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Sent by Email

December 29, 2019

Licensing
Nunavut Water Board
P.O. Box 119
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Re: November 2019 – Monthly Monitoring Report for Water Licence 2AM-DOH1335

This report is comprised of the monitoring requirements set out in Part I and Schedule I of water licence 2AM-DOH1335 Amendment 2 (the licence), and additional requirements from CIRNAC.

During the subject period of this report, the focus of activities at Doris North was underground mining, construction, ore processing, water management and environmental compliance.

Commissioning of the Water Treatment Facility (WTF) continued in early November with activities focused on treatment of underground mine effluent and discharge of treated effluent into the Tailings Impoundment Area (TIA). These activities resulted in an unauthorized release of untreated mine water onto the engineered camp pad. This unauthorized release was reported to the NT/NU Spills line and the Inspector within 24 hours of the event. Information regarding the release can be found under the Incident Summary heading on page 15 of this report.

Development of the Madrid North Portal commenced in November. Construction of the Madrid North Portal laydowns and the Waste Rock Pile continued including placement and commissioning of power generators, temporary fuel storage and a mobile maintenance shop. Overburden stripping and blast activities continued in the Naartok East Crown Pillar Recovery Trench under this licence for the month. Figure 1 shows construction activities at the Madrid North Portal laydown including initial portal development. Figure 2 shows continued progress of overburden stripping and mining activities at the Naartok East Crown Pillar Recovery Trench.

Monitoring locations associated with Madrid infrastructure (MMS) will be established with the Inspector as per Part I Item 3 as construction of Madrid facilities are completed. Sampling locations monitored under this licence (seasonally or when facilities are operational) are provided in Figure 6 and Figure 7 at the end of this report.

Figure 1. Madrid North Portal Laydown, November 2019

Figure 2. Naartok East Crown Pillar Recovery Trench, November 2019

Site Wide Water Quality Monitoring Program (Part I Item 3 and Schedule I)

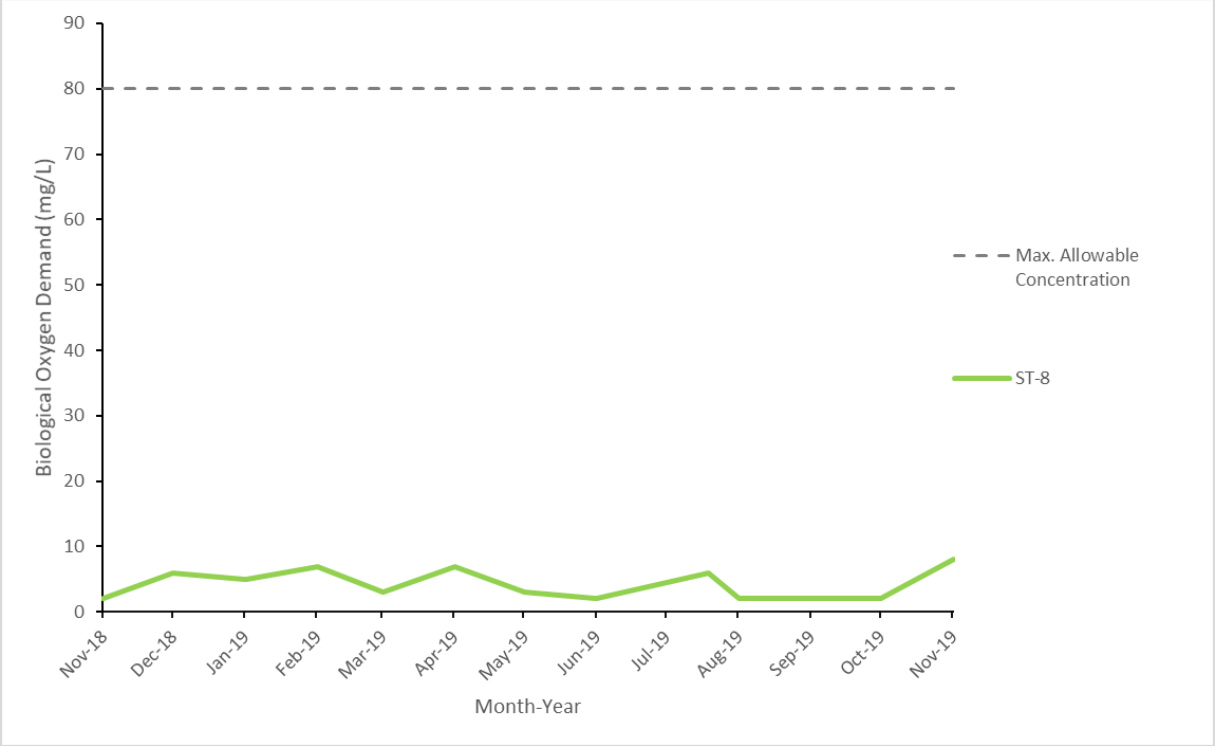
Water quality sampling was conducted in November at monitoring stations identified in Schedule I of the licence (ST-1 through ST-13, TL-1 through TL-12 and MMS-1 through MMS-10). Water quality samples were not collected for monitoring stations that were inactive during the month being reported (e.g., facilities that had not yet been constructed, were frozen during the month, or were not operationally active).

All parameters were compared to the applicable effluent quality limits outlined in Part D and Part F of the licence. No exceedances of effluent quality limits were observed in any samples collected this month. Results of all water quality monitoring are provided in Appendix A attached to this report.

A spike in TSS was observed at ST-8 from the sample collected in November, although the results were below the Maximum Average Concentration outlined in Part F, Item 5(a). An investigation was conducted upon receipt of the results. One of the sewage treatment units experienced a temporary upset due to a drop in pH that had an impact on treatment performance. This appears to have been an isolated event as subsequent sampling results were below detection limits, falling in line with the trend observed over the last monitoring year.

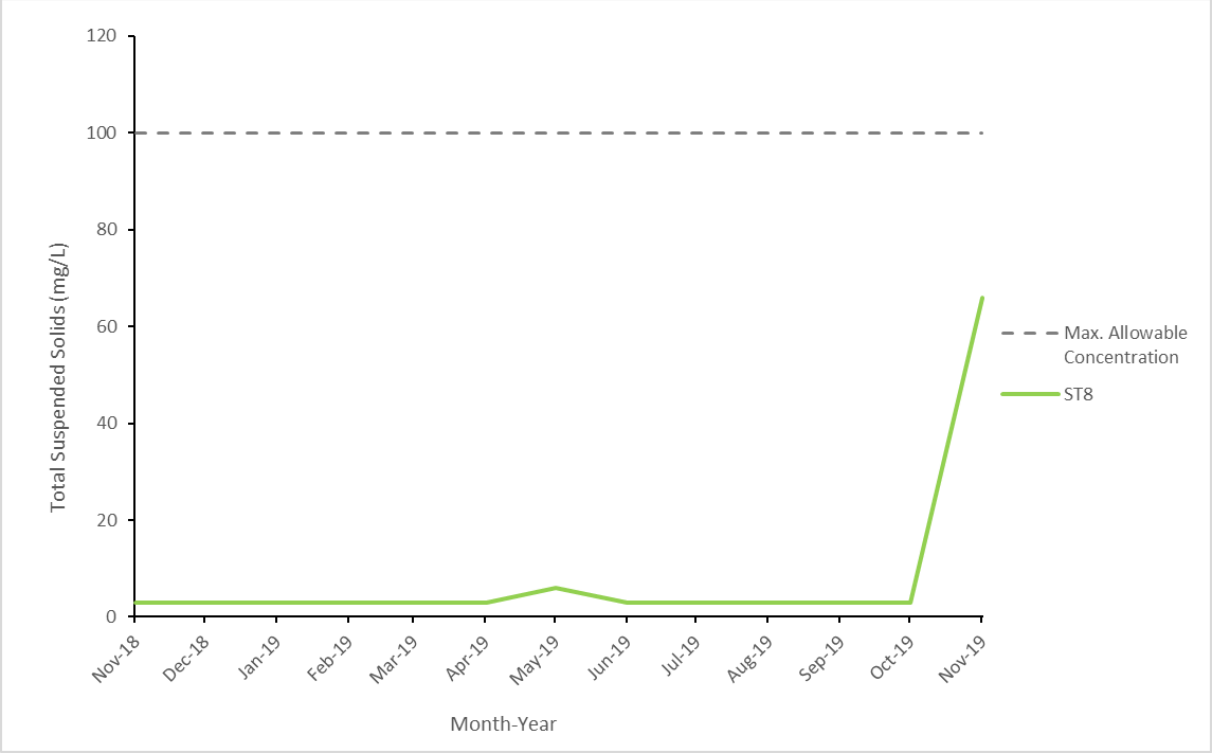
Figure 3 and 4 illustrates effluent quality characteristics for parameters of interest at select monitoring stations.

Figure 3. Biological Oxygen Demand Results Consistently Below Discharge Criteria for Wastewater Treatment Plant (ST8)



Note: Maximum Average Concentration as per Part F Item 4(b).

Figure 4. Total Suspended Solids Results Consistently Below Discharge Criteria for Wastewater Treatment Plant (ST8)



Note: Maximum Average Concentration as per Part F Item 4(b).

Flow and Volume Measurements (Part F, Part I and Schedule I)

Table 1. Effluent discharge, November 2019

Facility	Station Code	Discharge Volume (m^3)	Exceedances of Discharge Criteria	Discharge Location	Licence Reference
Doris Sedimentation Pond	ST-1	0	N/A	Tailings Impoundment Area	Part F Item 17
Doris Contact Water Pond #1	ST-2	0	N/A	Tailings Impoundment Area	Part F Item 17, 18(a)
Non-Hazardous Landfill Sump	ST-3	0	0	Facility not constructed	Part F Item 18(a)
Landfarm Sump	ST-4	0	0	Tailings Impoundment Area	Part F Item 18(b)
Doris Plant Site Fuel Storage Area	ST-5	0	0	Tailings Impoundment Area	Part F Item 18(b)
Rob Bay Single 5ML Fuel Storage Area	ST-6a	0	0	Tundra Discharge 13W 432904 7563494	Part F Item 18(b)
Rob Bay Fuel Storage and Containment Berm	ST-6b	0	0	Tailings Impoundment Area	Part F Item 18(b)
Doris Sewage Treatment Plant, Effluent	ST-8	1,384	0	Tundra Discharge 13W 432933 7559057	Part F Item 5(b-c)
Doris Sewage Treatment Plant, Sludge	N/A	23.8	N/A	Tailings Impoundment Area	Part I Item 5(f)
Doris Reagent and Cyanide Storage Facility Sump	ST-11	0	N/A	Tailings Impoundment Area	Part F Item 17
Doris Contact Water Pond #2	ST-13	0	N/A	Facility not constructed	Part F Item 17
Doris Mine Water Discharge	TL-12	40,140	N/A	Tailings Impoundment Area	
Madrid North Contact Water Pond	MMS-1	0	0	Tailings Impoundment Area	Part F Item 17, 18(a)
Madrid South Primary Contact Water Pond	MMS-2	0	N/A	Facility not constructed	Part F Item 17, 18(a)
Madrid South Secondary Contact Water Pond	MMS-3	0	N/A	Facility not constructed	Part F Item 17, 18(a)
Madrid South Fuel Storage Facility	MMS-5	0	0	Facility not constructed	Part F Item 18(b)
Madrid Brine Mixing Facility	MMS-6	0	N/A	Facility not constructed	
Madrid North Connector	MMS-7	0	N/A	No mining occurring at this time	
Madrid North Fuel Storage Facility	MMS-8	0	0	Facility not constructed	Part F Item 18(b)
Madrid Mine Water Discharge	MMS-10	0	N/A	Facility not constructed	

Records of visual monitoring of discharge to tundra are maintained on file as per Part I Item 11.
* Note: Volume reported includes effluent transferred the Doris Contact Water Pond #1, Landfarm Sump, Doris Plant Site Fuel Storage Area, Rob Bay Fuel Storage and Containment Berm and Doris Mine Water Discharge.

Table 2. Discharge from TIA, November 2019

Month	Number of days of discharge	Discharge Volume (m^3)	Exceedances of Discharge Criteria*
January	0	0	0
February	0	0	0
March	0	0	0
April	0	0	0
May	0	0	0
June	0	0	0
July	0	0	0
August	0	0	0
September	0	0	0
October	0	0	0
November	0	0	0
Annual Cumulative	**0**	**0**	**0**

* Discharge criteria as outlined in *Metal and Diamond Mining Effluent Regulations*.
Acute Lethality testing conducted as outlined in Part F Item 22 and Part I Item 14

Table 3. Water usage, November 2019

Month	Windy Lake (ST-7A)	Doris Lake (ST-7)					Total Usage
	Domestic Water (m^3)	Domestic Water (m^3)	Surface Exploration (m^3)	Industrial Usage* (m^3)	Dust Suppression (m^3)	Winter Track (m^3)	
January	1,438	0	0	16	0	432	1,886
February	1,341	0	0	48	0	275	1,664
March	1,403	0	0	77	0	0	1,480
April	1,422	0	0	20	0	2	1,444
May	1,513	0	0	51	0	0	1,564
June	1,374	0	0	30	96	0	1,500
July	1,340	0	0	33	0	0	1,373
August	1,294	0	0	78	48	0	1,420
September	1,274	0	0	68	81	0	1,422
October	1,418	0	0	36	0	0	1,454
November	1,464	0	0	57	0	0	1,521
Annual Total	15,281	0	0	546	224	709	16,760
Annual Allowance	**43,800**			**1,930,000**		**60,000**	**2,033,800**

As permitted by water licence 2AM-DOH1335 Part E Item 1 and Part I Item 5(a)(b).

* Includes industrial uses such as mining, core processing, concrete batching, etc.

Table 4. Volume of Reclaim Water from the TIA for Process Water, November 2019

Month	Reclaim Water (m^3) *
January	64,572
February	57,207
March	69,824
April	60,913
May	61,908
June	57,603
July	69,389
August	79,005
September	84,230
October	82,918
November	77,744
Annual Cumulative	**765,314**

* As per Part E Item 5 and Part I Item 5(c)
Numbers rounded to the nearest cubic meter.

Table 5. Doris Waste Rock and Ore Volumes, November 2019

Month	Waste Rock Management					Underground Void Space			Ore Processing and Tailings Management		
	Produced from Mining Activity (tonnes)	Backfilled Directly to Underground Stopes (tonnes)	Returned Underground from Temporary Waste Rock Pile* (tonnes)	Moved to Temporary Waste Rock Pile (tonnes)*	Cumulative on Temporary Waste Rock Pile (tonnes)*	Volume Created from Mining Activities (tonnes)	Cumulative Volume Available for Backfill (tonnes)	Cumulative Volume Available for Backfill (m^3)	Quantity of Ore Processed** (tonnes)	Total Dry Tailings Placed in TIA** (tonnes)	Total Dry Detoxified Tailings Placed Underground** (tonnes)
December Balance	-	-	-	-	838,227	-	1,287,608	510,092	-	-	-
January	37,535	29,226	8,326	8,309	838,210	27,861	1,259,747	523,016	45,387	44,133	1,054
February	34,681	29,440	76,020	5,241	767,431	-27,625	1,287,372	540,300	47,479	46,178	1,261
March	35,005	22,895	82,592	12,110	696,949	-31,976	1,319,347	558,377	52,083	50,519	1,576
April	33,999	39,184	54,683	-5,185	637,081	-38,889	1,280,458	564,018	40,046	38,750	773
May	35,786	35,769	7,320	17	629,778	8,405	1,288,863	569,634	61,969	59,998	1,945
June	39,331	12,018	320	27,313	656,771	40,354	1,329,217	584,160	56,316	54,565	1,551
July	40,833	18,405	260	22,428	678,939	57,152	1,386,369	604,664	43,908	42,578	1,276
August	40,531	21,269	0	19,262	698,201	32,338	1,418,707	616,214	56,885	55,302	2,053
September	42,633	14,700	0	27,933	726,134	46,855	1,465,562	632,948	56,783	55,150	1,715
October	33,204	15,178	0	18,026	744,160	34,210	1,499,772	645,165	55,557	53,427	2,079
November	29,109	12,304	0	16,802	760,962	36,169	1,535,941	658,083	41,080	39,438	1,854
Cumulative Total	402,647	250,388	229,521	152,256	760,692	184,854	1,535,941	658,083	557,493	540,038	17,137

* As per Part I Item 5(d)(e)

** As per Part I Item 6

Note: Void space created from mining activities is determined as the sum of the initial void space as calculated in March 2017 and void space created each month from mining activities. A negative volume of void space created in a month indicates that a higher volume of waste rock and detoxified tailings was returned underground compared to the volume of void space created from new mining activities.

Table 6. Madrid North Waste Rock and Ore Volumes, November 2019

Month	Waste Rock Management						Underground Void Space			Ore Processing
	Produced from Mining Activity (tonnes)	Backfilled Directly to Underground Stopes (tonnes)	Returned Underground from Temporary Waste Rock Pile* (tonnes)	Moved to Temporary Waste Rock Pile (tonnes)*	Used for Construction (tonnes)	Cumulative on Temporary Waste Rock Pile (tonnes)*	Volume Created from Mining Activities (tonnes)	Cumulative Volume Available for Backfill (tonnes)	Cumulative Volume Available for Backfill (m^3)	Quantity of Ore Processed** (tonnes)
December Balance	-	-	-	-	-	-	-	-	-	-
January	0	0	0	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0	0	0	0
March	0	0	0	0	0	0	0	0	0	0
April	0	0	0	0	0	0	0	0	0	0
May	0	0	0	0	0	0	0	0	0	0
June	0	0	0	0	0	0	0	0	0	0
July	18,562	3,640	0	0	840	0	13,830	13,830	4,939	0
August	38,493	5,077	0	5,760	27,654	5,760	31,893	45,723	16,330	0
September	32,074	6,599	0	18,286	7,889	24,046	23,495	69,218	19,782	0
October	49,461	2,220	0	24,071	23,374	48,116	51,430	120,648	26,759	4,855
November	108,570	6,413	0	86,677	4,991	134,793	111,805	232,453	58,298	11,572
Cumulative Total	247,160	23,949	0	134,793	64,747	134,793	232,453	232,453	58,298	16,247

* As per Part I Item 5(d)(e)

** As per Part I Item 6

Note: Void space created from mining activities is determined as the sum of the initial void space created each month from mining activities. A negative volume of void space created in a month indicates that a higher volume of waste rock and was returned underground compared to the volume of void space created from new mining activities.

Table 7. Doris Lake Water Level (ST-12), November 2019

Month	Minimum Water Level (masl)	Maximum Water Level (masl)	Mean Water Level (masl)	Monthly Water Level Variation (masl)**	Comparison of Mean Water Level from Month to Month (masl)^	Low Action Level Trigger (masl)*
January	21.726	21.747	21.739	0.011	0.019	21.347
February	21.725	21.743	21.736	0.018	-0.003	21.347
March	21.723	21.743	21.733	0.020	-0.003	21.347
April	21.735	21.757	21.751	0.022	0.018	21.347
May	21.748	21.756	21.752	0.008	0.001	21.347
June	21.758	22.659	22.176	0.901	0.424	21.347
July	22.040	22.449	22.236	0.409	0.060	21.347
August	21.965	22.030	21.983	0.065	-0.253	21.347
September	21.895	21.978	21.938	0.082	-0.045	21.506
October	21.831	21.889	21.866	0.058	-0.072	21.506
November	21.812	21.832	21.822	0.020	-0.044	21.506

As per Part I Item 1 and outlined in the *Hope Bay Project Aquatic Effects Monitoring Plan*.

* Low action level trigger is relative to the average water level value (September 10-30, 2018/19) measured in Doris Lake. Low action level trigger (-0.42 m) outlined in Section 5.4 of the Doris Aquatic Effects Monitoring Plan, September 2016.

** Monthly Water Level Variation is calculated as the difference between the Maximum Water Level and the Minimum Water Level measured during the month.

^ Comparison of the change in water level from month to month. This value is calculated by subtracting the Mean Water Level of the current month from the Mean Water Level of the previous month (e.g. February Mean Water level - January Mean Water level). A positive value from this calculation indicates a rise in water level since the previous month; a negative value from this calculation indicates a drop in water level since the previous month.

Note: The low action trigger was corrected from September to November as the low action trigger value was not applied to the September 10-30 average water level measured in Doris Lake.

Waste Management (Part F Item 10 and 11)

No offsite waste disposal occurred in November.

Summary of Assessments of Water Balance and Water Quality Model (Part F Item 24 and Part I Item 12 c)

Average monthly water quality, hydrologic, and climatic monitoring data were collected while in operations during November. Data will contribute to the assessment of the water and load balance model, and will be compared to the predicted water quality and elevation within the TIA and will be reported in the annual report for 2019.

Thermal Monitoring (Part I Items 7, 8 and Schedule I)

Thermal monitoring undertaken as per Part I Items 7, 8 and Schedule I is reported in the annual Geotechnical Report.

Site Freshet and Precipitation Conditions (Part I Item 12(d))

Visual monitoring was conducted during major rain events and periods of sustained precipitation in November.

The Diversion Berm and associated check dam were observed to be functioning as designed and diverting non-contact water around the Doris site infrastructure. Photos of this infrastructure are provided in Figures 5 and 6 below.

Inspections were completed of site culverts throughout the month of November. No issues were identified with these water management structures as they were observed to be frozen due to the onset of winter.

Figure 5. Diversion berm dry during November

Incident Reporting

Spill # 19-453 - At the time of the spill event, TMAC was in the process of commissioning components of the Robert's Bay Discharge System (RBDS). The RBDS is designed to transport a single compliant effluent stream consisting of effluent from the Tailings Impoundment Area (TIA) and the underground mine workings.

Underground workings at the Doris-Madrid Project are dewatered to allow for continued mining activities. In this process, effluent is pumped from an underground sump to a tank in a water treatment pump house (Tank-001).

At the time of the incident (approx. 02:10am), Pump-001 had shut down as no water was being pumped from the underground workings and the level of Tank-001 was low. When pumping from underground recommenced and filled Tank-001, Pump-001 failed to restart. Effluent began to overflow from Tank-001 onto the floor which activated the sump pump. A high level alarm for Tank-001 had been installed to notify the Mill Control Room in advance of a potential overflow situation, however this alarm failed to initiate during this event.

The sump pump directed the effluent into an alternate storage tank in the water treatment pump house (Tank-140). As a result of the heightened load, the level in Tank-140 also increased beyond capacity and effluent began to overflow from this tank onto the floor of the facility. Effluent seeped into the Motor Control Centre (MCC) room and triggered an electrical fault, causing power in the facility to be lost. No alarm was activated when the facility lost power, and the status of the building was not discovered until the next control room rounds at 06:00am. Untreated mine effluent overtopped the doorsills of the building and spilled onto the crush aggregate pad outside the pump house. Effluent froze to the surface of the camp pad and no effluent was released to the surrounding environment.

An incident investigation was conducted soon after the incident occurred to determine the root cause. The investigation concluded with the following root causes:

- Inadequate communications between hardware, software and process when the high level alarm failed to communicate to the Mill control room of the potential overflow situation when Pump-001 did not restart;
- Inadequate warning systems as no alarm was in place to alert the Mill control room that power was lost in the facility (loss of communications alarm);
- Inadequate barriers in place to prevent water from entering MCC room.

Upon discovery, the underground effluent pumping was ceased, stopping the active spill. Power supply to the building was turned off to allow for safe entry. Contaminated snow, ice, and crush was excavated from the camp pad and removed for disposal in

the TIA. Refer to Photos 1 through 4 at the end of this report showing the spill location prior to, and after reclamation activities.

The following corrective/preventative actions were identified to reduce the likelihood of a reoccurrence:

- Review of control programming and field verification of all alarms. Ensure new alarms are tested prior to recommencing operations;
- New alarm will be installed to notify the Mill Control Room if a loss of communications/power has occurred within the facility;
- Construct concrete berm at the MCC doorway;
- Install an emergency drainage pipe system from the pump house building to the Sedimentation Control Pond to manage overflow in the event the sump pump system is overwhelmed within the facility.

Should there be any questions regarding this monthly report, please contact enviro@tmacresources.com.

Yours sincerely,

Kyle Conway
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Hope Bay Project
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Cc:
Omer Pasalic, Water Resources Officer, CIRNAC
Oliver Curran, Vice President - Environmental Affairs, TMAC
Jerome Girard, Mine General Manager, TMAC

Figure 6. 2AM-DOH1335 SNP Monitoring Locations

Figure 7. 2AM-DOH1335 SNP Monitoring Locations