

Fiehweg, Robert E.

From: Nesta, Stephen
Sent: Monday, July 11, 2005 10:37 AM
To: Fiehweg, Robert E.
Subject: FW: B995/Sanitary Sewer Closeout Report

The #1 priority.
Steve Nesta
Environmental Manager, RISS Project
Kaiser-Hill Co., LLC
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-----Original Message-----

From: David Kruchek [SMTP:dakruche@smtggate.dphe.state.co.us] <mailto:
[SMTP:dakruche@smtggate.dphe.state.co.us]>
Sent: Friday, July 08, 2005 7:34 AM
To: Morgan, Gary; Nesta, Stephen
Cc: Primrose, Annette; Wiemelt, Karen; Myers, Kim; STEVE Gunderson
Subject: B995/Sanitary Sewer Closeout Report

I have the following comments on the B995 Closeout Report:

- 1) Although B995 may have been a Type 1 facility, per our previous agreement regarding the closure of the Sanitary Sewer System (our ER NFAA approval letter dated 3/21/05), this Closeout Report was to be submitted for our approval.
- 2) Please identify or add the removal of the solids found under Buildings 974 and 977 to the Waste disposal list Section A & C.
- 3) Figure C - Please discuss the final disposition of all inground lines, including the process waste line, foundation drains, storm drains, and sanitary sewer lines, gas lines, water lines, etc. And please provide a figure that actually identifies all removed and remaining infrastructure associated with the B995 complex (including the B990 tanks), and the locations of disruptions/removals/plugging of the in ground lines. Please include the disposition of the sanitary sewer line shown to continue to the east of this figure.
- 4) Table 1 - This table does not appear to be complete. As such, please include all of the infrastructure associated with this system, including the 2 Aeration Tanks (are these 995-AB-1 & 2?) and Manhole associated with B990 which were only partly destroyed and left in place.
- 5) Closure of the Sanitary Collection System - a) It should be recognized that some of the infrastructure associated with this system was not closed as described in the Tech Memo, especially the previously abandoned sections, as well as some of the earlier demolition activities such as at B771/774 and 779. b) Please change the terminology as discussed to actually reflect the actions taken. Not all of the sanitary sewer lines were flushed as described, including the line from B995 to B910. "Removal" should mean that the item was actually removed and is no longer present. Please define what "Demolished" means and what it is supposed to indicate in relation to the system components, or provide a more accurate term to describe the actual actions conducted. Generally the manholes and lift stations were not removed but plugged, filled, and left in place, with only the upper portion actually demolished or removed if within 3 ft of the final grade, but not all of them had the upper portion demolished. In some instances the sanitary closure strategy was not followed, and the grout plugging did not occur (such as in the area associated with B771/774). As such, please identify the actions that actually occurred, and the locations that did not follow the agreed upon procedures.
- 6) Table 2 - a) Please modify Table 2 as necessary to properly identify the actions actually conducted, including those MHs actually removed vs. those closed in place, and the final disposition of all of these MHs. The final disposition of some appear to be incorrectly identified, such as it is our understanding that the MH associated with B122/121 was actually removed. b) Although it is appropriate to refer to the Closeout Reports for additional information, please provide the ultimate disposition of these MHs in this document, since the Building Closeout Reports do not always discuss the specific sanitary sewer MH disposition. c) Please show all of these MHs and their disposition on the drawing provided (include the "previously abandoned" MHs).
- 7) Lift Stations - Please properly discuss the actual demolition of the lift stations, as it is our understanding that all were not "demolished as described in the Closure Strategy" as stated, nor were they all "either removed completely, or grouted and removed down to 4 feet below grade".
- 8) Please modify this document to properly reflect the difference between the use of grout, flowfill, and fill, with grout being concrete, flowfill being engineered material (dirt) containing cement, and fill or backfill generally being native soil.
- 9) Table 3 - Since it is our understanding that not all of the lift stations were properly disposed as indicated, this needs to be modified to identify the lift stations where the remaining inlet and outlet pipes were actually grouted shut, and those that weren't, as well as the actual disposition of each of these lift stations that actually occurred.
- 10) Drawing #1 - a) Please provide the disposition of MH-201, b) Please indicate if the N-S interruption of the line next to

MH-58 and at MH-55 included the abandoned lines and utility trenches as well, c) Please provide the disposition of LS-13, d) Please indicate if MH-55, MH-58, MH-117, MH-147, and MH 183 were removed during the interruption of the lines at these locations, e) Please show the disposition of the sanitary sewer line shown to continue to the east of the B995 complex on figure C, f) Please discuss the sanitary system, or lack of such a system, that may have been associated with the East and West Gates, g) please show the locations and disposition of the MHs associated with the abandoned system as included in Table 2.

- 11) Please include a discussion of the remaining infrastructure, such as manholes, lines, and septic tanks, associated with the abandoned sections of the sewer system shown in green on the Drawing.
- 12) **GW & Closed Sanitary Collection System** - a) Please modify this discussion to recognize that the actions attempted to block the preferential pathways generated by the sanitary sewer trenches, but that other deep excavations may still allow for migration of GW across this area. b) It is recommended to change the next to last sentence of the 1st paragraph to read , "...key locations along this line were made in an effort to isolate the collection system...". Also please remove the word "any" from the last sentence of the 1st paragraph. b) Please modify the 1st sentence of the 2nd paragraph, to actually make a statement. Proposed change to "The actions undertaken to isolate the Sanitary Sewer System should reduce or eliminate adverse environmental impacts associated with this system." c) Since there has been some contamination identified in this system, some remaining and some removed, please modify the 4th sentence of the 2nd paragraph to properly discuss this issue, as well as the previous comments. This should also recognize the previously approved ER NFAA for the Sanitary Sewer System PAC 000-500 (our letter dated 3/21/05).

Instructions for Completion of Type 1 Facility Closeout Report

Section A. Facility Data	
Facility No.	Building 995
Facility Descriptor:	Concrete block, concrete, and structural metal buildings, 21,140 total sq. ft.
Project:	RISS - Area 5 D&D - Type I
Date of Demolition:	Dec. 12, 2004 - April 1, 2005
Additional Information:	Sanitary disposal values for 995 includes 988, 988A, 988 Pad, T974, 974, 977, aeration basins 995-AB-1, 995-AB-2, clarifier basins 995C-1, 995C-2, 995C-3, 995C-4, 995C-5, influent cells 995-IC1, 995-IC2, 995-IC3, 995-D1, 995-D2, 995-CCC-1, 995-CCC-2, 930, 931, 990, 990A, 990 aeration tanks, 995-EC1, 995-EC2, 995-EC3. The building location is identified on the attached drawing.

Section B. Final Characterization Data	
Reconnaissance Level Characterization Report <i>(concurrence received)</i>	Reconnaissance Level Characterization Reports dated Nov. 1, 2004, Nov. 16, 2004, and Dec. 20, 2004; RLCR/PDSRs dated Dec. 9, 2004 and Jan. 25, 2005, - Concurrence, Steven H. Gunderson to Joseph A. Legare, dated Dec. 1, 2004, Dec. 7, 2004, Jan. 3, 2005, Dec. 23, 2004, and Jan. 28, 2005 respectively.
In-process Characterization	N/A
Pre-Demolition Survey Report <i>(approval received)</i>	N/A
Post-Demolition Survey Report <i>(as necessary)</i>	N/A

Section C. Waste Data <i>(complete categories as appropriate)</i>	
<u>Sanitary Disposal</u>	
Disposal Site:	BFI Foothills 93
Waste Volume (m ³):	8310 m ³
Waste Weight (tons):	7244 tons
Additional Information:	Shipping Dates: Dec. 12, 2004 - April 1, 2005
<u>Hazardous Disposal</u>	
Disposal Site:	Circuit boards, mercury switches, light bulbs and other managed materials Kettleman Hills, Kettleman City, CA and Bethlehem Apparatus Facility, Hellertown, PA
Waste Volume (m ³):	Less than 1 m ³
Additional Information:	
<u>TSCA Waste Disposal</u>	
Disposal Site:	N/A
Waste Volume (m ³):	
Additional Information:	
<u>Asbestos Waste Disposal</u>	
Disposal Site:	BFI Tower Road Landfill
Waste Volume (m ³):	Less than 1 m ³
Additional Information:	Shipping Date: Nov. 15, 2004
<u>Low-Level Waste Disposal</u>	
Disposal Site:	Nevada Test Site
Waste Volume (m ³):	43 m ³
Additional Information:	The final inventory of biosolids removed from the drying beds in B974 and B977 were managed and disposed of in the same manner as all previously generated biosolids. The volume reported here is the volume reported to EPA of biosolids production for CY2004.

Instructions for Completion of Type 1 Facility Closeout Report

Low-Level Mixed Waste Disposal	Solids from B990 Equalization Basins
Disposal Site:	EnviroCare of Utah
Waste Volume (m³):	5
Additional Information:	
Recycled Material	N/A
Recycle Facility:	
Waste Volume (m³):	
Additional Information:	
Property Disposition	N/A
Receiver Locations (major items only):	
Volume (m³):	
Weight (tons):	
Additional Information:	

Section D. Approvals			
Kaiser-Hill Project Manager	KAREN WIEMELT	<i>Karen P. Wiemelt</i>	7/26/05
	Name/Signature		Date

Facility Descriptions, Operation and Closure of the Sanitary Collection and Treatment Systems at RFETS

Facility Descriptions

The Rocky Flats Sanitary Collection system comprised approximately 40,000 feet of sewer line and over 200 manholes used to convey domestic wastewater to the site's wastewater treatment plant at what was collectively known as Building 995. The components of the Building 995 facility are described below in Table 1. Several lift stations operated in the lower portions of the Site and moved sanitary waste into the gravity flow portion of the system. The collection system was divided generally into two areas roughly corresponding to the north and south sides of the industrial area. The two parts of the system joined at Building 990, which housed the original equalization basins with a capacity of 120,000 gallons. Wastewater then flowed by gravity to B995, the treatment facility.

Sanitary waste was also hauled from the East and West Gates (B920 and B120, respectively) to B995, the only sanitary waste hauling activity on-site. Each gate was equipped with sanitary facilities and a holding tank from which waste was regularly removed and transported to B995. The gate facilities had previously been equipped with modified septic systems which were installed in the late 1980s. These systems never operated as promised and were abandoned in favor of the waste hauling option.

B995 (and the related structures discussed in Table 1 below) was designed to have a capacity of 0.5 million gallons per day (MGD) using activated sludge plus a tertiary clarifier and sand filtration as a final step. The activated sludge process was divided into two trains of similar size, with primary clarifiers, aeration basins and secondary clarifiers. The original installation in 1953 had one treatment train (primary clarifier, aeration basin and secondary clarifier), which was supplemented with the second train in 1970. Biosolids were anaerobically digested then air dried prior to disposal. Effluent was disinfected with chlorine and dechlorinated with sulfur dioxide and discharged to an effluent pipeline that directed the discharge to Pond B-3. Numerous upgrades were made to the facility in the mid-1990s, including the installation of influent and effluent storage tanks (with a total capacity of over 800,000 gallons), the addition of a belt filter press for biosolids processing, and conversion from chlorine-based disinfection to ultraviolet light.

The following table describes the components of the B995 complex.

Table 1: Components of the RFETS Wastewater Treatment Facility

Building	Description
930 and 931	Access points to the sanitary collection system housing radiological detection apparatus. These structures were also given manhole numbers (144 and 145 for B930 and 149 for B931); there were two detectors at the 930 location, one on the influent line from the Protected Area (PA), and one on the non-PA influent line. Removed and closed separately from the demolition of B990 and B995 in December 2004. Utilities: electric.
T974	A 320 square foot modified semi-truck trailer with aluminum sides and roof and a steel floor that housed the 0.7 m belt filter press used to dewater sludge prior to drying in the drying beds. Utilities: electric.
974	A 2,280 square-foot non-insulated metal building used to house 4 sludge drying beds (beds number 1, 2, 3, and 4). Anaerobically digested sludge was spread in the drying beds for dewatering and drying. Utilities: Electric.

Building	Description
977	A 2,280 square-foot non-insulated metal building used to house 3 sludge drying beds (beds number 5, 6, and 7). Anaerobically digested sludge was spread in the drying beds for dewatering and drying. Utilities: Electric.
988	Known as the Tertiary Pump House, it was a 1,224 square-foot building originally built in 1953 and expanded in 1990. The building was insulated concrete on a concrete floor. The building housed pumps and the three sand filters used to polish the effluent. After demolition, the building foundation was left at greater than 4 feet Below Final Grade. Utilities: electric.
988A	The Ultraviolet Disinfecting Facility was a 432 square-foot building constructed of insulated metal sections mounted on a steel frame and a concrete floor built in 1996. Ultraviolet light technology replaced the chlorination-dechlorination steps used previously. Utilities: electric.
990	A 222 square-foot building constructed in the early 1950s. B990 was a concrete cinder block building with a concrete foundation and a concrete roof slab and a built-up roofing system. This building was the pre-aeration building housing two air compressors used to aerate raw sewage in the equalization basins. Utilities: electric.
990A	A 200 square-foot building constructed in the 1970s. B990A was a concrete cinder block building with a concrete foundation and a concrete roof slab and a built-up roofing system. B990A housed a bar screen and radiological monitoring equipment. Utilities: electric.
990 Aeration Tanks and Manhole	Two concrete tanks, approximately 40 ft. X 12 ft and 18 ft. deep each, provided flow equalization and pre-aeration upstream of the wastewater treatment plant, B995. Each tank had an operating volume of 60,000 gallons. Flow was controlled by a pinch valve in a manhole downstream of the tanks. The manhole also housed instrumentation that measured pH, conductivity and L.E.L. on a real time basis. The function of B990 was replaced by the installation of new influent storage tanks (see 995-IC1, 2, and 3, below). Utilities: electric.
995	Administration and Process Control Building. Originally built in 1953, the concrete block and metal roof building had two additions which increased the floor space to 6000 square feet. 995 was the main structure supporting the wastewater treatment plant, with office space, laboratories, and system infrastructure for the anaerobic digesters. Upon demolition the north and a portion of the west edge of the foundation was left at greater than 4 feet Below Final Grade. Utilities: electric, natural gas, plant water, plant sewer.
995-AB-1	North Aeration Basin approximately 623 square-feet built in 1953. The basins were equipped with fine bubble diffusers that aerated the activated sludge treatment process. Utilities: electric.
995-AB-2	South Aeration Basin approximately 623 square-feet built in 1970. The basins were equipped with fine bubble diffusers that aerated the activated sludge treatment process. Utilities: electric.
995-C-1	Primary Clarifier Basin approximately 200 square-feet built of concrete in 1953. The clarifiers' purpose was to separate solids from liquids. Utilities: electric.
995-C-2	Primary Clarifier Basin approximately 300 square-feet built of concrete in 1970. The clarifiers' purpose was to separate solids from liquids. Utilities: electric.
995-C-3	Secondary Clarifier Basin approximately 600 square-feet built of concrete in 1953. The clarifiers' purpose was to separate solids from liquids. Utilities: electric.
995-C-4	Clarifier Basin approximately 650 square-feet built of concrete in 1953. The clarifiers' purpose was to separate solids from liquids. Utilities: electric.
995-C-5	Tertiary Clarifier Basin approximately 600 square-feet built of concrete in 1970. The clarifiers' purpose was to separate solids from liquids. Upon demolition, the clarifier bottom and a portion of the wall was left at greater than 4 feet Below Final Grade. Utilities: electric.
995-CCC-1	Chlorine Contact Basin was a 65 square-foot concrete basin, built in 1953, formerly used for disinfecting the effluent from the wastewater treatment process.

Building	Description
	Chlorination was replaced with UV disinfection in 1996. Upon demolition, the contact chamber bottom and a portion of the walls was left at greater than 4 feet Below Final Grade.
995-CCC-2	Chlorine Contact Basin was a 200 square-foot concrete basin, built in 1953, formerly used for disinfecting the effluent from the wastewater treatment process. Chlorination was replaced with UV disinfection in 1996.
995-D-1	Anaerobic Digester approximately 500 square-feet built in 1953. The digester provided further treatment of the biosolids prior to drying in the drying beds. Upon demolition, a portion of the north wall was left at greater than 4 feet Below Final Grade. Utilities: electric.
995-D-2	Anaerobic Digester approximately 500 square-feet built in 1953. The digester provided further treatment of the biosolids prior to drying in the drying beds. Utilities: electric.
995-EC-1	Effluent Storage Cell is an 1,836 square-foot concrete basin built in 1996. The effluent cells were designed to hold several days flow of effluent in the event there was an off-normal condition in the treatment plant. Utilities: electric.
995-EC-2	Effluent Storage Cell is an 1,836 square-foot concrete basin built in 1996. The effluent cells were designed to hold several days flow of effluent in the event there was an off-normal condition in the treatment plant. Utilities: electric.
995-EC-3	Effluent Storage Cell is an 1,836 square-foot concrete basin built in 1996. The effluent cells were designed to hold several days flow of effluent in the event there was an off-normal condition in the treatment plant. Upon demolition, the effluent cell bottom was left at greater than 4 feet Below Final Grade. Utilities: electric.
995-IC-1	Influent Storage Cell was a 1,271 square-foot concrete basin built in 1996. The influent cells were designed to hold up to a days flow of influent each in the event there was a spill on-site that threatened the wastewater treatment plant. Utilities: electric.
995-IC-2	Influent Storage Cell was a 1,271 square-foot concrete basin built in 1996. The influent cells were designed to hold up to a days flow of influent each in the event there was a spill on-site that threatened the wastewater treatment plant. Upon demolition, a portion of the north and west walls was left at greater than 4 feet Below Final Grade. Utilities: electric.
995-IC-3	Influent Storage Cell was a 1,271 square-foot concrete basin built in 1996. The influent cells were designed to hold up to a days flow of influent each in the event there was a spill on-site that threatened the wastewater treatment plant. Upon demolition, a portion of the north wall was left at greater than 4 feet Below Final Grade. Utilities: electric.

Facility Disposition

Upon initial review, some portions of the sanitary system were not clearly Type I facilities, either because of the nature of the facility and the potential for contamination or because portions of the system were still in operation and inaccessible when characterization began. For those parts of the system that had the potential to be Type 2, a Pre-Demolition Survey was performed and the results reported in a Reconnaissance Level Characterization Report/Pre-Demolition Survey Report (RLCR/PDSR). Two RLCR/PDSRs were submitted for the Sewage Treatment Plant Closure Project; both presented survey results that all facilities were uncontaminated and reported them as RFCA Type 1 facilities. CDPHE concurred with both reports.

As part of the Rocky Flats security system, radiological detection equipment was located in the sanitary collection system at Buildings 930 and 931 (also designated as manholes 144, 145 and 149 – see Table 1). The detectors were removed separately, the manholes removed to 4 feet below final grade, and access to the collection system eliminated.

Attached to this report are Figures A, B C and D which show the utility removals and facility disposition. Buildings in the 990 area were removed as was the junction box identified as Manhole 146. The equalization basins were removed to 4 feet below final grade, then filled with clean fill. All of the structures in the 995 area were removed, including the sludge drying beds, the influent and effluent storage tanks, the digesters, all manholes and similar structures, and in ground lines. Some structural components of the buildings were left in place at least 4 feet below final grade, and are identified on Figure D. The main concrete structures left in place include partial walls of B995 and influent storage tanks 2 and 3 plus the foundations of the tertiary clarifier (C-5), one of the chlorine contact chambers (CCC-2), B988, and one effluent cell (EC-3). The PVC pipe foundation drain at the base of EC-3 was also left in place.

The effluent from the wastewater treatment plant was transferred to Pond B-3 via a 6 inch corrugated metal pipe that ran from B995 to the east end of Pond B-4. Valves were installed at each of the B-series ponds along the pipeline route so that effluent could be diverted to any of the ponds. The pipeline and valve structures were removed as part of the B-Pond sediment remediation project.

Closure of the Sanitary Collection System

The closure of the collection system was conducted in accordance with the Technical Memorandum: Closure Strategy for the Rocky Flats Environmental Technology Site Sanitary Sewer System (August 31, 2004; "Closure Strategy"). This Technical Memorandum is part of the Site's Administrative Record. The Tech Memo provided a comprehensive strategy for closing the sanitary system components that were part of Individual Hazardous Substance Site (IHSS) Group 000-3. Closure work in this group was on-going when the Tech Memo was finalized, so some of the infrastructure, especially previously abandoned sections of sanitary sewer, was not closed as prescribed in the Tech Memo. Additionally, sanitary service to some of the buildings that were demolished prior to the final Tech Memo, such as B771/774 and B779, was removed or abandoned in a manner other than that described in the Tech Memo.

Prior to the finalization of the Tech Memo, the basic steps in closing sanitary sewer lines and manholes had two distinct periods. In the earlier days of Rocky Flats, some of the oldest parts of the sanitary sewage system were abandoned as new lines were installed. The original abandonment process was to fill the old lines with sand after they were taken out of service. More recently, as site decommissioning and demolition first began, the process for sanitary sewer line closure was set out in various Environmental Restoration (ER) documents such as the Approach for Building Slab, Sewer, and Process Waste Line Removal, after consultation with the regulatory agencies. The steps for sewer line and manhole removal, as described in the ER Approach, were: 1.) remove to 3 feet below the probable final grade and 2.) perform radiological surveys. If results were clean, plug and record GPS location. If the results were not clean, an agency consultation was required.

All site discharges to the sanitary collection system were terminated on September 30, 2004. Sewer lines were flushed with potable water to move remnant solids to the treatment plant. Biological treatment at B995 continued through most of October and the first week of November.

The last discharge from Building 995 was on November 6, 2004. Demolition of the facility began in late November and was completed in January 2005.

Following the flushing of the lines, manhole demolition commenced in a general west to east progression across the industrial area. Demolition of manholes and lift stations began after the lines were flushed and continued through April 2005. In accordance with the closure procedure described in the Technical Memorandum, each manhole was screened for contamination before demolition began. In certain cases, solids were collected from the manholes and in the connecting lines in areas of interest. Once the manhole screening demonstrated that there was no contamination, the manhole was grouted to at least one foot above the bench. None of the manholes evaluated in this manner showed any contamination. After the concrete had-cured, the top 4 feet of the manhole was addressed. Usually, this section was pre-cast concrete and was easily removed intact and disposed. In some cases, the top section had been damaged or cracked, and could not be removed in one piece. Those pieces that could be removed were and those that could not were pushed into the manhole void. In other cases, especially the oldest manholes constructed of brick, the top 4 feet of material was displaced into the void completely. In all cases, the void was filled with clean fill material. Table 2 Manholes Removed and Demolished lists the manholes that were closed as described here, including the dates that surveys were conducted, when concrete plugs were poured and the date of final demolition. In some cases, manholes were excavated and physically removed (designated as "removed completely"). After the manhole was excavated, the connecting sanitary lines were grouted and the excavation filled.

As noted above, some manholes were removed as part of a building demolition before the closure strategy described in the Tech Memo was finalized; those cases are identified in Table 2. The attached drawing "Rocky Flats Sanitary Waste Lines Closeout Report Dwg 1" shows the status of the entire sanitary collection system, including which lines were removed and which remain, and the parts of the system (manholes, lift stations and cleanouts) that were "completely removed" as well as those "removed to 4 feet below grade". As described in the Technical Memorandum, known abandoned sanitary lines will be removed to a depth of at least 3 feet below final grade (bfg). The Technical Memorandum also describes abandoned lines for which no reliable information is available, citing erroneous reports, maps showing existing lines in the wrong direction, and indications that some designed installations were never implemented. Some portions of the original collection system had been abandoned prior to 1990; these lines were identified in the Technical Memorandum. Some parts of the active system had been abandoned after 1990, about the time a major portion of the collection system had been sliplined. In accordance with the Technical Memorandum, known abandoned lines were removed to below 3 feet and exposed ends grouted. Sewer lines discovered in the course of building demolition were also treated in a similar manner.

Table 2: MANHOLES REMOVED AND DEMOLISHED

MH No.*	Location	Comments	Rad Survey Complete	Concrete Plugs	Demolished
MH-1	S T130I	Manhole removed to 4 ft. bfg	8/30/04	10/4/04	11/9/04
MH-1A	W115	Abandoned brick manhole	N/A	N/A	12/6/04
MH-2	E T130A	Manhole removed to 4 ft. bfg	8/30/04	10/4/04	11/9/04
MH-3	NW T130G	Manhole removed to 4 ft. bfg	8/30/04	10/4/04	11/9/04

MH No.*	Location	Comments	Rad Survey Complete	Concrete Plugs	Demolished
MH-4	N T130G	Manhole removed to 4 ft. bfg	8/30/04	10/4/04	11/9/04
MH-5	W T130E	Manhole removed to 4 ft. bfg	8/30/04	10/4/04	2/11/05
MH-5A	SWB331	Abandoned System. This manhole could not be located during the final closure activities.	N/A	N/A	No record
MH-6	SW B130	Manhole removed to 4 ft. bfg	8/30/04	10/4/04	10/6/04
MH-7	NE B124	Manhole removed to 4 ft. bfg	9/14/04	10/4/04	11/15/04
MH-8	E B125	Manhole removed to 4 ft. bfg	9/14/04	10/5/04	11/15/04
MH-10	N B125	Manhole removed to 4 ft. bfg	8/19/04	10/4/04	11/15/04
MH-13	Between B121/122	Demolished w/ B122 foundation.. Manhole was not accessible for plugging. Manhole removed to 4 ft. bfg	8/19/04	Not plugged	10/4/04
MH-14	NE B125	Manhole removed to 4 ft. bfg	8/19/04	10/5/04	11/15/04
MH-15	E B111	Manhole removed to 4 ft. bfg	10/4/04	10/4/04	10/12/04
MH-16	SE B111	Manhole removed to 4 ft. bfg	8/19/04	7/13/04	10/11/04
MH-17	S B111	Manhole removed to 4 ft. bfg	Contact Record Exempt**	7/13/04	10/11/04
MH-18	S B111	Manhole removed to 4 ft. bfg	Contact Record Exempt	7/13/04	10/11/04
MH-19	S B115	Manhole removed to 4 ft. bfg	9/14/04	10/4/04	10/12/04
MH-20	NE B122	Manhole removed to 4 ft. bfg	8/19/04	10/5/04	10/11/04
MH-21	N B119	Manhole removed to 4 ft. bfg	Contact Record Exempt	7/13/04	10/11/05
MH-22	N B123	Manhole removed to 4 ft. bfg	9/14/04	10/6/04	10/7/04
MH-25	NW B441	Manhole removed to 4 ft. bfg	10/5/04	10/6/04	12/6/04
MH-26	N B441	Removed with 441 Slab (see IHSS 400-8 Close Out Report)	9/18/02	9/18/02	9/18/02
MH-29	NW B441	Manhole removed to 4 ft. bfg	9/14/04	10/6/04	10/6/04
MH-30	W B331	Manhole removed to 4 ft. bfg	10/5/04	10/6/04	12/7/04
MH-31	SW B331	Manhole removed to 4 ft. bfg	9/14/04	10/6/04	10/11/04
MH-32	SE B331	Manhole removed to 4 ft. bfg	9/21/04	10/6/04	10/11/04
MH-33	5th & Central	Manhole removed to 4 ft. bfg	10/4/04	10/6/04	10/11/04
MH-34	W B442	Manhole removed to 4 ft. bfg	10/4/04	10/6/04	11/15/04
MH-35A	WB442	Previously removed. . This manhole could not be located during the final closure activities.	N/A	N/A	No record.
MH-35B	NW B331	Manhole removed to 4 ft. bfg	9/14/04	10/4/04	10/6/04
MH-36	N B444	Manhole removed to 4 ft. bfg	9/21/04	10/5/04	12/8/04
MH-38	W B444	Manhole removed to 4 ft. bfg	10/4/04	10/5/04	12/8/04
MH-39	W B444	Manhole removed to 4 ft. bfg	9/21/04	10/5/04	1/20/05
MH-40	NE B460	Manhole removed to 4 ft. bfg	10/4/04	10/5/04	12/8/04
MH-41	Inside B447	Demo w/ bldg. Manhole removed to 4 ft. bfg	Contact Record	N/A	Demolished with B447

MH No.*	Location	Comments	Rad Survey Complete	Concrete Plugs	Demolished
			Exempt		
MH-42	Inside B447	Manhole removed to 4 ft. bfg	Contact Record Exempt	N/A	Demolished with B447
MH-43	E B460	Manhole removed to 4 ft. bfg	10/4/04	10/5/04	10/7/04
MH-44	E B460	Manhole removed to 4 ft. bfg	9/21/04	10/5/04	10/7/04
MH-46	NW B440	Manhole removed to 4 ft. bfg	9/21/04	10/5/04	12/10/04
MH-47	NW B440	Manhole removed to 4 ft. bfg	10/4/04	10/5/04	12/8/04
MH-48	N B439	Manhole removed completely w/30 ft. of sewer line	10/4/04	N/A	2/4/05
MH-49	S B334	Manhole Removed completely with 334 Demo	N/A	N/A	Demolished with B334
MH-50	SE B334	Manhole removed to 4 ft. bfg	9/21/04	10/7/04	10/11/04
MH-51	S B551	Manhole removed to 4 ft. bfg	9/21/04	10/7/04	10/12/04
MH-52	SE B551	Manhole removed to 4 ft. bfg	9/21/04	10/7/04	10/12/04
MH-53	S B681	Manhole removed to 4 ft. bfg	9/21/04	10/7/04	10/12/04
MH-54	E MH-53	Manhole removed to 4 ft. bfg	9/21/04	10/7/04	10/12/04
MH-55	8th & Cntr1	Manhole removed completely.	8/19/04	10/8/04	10/12/04
MH-58	N B762	Manhole removed to 4 ft bfg.	9/27/04	10/11/04	1/19/05
MH-59	SE B707	Manhole removed to 4 ft. bfg	10/8/04	10/11/04	12/1/04
MH-60	W B762A	Manhole removed to 4 ft. bfg	8/19/04	10/8/04	10/12/04
MH-61	N T760A	Manhole removed to 4 ft. bfg	8/19/04	10/11/04	12/14/04
MH-62	NW B569	Manhole removed to 4 ft. bfg	9/21/04	10/7/04	11/10/04
MH-63	E B549	Manhole removed to 4 ft. bfg	9/21/04	10/7/04	12/7/04
MH-64	S B552	Manhole removed to 4 ft. bfg	9/21/04	10/7/04	10/13/04
MH-65	SE B552	Manhole removed to 4 ft. bfg	9/21/04	10/7/04	10/13/04
MH-66	NE T760A	Manhole removed to 4 ft. bfg	8/19/04	10/11/04	10/13/04
MH-67	N MH-66	Manhole removed to 4 ft. bfg	10/4/04	10/11/04	10/13/04
MH-68	SE Tent 12	Manhole removed to 4 ft. bfg	10/4/04	10/11/04	12/16/04
MH-69	SE Tent 12	Manhole removed to 4 ft. bfg	10/4/04	10/11/04	12/16/04
MH-71	E Tent 4	Manhole removed to 4 ft. bfg	10/12/04	12/8/04	1/3/05
MH-75	S T371C	Manhole and associated lines removed completely as burrow area was excavated to 12 feet BFG	Not surveyed	Not plugged; removed completely	3/17/05
MH-76	SE T371C	Manhole and associated lines removed completely as burrow area was excavated to 12 feet BFG	Not surveyed	Not plugged; removed completely	3/17/05
MH-77	NW B372A	Manhole Removed completely by Sector Closure	8/30/04	N/A	2/22/05
MH-78	NE B372A	Manhole removed to 4 ft. bfg	10/7/04	10/11/04	12/21/04
MH-79	NE B223	Manhole removed to 4 ft. bfg	9/21/04	10/7/04	10/13/04
MH-80	S B374	Manhole removed to 4 ft. bfg	9/21/04	10/11/04	12/28/04
MH-82	SE B374	Lift Station #1	9/21/04	N/A	3/15/05
MH-83	S T376A	Manhole Removed completely by Sector Closure	4/13/05	N/A	4/13/05
MH-84	N B376	Manhole Removed	9/21/04	N/A	4/8/05

MH No.*	Location	Comments	Rad Survey Complete	Concrete Plugs	Demolished
		completely by Sector Closure			
MH-86	W 373 CT	Not a manhole but a sump associated with cooling tower connection to sanitary system. Removed completely with basin foundation.	12/28/04	12/29/04	12/29/04
MH-95	N B777	Manhole removed to 4 ft. bfg	12/8/04	12/8/04	12/14/04
MH-96	NE B777	Manhole removed to 4 ft. bfg	10/12/04	10/12/04	12/14/04
MH-97	SW B776	Manhole removed completely	10/8/04	10/11/04	1/18/05
MH-98	S B776	Manhole removed to 4 ft. bfg	9/27/04	10/11/04	1/18/05
MH-99	SW B776	Manhole removed to 4 ft. bfg	9/27/04	10/11/04	12/6/04
MH-100	N B750	Manhole removed to 4 ft. bfg	9/27/04	10/11/04	1/18/05
MH-101	NE B707	Manhole removed to 4 ft. bfg	9/27/04	10/11/04	12/1/04
MH-103	E B707	Manhole removed to 4 ft. bfg	9/27/04	10/11/04	12/1/04
MH-104	E B777	Manhole removed to 4 ft. bfg	9/27/04	10/21/04	11/23/04
MH-105	SW B779	Manhole removed to 4 ft. bfg	10/21/04	10/21/04	12/13/04
MH-106	S B779	Manhole Removed to 4 ft. bfg with 779 Pad as described in IHSS 700-7 Close Out Report.	05/04	05/04	05/04
MH-107	S B779	Manhole removed to 4 ft. bfg	10/21/04	10/21/04	11/23/04
MH-108	NE B664	4' 3" below grade	9/14/04	10/8/04	11/22/04
MH-109	SE B664	4' 4" below grade	9/14/04	10/8/04	11/22/04
MH-110	W B850	None	10/4/04	10/8/04	11/10/04
MH-111	N B850	None	10/4/04	10/8/04	11/10/04
MH-112	N B850	Not a manhole but a grease trap associated with B850 cafeteria	N/A	N/A	6/26/02
MH-113	N B850	Not a manhole but a grease trap associated with B850 cafeteria	N/A	N/A	6/26/02
MH-115	NW 215C	Manhole removed to 4 ft. bfg	10/5/04	10/11/04	11/11/04
MH-116	NE 215C	Manhole removed to 4 ft. bfg	9/27/04	10/11/04	11/11/04
MH-117	NW 215D	Manhole removed to 4 ft. bfg	9/27/04	10/12/04	11/11/04
MH-121	NE Tent 2	Manhole removed to 4 ft. bfg	10/8/04	10/12/04	1/12/05
MH-122	SW B928	Manhole removed to 4 ft. bfg	9/27/04	10/12/04	11/11/04
MH-123	SE B910	Manhole removed to 4 ft. bfg	10/7/04	10/12/04	1/24/05
MH-127	W B883	Manhole removed to 4 ft. bfg	9/14/04	10/8/04	11/8/04
MH-128	NW B883	Manhole removed to 4 ft. bfg	10/4/04	10/8/04	11/10/04
MH-129	W B889	Manhole removed to 4 ft. bfg	8/30/04	10/8/04	11/8/04
MH-130	W B884	Manhole removed to 4 ft. bfg	9/14/04	10/8/04	11/8/04
MH-131	Inside B883 on "C" side	Removed completely with building slab.	N/A	N/A	Demolished with B883
MH-133	SW T883A	Manhole removed to 4 ft. bfg	10/21/04	10/21/04	11/8/04
MH-134	NW B889	Previously removed completely to allow for OPWL excavations.	N/A	N/A	Previously

MH No.*	Location	Comments	Rad Survey Complete	Concrete Plugs	Demolished
MH-135	W B886	Manhole removed completely with B886.	N/A	6/28/02	6/28/02
MH-136	W B707	Manhole removed to 4 ft. bfg	10/12/04	10/11/04	11/10/04
MH-138	NW B881	Manhole removed to 4 ft. bfg	9/14/04	10/8/04	11/8/04
MH-139	S B881	Manhole removed completely with B881	N/A	N/A	Demolished with B881
MH-140	NE B910	Manhole removed to 4 ft. bfg	10/8/04	10/12/04	1/11/05
MH-141	E B910	Manhole removed to 4 ft. bfg	9/27/04	10/12/04	12/10/04
MH-144	W 990	Part of B930 SNM Detectors located on the PA influent line to B990. Removed to 4 ft. bfg.	10/4/04		12/6/04
MH-145	W 990	Part of B930 SNM Detectors located on the non-PA influent line to B990. Removed to 4 ft. bfg.	10/4/04		12/6/04
MH-146	W 990	Not a manhole but the junction box at B990 where the two influent lines (PA and non-PA) combined flow. Removed completely.	N/A	N/A	12/6/04
MH-147	NE 990	Manhole removed to 4 ft bfg.	9/27/04	10/12/04	11/11/04
MH-148	E 990	Manhole removed to 4 ft. bfg	9/27/04	10/12/04	12/29/04
MH-149	W 995	Also designated as B931 housing SNM detectors at the influent to B995. Removed to 4 ft. bfg.	10/4/04	N/A	January 2005
MH-150	W 995	Manhole removed to 4 ft. bfg.	10/4/04	N/A	January 2005
MH-151	995	Manhole located at B995 as part of the treatment system infrastructure. Removed completely during demolition of B995.	N/A	N/A	January 2005
MH-152	995	Manhole located at B995 as part of the treatment system infrastructure. Removed completely during demolition of B995.	N/A	N/A	January 2005
MH-153	995	Manhole located at B995 as part of the treatment system infrastructure. Removed completely during demolition of B995.	N/A	N/A	January 2005
MH-154	995	Manhole located at B995 as part of the treatment system infrastructure. Removed completely during demolition of B995.	N/A	N/A	January 2005

MH No.*	Location	Comments	Rad Survey Complete	Concrete Plugs	Demolished
MH-155	995	Manhole located at B995 as part of the treatment system infrastructure. Removed completely during demolition of B995.	N/A	N/A	January 2005
MH-156	995	Manhole located at B995 as part of the treatment system infrastructure. Removed completely during demolition of B995.	N/A	N/A	January 2005
MH-157	995	Manhole located at B995 as part of the treatment system infrastructure. Removed completely during demolition of B995.	N/A	N/A	January 2005
MH-158	995	Manhole located at B995 as part of the treatment system infrastructure. Removed completely during demolition of B995.	N/A	N/A	January 2005
MH-159	995	Manhole located at B995 as part of the treatment system infrastructure. Removed completely during demolition of B995.	N/A	N/A	January 2005
MH-160	995	Manhole located at B995 as part of the treatment system infrastructure. Removed completely during demolition of B995.	N/A	N/A	January 2005
MH-161	995	Manhole located at B995 as part of the treatment system infrastructure. Removed completely during demolition of B995.	N/A	N/A	January 2005
MH-162	995	Manhole located at B995 as part of the treatment system infrastructure. Removed completely during demolition of B995.	N/A	N/A	January 2005
MH-163	NE T117A	Manhole removed to 4 ft. bfg	Contact Record Exempt	N/A	12/3/03
MH-164	NW B116	Manhole removed to 4 ft. bfg	Contact Record Exempt	N/A	12/3/03
MH-165	N B116	Manhole removed to 4 ft. bfg	10/7/04	10/12/04	12/7/04
MH-166	S T371C	Manhole and associated lines removed completely as burrow area was excavated to 12 feet BFG	Not surveyed	Not plugged; removed completely	3/17/05

MH No.*	Location	Comments	Rad Survey Complete	Concrete Plugs	Demolished
MH-167	E MH-66	Manhole removed to 4 ft. bfg	8/30/04	9/2/04	9/7/04
MH-168	N Tent 7	Manhole removed to 4 ft. bfg	8/19/04	8/18/04	8/23/04
MH-169	NE Tent 7	Manhole removed to 4 ft. bfg	8/30/04	9/2/04	9/7/04
MH-170	SW Tent 7	Manhole removed to 4 ft. bfg	8/19/04	8/18/04	8/23/04
MH-171	S Tent 7	Manhole removed to 4 ft. bfg	8/19/04	8/18/04	8/23/04
MH-173	NW T891E	Manhole removed to 4 ft. bfg	8/19/04	9/2/04	9/7/04
MH-174	SW T891Q	Manhole removed to 4 ft. bfg	8/19/04	8/18/04	8/23/04
MH-175	NE T891E	Manhole removed to 4 ft. bfg	9/1/04	9/2/04	9/7/04
MH-176	NW T891E	Manhole removed to 4 ft. bfg	8/19/04	8/18/04	8/23/04
MH-177	NE T891A	Manhole removed to 4 ft. bfg	8/19/04	8/18/04	8/23/04
MH-178	NE B865	Manhole removed to 4 ft. bfg	8/19/04	8/18/04	9/10/04
MH-180	S T886B	Manhole removed to 4 ft. bfg	8/19/04	8/18/04	9/10/04
MH-181	N T893A&B	Manhole removed to 4 ft. bfg	8/19/04	8/18/04	9/10/04
MH-182	N B706	Manhole removed to 4 ft. bfg	10/5/04	10/11/04	11/23/04
MH-183	S MH-55	Previously Removed. This manhole could not be located during the final closure activities.	N/A	N/A	Previously
MH-184	E B443	Removed completely with fuel oil remediation	10/5/04	N/A	Demolished with B443
MH-188	S B130	Manhole removed to 4 ft. bfg	8/30/04	10/4/04	10/6/04
MH-189	SW B131	Manhole removed to 4 ft. bfg	8/30/04	10/4/04	10/6/04
MH-190	E MH-189	Manhole removed to 4 ft. bfg	8/30/04	10/4/04	10/6/04
MH-191	N T124A	Manhole removed to 4 ft. bfg	9/14/04	10/4/04	11/9/04
MH-192	NW B331	Manhole removed to 4 ft. bfg	9/14/04	10/4/04	12/7/04
MH-193	E B460	Manhole removed to 4 ft. bfg	10/5/04	10/5/04	10/7/04
MH-194	SE T371C	Manhole and associated lines removed completely as burrow area was excavated to 12 feet BFG	Not surveyed	Not plugged; removed completely	3/17/05
MH-195	SE T371C	Manhole and associated lines removed completely as burrow area was excavated to 12 feet BFG	Not surveyed	Not plugged; removed completely	3/17/05
MH-197	E B991	Manhole removed to 4 ft. bfg during the demolition of B991.	Contact Record Exempt	3/9/04	3/9/04
MH-198	E B991	Manhole removed to 4 ft. bfg during the demolition of B991.	Contact Record Exempt	3/9/04	3/9/04
MH-199	NE B771	Manhole removed to at least 3 feet bfg and filled with clean fill.	N/A	N/A	September 2004
MH-200	E B566	Manhole removed to 4 ft. bfg	10/12/04	10/13/04	10/20/04
MH-201	E B777	Manhole removed to 4 ft. bfg	10/21/04	10/21/04	3/1/05
MH-202	E B569	Manhole removed to 4 ft. bfg	10/12/04	10/11/04	11/10/04

MH No.*	Location	Comments	Rad Survey Complete	Concrete Plugs	Demolished
MH-203	E B569	Manhole removed to 4 ft. bfg	10/12/04	10/11/04	11/10/04
MH-204	W B883	Manhole removed to 4 ft. bfg	9/14/04	10/8/04	11/23/04
MH-205	SW B441	Manhole removed to 4 ft. bfg	10/4/04	10/6/04	10/7/04
MH-206	SW B440	Manhole removed to 4 ft. bfg	3/15/05	N/A	3/31/05
MH-207	SW B440	Manhole removed to 4 ft. bfg	3/15/05	N/A	3/31/05
MH-208	S B790	Manhole removed to 4 ft. bfg during demolition of B790	N/A	7/9/04	7/9/03
MH-209	N MH-167	Previously removed. This manhole could not be located during the final closure activities.	N/A	N/A	Previously
MH-210	NW 372A	Manhole Removed completely by Sector Closure	10/21/04	N/A	3/20/05
MH-211	SE B564	Manhole removed to 4 ft. bfg	10/12/04	10/11/04	11/10/04
MH-212	N T690N	Manhole removed to 4 ft. bfg	10/21/04	10/21/04	11/9/04
MH-213	W B702	Manhole removed completely with B702 demolition.	N/A	N/A	Demolished with B702
MH-214	NE B559	Manhole removed to 4 ft. bfg	10/12/04	10/11/04	1/17/05
MH-215	E B112	Manhole removed to 4 ft. bfg	10/5/04	10/6/04	10/7/04
MH-216	S B371	Manhole removed to 4 ft. bfg	9/21/04	10/11/04	3/20/054

* The manhole numbers were established in the 1990s as part of a utility inventory. There are gaps in the numerical sequence because field work demonstrated that some of the numbered structures were not manholes.

**Contact Record Exempt – Manhole removals conducted prior to the Final Closure Strategy (August 31, 2004)

Lift Stations

There were 13 lift stations in the Rocky Flats sanitary collection system. All have been demolished as described in the Closure Strategy. Table 3 list the lift station number and the location.

Lift stations were either removed completely, or grouted and removed down to 4 feet below grade as described in the Technical Memorandum, except for the lift station associated with B771, LS-5. This facility was stripped, removed to at least 3 feet bfg, and filled with clean fill. All pumps, piping, controls and related equipment were removed completely.

Table 3: Rocky Flats Sanitary Collection System Lift Stations

Lift Station Number	Location	Removed to Below 4 Ft. (O) or Completely Removed (X)*
LS-1	SE 374	O
LS-2	S 771F	O
LS-3	NW 771	O
LS-4	E 792A	O
LS-5	N 771	O
LS-6	S 883	O
LS-7	S 881	X
LS-8	N 886 B	O
LS-9	S 906	O
LS-10	S 792	O
LS-11	S 792	O
LS-12	NE 713	X
LS-13	S B765	O

Groundwater and the Closed Sanitary Collection System

There was some concern that the sewer lines left in place or the bedding material of the sewer lines could serve as a conduit for underground contamination to impact surface waters. To protect against such preferential flow, the sewer lines were grouted at every manhole, as described above, and at strategic locations the lines were excavated and both the line and the bedding material were grouted. Those locations are shown on the Close Out Report Drawing 1 as Interruption Ditches. Groundwater modeling assessing contaminant transport shows that, in general, without the disruptions to the bedding material, there is a potential for contaminants to move along this pathway. Even with the interruptions, other deep excavations may still allow for the migration of ground water across this area. Interruptions were made at 8 locations, primarily from the B776-B881 corridor and eastward. The N-S interruption next to manholes 55 and 58 included the abandoned lines and utility trenches known to be in this area. Bed rock is known to be shallow in the corridor area, so the disruptions at the key locations along this line were made in an effort to isolate the collection system for the western half of the industrial area. In the area

10/10

east of the corridor, additional interruptions have been made in the vicinity of B910 and B990, further disrupting preferential groundwater pathways in the sewer line bedding material.

The actions taken to isolate the Sanitary Sewer System should reduce or eliminate adverse environmental impacts associated with this system. Further, a Programmatic Biological Assessment (PBA) and accompanying Biological Opinion (BO) conducted to assess impacts of demolition activities was completed in April 2004. The PBA/BO concludes that the cessation of wastewater treatment plant effluent and of imported water is not considered to be a depletion of the Platte River system.

As for residual waste, screening activities during closure showed that there was no contamination in the system, although historical data documents that the sanitary system had carried contaminants. In its role as Lead Regulatory Agency for the Industrial Area, the State of Colorado expressed concern about the residual contamination, but did approve the Environmental Restoration No Further Action Alternative (NFAA) for the Sanitary Sewer System (PAC 000-500) on March 21, 2005. Closure activities, such as line flushing and grouting, further reduced any remnant levels of contamination, and, in the case of grouting, reduced the potential for migration. All facilities have been removed to at least 3 feet below final grade, and the former site of B995 has been regraded as part of Functional Channel 4. Figure 1 shows a present day view of Functional Channel 4 from the 750 Pad to the west down to Pond B-1 to the east. The north side of the drainage was the site of B995.

Drawing

July 21, 2005

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