation is applicable to Professional Recovery, Inc., which, for all that appears, was simply a sublessor of the C Avenue facility to Tri-State Mint, Inc. Accordingly, it would be necessary to dismiss the complaints as to Von Hoff International, Inc. and Professional Recovery, Inc. in any event.

ORDER[39]

Complainant's motion for leave to file the proposed amended complaint is denied.

The complaints are dismissed.

Dated this 22nd day of July 1992.

Spencer T. Nissen

Spencer T. Nissen
Administrative Law Judge

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[39] In accordance with Rule 22.27(c) (40 CFR Part 22), this initial decision will become the final order of the Environmental Appeals Board, unless appealed in accordance with Rule 22.30, or unless the Board elects, sua sponte, to review it. See 57 Fed. Reg. 5320 (February 13, 1992).

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

BEFORE THE ADMINISTRATOR

In the Matter of)
)
Tri-State Mint, Inc.,) **Docket Nos. EPCRA-VIII-89-05**
Von Hoff International, Inc.,) **and CEPC-VIII-89-01**
Tri-State Professional)
Recovery, Inc.,)
Robert W. Hoff, and)
Connie K. Hoff,)
)
Respondents)

E R R A T A

In footnote 24, page 41, delete findings "10 and 17" and substitute findings "11 and 19." In penultimate sentence, delete "prior to the more than sixfold dilution shown here and" following "were drawn."

Dated this 30th day of July 1992.

Spencer T. Nissen

Spencer T. Nissen
Administrative Law Judge