

**PHASE I ENVIRONMENTAL SITE
ASSESSMENT AND HISTORICAL REVIEW
OF THE FORMER
IMPERIAL OIL REFINERY SITE**

REGINA, SASKATCHEWAN

10-4700.300

Submitted to:

Imperial Oil Limited

Submitted by:



O'CONNOR ASSOCIATES ENVIRONMENTAL INC.

**Suite 200, 318 - 11th Avenue SE
Calgary, Alberta
T2G 0Y2**

Phone: (403) 294-4200

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**THIS REPORT CONTAINS PROVISIONS LIMITING LIABILITY, THE SCOPE OF
THE REPORT AND THIRD PARTY RELIANCE**

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EXECUTIVE SUMMARY

Under the authorization of Imperial Oil Limited (Imperial Oil), O'Connor Associates Environmental Inc. (OAEI) conducted a Phase I Environmental Site Assessment (ESA) and Historical Review of the Former Imperial Oil Refinery located in northeast Regina, Saskatchewan. The purpose of the Phase I ESA and Historical Review was to help identify and summarize in a single document any potential environmental concerns arising from past land use activities on the subject property and surrounding properties.

The study area is located in northeast Regina, Saskatchewan, east of Winnipeg Street, south of the Ring Road, north of 1st Avenue and west of the Imperial Oil Terminal. The study area itself is currently comprised of the addresses on the following list. The legal property locations and descriptions are shown on Drawing No. 3.

- 333 Winnipeg Street is currently owned by the City of Regina and occupies the approximate northern half of the study area;
- 425, 445 and 445B Winnipeg Street are currently owned by the Food Bank and occupy the central southern half of the study area, with the exception of the eastern most 31 m, which does not have an address but is owned by the City of Regina;
- 609 Winnipeg Street, which occupies the southwestern corner of the study area, is owned and occupied by Auto Gallery 1994 Ltd.;
- 607 Adams Street, which occupies the southeastern corner of the study area, is owned and occupied by Japanese Auto Supply Ltd.; and,
- 623 Adams Street, which also occupies the southeastern corner of the study area, is owned and occupied by MacKenzie Plumbing & Heating (1989) Ltd.

Currently, the study area is bordered on the west side by Winnipeg Street. The Canadian National (CN) Railway line runs diagonally (towards the northeast) across the north end of the property, forming the north boundary. To the east of the study area is the Canadian Pacific (CP) Railway, which is oriented slightly to the northwest. The operating Imperial Oil Terminal and Distribution facility is located east of the CP Railway. The south end of the property is bordered by other industrial and commercial properties. The north end of Adams Street runs perpendicular to the southern boundary of the study area.

The north portion of 333 Winnipeg Street is generally vacant, with some debris piles located in the central region of the property. These piles are believed to be compost and/or Christmas tree recycling areas used by the City of Regina. The south portion of 333 Winnipeg Street is currently used as the City of Regina Transit Operations Facility. The area is occupied by one large building. Much of the remaining property is currently covered by grass and vegetation.

EXECUTIVE SUMMARY (continued)

The area is comprised of a combination of buildings, paved areas and landscaped areas. 425 Winnipeg Street consists of a rectangular building which appears to be a former refinery building which runs parallel to Winnipeg Street and houses several different businesses. 445 Winnipeg Street consists of one large building in the centre of the property and two other buildings that parallel the CP Railway. The southern most of these two buildings appears to be a former refinery building. As well, there appear to be two smaller abandoned former refinery buildings, as well as a former pump island. Provincial databases indicate that three above ground storage tanks (ASTs) and four underground storage tanks (USTs) were registered on this property. Records also show that four USTs on 445 Winnipeg Street were decommissioned in August 2002. Municipal information indicates that these tanks were between the large building and the two parallel to the CP Railway.

Immediately to the west of the CP Railway is a small strip of land, 445B Winnipeg Street that runs the length of 445 Winnipeg Street. This area is owned by the City of Regina and is mainly grass covered.

Located to the south of 425, 445 and 445B Winnipeg Street are 609 Winnipeg Street, in the southwestern corner of the study area, owned and occupied by Auto Gallery 1994 Ltd.; 607 Adams Street, in southeastern corner of the study area, owned and occupied by Japanese Auto Supply Ltd.; and 623 Adams Street, also in the southeastern corner of the study area, owned and occupied by MacKenzie Plumbing & Heating (1989) Ltd.

The above properties were part of the former Imperial Oil Regina Refinery which operated from approximately 1916 to 1975. Refinery facilities were also located on the adjacent Imperial Oil Distribution Terminal. Prior to 1916 the Refinery site and Distribution Terminal property were privately owned and apparently were not used for any commercial or industrial purposes. The City of Regina apparently acquired the Refinery site from Imperial Oil in 1979, with the exception of the southern most portion of the Refinery which was sold to Dairy Producers Co-Operative. The City of Regina then immediately sold the southern portion of the property they had acquired to Dairy Producers Co-Operative. The strip of land crossing the north portion of the Distribution Terminal property under the current Ring Road was transferred to the City of Regina in 1966. The former Refinery property north of the current ring road was sold to Interprovincial Pipeline Limited (IPPL), now Enbridge Pipelines, in 1950.

EXECUTIVE SUMMARY (continued)

Key findings of the Historical Review may be summarized as follows:

- The Imperial Oil Refinery was initially designed and constructed in 1916 to process crude oil and condensate at a rate of approximately 1500 barrels per day. The refinery was upgraded several times between 1925 and 1975 with a major modernization and expansion to 22 500 barrels per day capacity in 1954. The operations and waste management practices appear to have been typical of similar industrial facilities operating in this time period;
- The former Imperial Oil refinery operations and equipment were located principally on the Refinery site with storage operations and a waste disposal site located east of the CP Railway on the current Imperial Oil Distribution Terminal property;
- The seven water supply wells installed by Imperial oil into the Regina Aquifer to provide processing water for the refinery operations were left in place at the time of the refinery decommissioning (1975 to 1979). Five of these wells which had not been destroyed or covered by new buildings were later removed and sealed by Imperial Oil in 1991;
- The API oil/water separator was used to treat surface runoff water from the process area and the bermed tank compounds before being discharged, presumably, to the sanitary sewer. After 1963, sour water from the processing and treating operations and other hydrocarbon contaminated water was disposed in a deep disposal well installed to a depth of approximately 1200 m with Provincial Government approval. The deep disposal well was decommissioned and sealed as part of the refinery decommissioning operations in the late 1970s;
- A number of spills and smaller releases of both refined and unrefined hydrocarbon liquids occurred on the former Imperial Oil Refinery, generally originating from the Distribution Terminal property. A few larger spills have also been reported at both the Enbridge facility north of the site and the Co-op Refinery east of the site;
- The historical records and aerial photographs indicate that the aboveground equipment, tankage and some of the buildings on the refinery portion of the property were removed during the decommissioning between 1975 and 1979. Based on historical documents and current observations, below grade piping, sewers and foundations appear to have been left in place. Most of the waste materials, such as excavated oily soils, sludges and sediments cleaned from tanks, separators and processing units during the decommissioning or spent catalysts, coke and other waste materials were reported to either have been moved to the adjacent petroleum terminal property for landfarming or hauled offsite for landfill disposal;

EXECUTIVE SUMMARY (continued)

- Since the decommissioning of the former Imperial Oil Refinery in 1979 and the subsequent transfer of the land ownership to the City of Regina and others, the following site development activities have occurred:
 - a) Construction and expansion of the Ring Road over the time period from 1967 to 1976 across the northern portion of the land formerly owned by Imperial Oil;
 - b) Conversion of the former Imperial Oil Tank Farm east of the CP Rail right-of-way to a Distribution Terminal in 1974;
 - c) Remedial excavation of the former Coke disposal pits from 1974 to 1979;
 - d) Remedial excavation of the former sludge disposal pits from 1974 to 1979;
 - e) Construction of the Agrifoods Dairy Producers building between 1980 and 1981. This area was formerly occupied mainly by petroleum storage tanks. The building was apparently donated or sold by Agrifoods in 2004 to the Regina District Food Bank, which currently occupies the building;
 - f) Widening of Winnipeg Street to the west in 1983;
 - g) Development of the Staples Call Centre in 1984 on land formerly owned, but never used or developed, by Imperial Oil north of the refinery site and bounded by CP Rail on the east, CN Rail on the south, Winnipeg Street on the west and the Ring Road on the north side;
 - h) Construction of the Regina Transit Operations Facility (Bus Barns) in 1987 in the centre of the former refinery near the location of the former cooling water storage area and just north of the former main processing area;
 - i) Use of the northern portion of the former Refinery site as a City facility for mulching and composting of Christmas trees and other organic waste materials from approximately 1988 to the present time;
 - j) Remedial excavation of soil in the vicinity of the first TEL plant located in the northeast corner of the study area in 1990;
 - k) Acquisition of 623 Adams Street, at the southeast corner of former Refinery site, by MacKenzie Plumbing and Heating in 1999;
 - l) Acquisition of 607 Adams Street, at the southeast corner of former Refinery site, by Japanese Auto Supply in 2000; and
 - m) Acquisition of 609 Winnipeg Street, at the southwest corner of former Refinery site, by Auto Gallery in 2001.

- Some environmental assessments have been carried out on the former refinery property and adjoining properties since the site decommissioning was completed in 1979. The data summarized in Drawings No. 11 to 16, inclusive, indicates that the shallow, fine grained

EXECUTIVE SUMMARY (continued)

soils and groundwater in the shallow Condie Aquifer in some areas on, or adjacent to, the site, exhibit some evidence of impact by metals and limited impacts from petroleum hydrocarbons and possibly phenols. Although much of the available soil and groundwater data was collected in the late 1980s and 1990s, our comparison of these results with the current guidelines indicates that the extent of residual groundwater impacts at the site is limited. Furthermore, there is currently no direct evidence to suggest that the occupants of the commercial and industrial properties are being adversely affected by the reported exceedances in the subgrade soils and groundwater. The limited groundwater sampling data available from the deeper Regina Aquifer indicates that the groundwater quality has not been adversely affected by contaminants of possible concern from the former refinery operations or the current land use. LNAPL has never been recorded in any of the monitoring wells completed in either the Condie or Regina Aquifers; and

- This document has been prepared in order to summarize historical land use information that has been recorded over more than 90 years at this site for use in evaluation of possible future environmental assessment requirements and any associated environmental management activities.

1.0 INTRODUCTION

1.1 Objectives and Scope of Work

Under the authorization of Imperial Oil Limited (Imperial Oil), O'Connor Associates Environmental Inc. (OAEI) conducted a Phase I Environmental Site Assessment (ESA) and Historical Review on the portion of the former Imperial Oil Refinery and Tank Farm now owned by third parties. Imperial Oil has retained ownership of the Tank Farm property, which is now operated as a Distribution Terminal. The former Imperial Oil Refinery and Tank Farm is located in the northeast quadrant of the City of Regina, Saskatchewan. The purposes of the Phase I ESA and Historical Review were to help identify and summarize in a single document the potential environmental concerns arising from past land use activities on the former Regina Refinery site and surrounding properties. A site location map and a site plan (2006 aerial photograph) identifying the study area are presented as Drawings No. 1 and 2, respectively.

1.2 Methodology

This report has been prepared in general accordance with the Canadian Standards Association (CSA) Z768-01 Standard *Phase I Environmental Site Assessments* but specifically does not include any recommendations. This Phase I ESA consisted of:

1. A reconnaissance survey of the study area and surrounding properties on May 13, 2008.
2. An evaluation of the historical study area and adjacent property use by reviewing the following sources:
 - a. Aerial photographs;
 - b. City infrastructure records;
 - c. City zoning maps;
 - d. City address and street maps;
 - e. Historical land titles; and
 - f. Historical local directories.

Note that historical fire insurance maps are not available for this area of Regina.

3. A review of reports and records available from the City of Regina and Saskatchewan Ministry of the Environment (SMOE) regarding the study area.
4. A review of reports, records and other documents available from Imperial Oil.
5. A review of relevant records in government and non-government maintained databases regarding site use, compliance, spills, storage, etc.
6. Interviews with personnel familiar with the study area and surrounding areas.

7. A review of information regarding the physical setting of the study area including:
 - a. Topographic maps,
 - b. Geological studies, and
 - c. Hydrogeological studies.

Historical information was reviewed from the first property use that may have affected the study area, or to the extent that historical information allowed. Historical information regarding surrounding properties was limited to either an approximate 500 m radius from the study area, or to the properties directly adjacent to the study area, unless otherwise indicated. Furthermore, the review of historical and regulatory information for surrounding properties was restricted to publicly available information and was limited to constraints imposed by practicality and scheduling. This Phase I ESA did not involve intrusive investigations, noise assessments, an evaluation of compliance with government regulations, or effects on property value.

1.3 General Description of the Study Area

The study area is located in northeast Regina, Saskatchewan, east of Winnipeg Street, south of the Ring Road, north of 1st Avenue and west of the Imperial Oil Distribution Terminal. A site location map and site plan showing the study area, current surrounding land use and site features are presented on Drawings No. 1 and 3, respectively.

2.0 SITE DESCRIPTION

2.1 Site Setting and Current Condition

The study area is located in northeast Regina, Saskatchewan, within the west half of Section 32, Township 17, Range 19, West of the 2nd Meridian. A site plan showing the study area and the features described in this section is included as Drawing No. 3.

Currently, the study area is bordered on the west side by Winnipeg Street. The Canadian National (CN) Railway line runs diagonally (towards the northeast) across the north end of the property, forming the north boundary. To the east of the study area is the Canadian Pacific (CP) Railway, which is oriented slightly to the northwest. The operating Imperial Oil Terminal and Distribution facility is located east of the CP Railway. The south end of the property is bordered by other industrial and commercial properties. The north end of Adams Street runs perpendicular to the southern boundary of the study area.

The properties within the study area are currently zoned as Medium Industrial (IB), which is categorized as *“intended to provide for a wide range of manufacturing, processing, assembly, distribution, and service and repair activities that carry out some of their operations outdoors or require outdoor storage.”*

The study area itself is currently comprised of the following addresses:

- 333 Winnipeg Street is currently owned by the City of Regina and occupies the approximate northern half of the study area;
- 425, 445 and 445B Winnipeg Street are currently owned by the Food Bank and occupy the central southern half of the study area, with the exception of the eastern most 31 m, which does not have an address but is owned by the City of Regina;
- 609 Winnipeg Street, which occupies the southwestern corner of the study area, is owned and occupied by Auto Gallery 1994 Ltd.;
- 607 Adams Street, which occupies the southeastern corner of the study area, is owned and occupied by Japanese Auto Supply Ltd.; and
- 623 Adams Street, which also occupies the southeastern corner of the study area, is owned and occupied by MacKenzie Plumbing & Heating (1989) Ltd.

The north portion of 333 Winnipeg Street is generally vacant, with some debris piles located in the central region of the property. These piles are believed to be compost and/or Christmas tree recycling areas used by the City of Regina. The south portion of 333 Winnipeg Street is currently used as the City of Regina Transit Operations Facility. The area is occupied by one large building. Provincial databases indicate there are three registered underground storage tanks (USTs), and one registered above ground storage tank (AST) currently on the property. Much of the remaining property is currently covered by grass and vegetation.

Located to the south of 333 Winnipeg Street are 425, 445 and 445B Winnipeg Street. These three addresses appear to operate essentially as one business park complex. The sign at the entrance to the business park indicates the following businesses are located in this complex:

- Food Bank;
- First Years Child Care Inc.;
- Dumont Technical Institute;
- Adult Centre for Employment and Readiness Training; and
- Community Services Village.

During the site reconnaissance, the following businesses were also identified in the complex:

- Independent's Choice Distribution Ltd. (ICD);
- Community First Computers;
- Saskatchewan Trucking Association Driver Training;
- Regina Education and Action on Child Hunger (REACH);
- Farm Credit Canada Community Kitchen;
- Chip and Dale Housing; and
- Conexus Community Room.

The area is comprised of a combination of buildings, paved areas and landscaped areas. 425 Winnipeg Street consists of a rectangular building which appears to be a former refinery building which runs parallel to Winnipeg Street and houses several different businesses. 445 Winnipeg Street consists of one large building in the centre of the property and two other buildings that parallel the CP Railway. The southern most of these two buildings appears to be a former refinery building. As well, there appear to be two smaller abandoned former refinery buildings, as well as a former pump island. Provincial databases indicate that three ASTs and four USTs were registered on this property. Records also show that four USTs on 445 Winnipeg Street were decommissioned in August 2002. Municipal information indicates that these tanks were between the large building and the two parallel to the CP Railway.

Immediately to the west of the CP Railway is a small strip of land, 445B Winnipeg Street, which runs the length of 445 Winnipeg Street. This area is owned by the City of Regina and is mainly grass covered.

Located to the south of 425, 445 and 445B Winnipeg Street are 609 Winnipeg Street, in the southwestern corner of the study area, owned and occupied by Auto Gallery 1994 Ltd.; 607 Adams Street, in southeastern corner of the study area, owned and occupied by Japanese Auto Supply Ltd.; and 623 Adams Street, also in the southeastern corner of the study area, owned and occupied by MacKenzie Plumbing & Heating (1989) Ltd.

2.1.1 Topography, Drainage and Vegetation

The study area is relatively flat-lying with some low lying areas in the undeveloped portions. In the developed/paved areas the surface water runoff is collected in onsite catch basins presumed to be connected to the City of Regina storm sewer system. In the undeveloped and landscaped portions, the surface water appears to move over the ground surface towards a paved area, or pool in the low lying areas.

According to Mr. Randy Burant of the City of Regina, the Ross Avenue Drainage Ditch shown on Drawing No. 3, which is approximately 450 m south of the site, is a storm water channel which drains surface storm water away from the area to the nearest water body. The Ross Avenue Drainage Ditch originates on the east side of Regina at Fleet Street and Emmitt Hall Road and extends westerly as an open channel. At Broad Street it enters an underground culvert and then exits at Albert Street back as an open channel. This open channel meanders westerly until it drains into Wascana Creek located on the west side of Regina. It is used solely to contain storm water runoff.

The majority of the northern half of the study area is undeveloped with the exception of an access road; two parking areas; and one large L-shaped building, the main transit facility building (i.e. Bus Barn). The access road and parking areas are paved.

The southern most portion of the study area (south of 425, 445 and 445B Winnipeg Street) is occupied by 607, 609 and 623 Adams Street and consists of two car lots (one paved and one gravel) and grass covered vacant land.

2.1.2 Geology/Hydrogeology

The City of Regina is situated on the Assiniboine River Plain, on the bed of the extinct glacial Lake Regina, and south of the Qu'Appelle Valley, a glacial meltwater channel. Accordingly, the study area is underlain by a kettled glacio-lacustrine plain, consisting mainly of silt and clay of the Bearpaw Formation. The Bearpaw formation also consists of approximately 18 m of sand near the base of the Formation. The Condie Aquifer lies beneath the study area, and consists of a thin layer of glacio-lacustrine, ribbed moraine and glacio-fluvial kettle. Further down lies the Regina Aquifer.

The primary source of the City of Regina's potable water is the Buffalo Pound Water Treatment Plant. The secondary source of drinking water comes from several large water wells screened in the Regina Aquifer located outside the City limits. The wells are intended as a back-up supply to the Buffalo Pound source, and are used sparingly, and in times of drought and high demand. According to Randy Burant, City of Regina Public Works, the City of Regina has not used these water wells to supplement the public drinking water system since 1999, and does not intend to use them in the future, unless emergency situations called for their use. Of the City of Regina's 28 water wells:

- Six of the City's in-service water wells are located in the Boggy Creek well field, 8 to 10 km northeast of Regina;
- One of these six wells is scheduled to be abandoned this year;
- Six former wells in the Boggy Creek area have already been abandoned and capped;

- The former wells located within the city limits have also been abandoned and capped;
- The four wells located at the Mound Springs well field have been sold to a water user group in the area; and
- The wells located west of the city are still in service although used infrequently, and three of which are scheduled to be abandoned this year.

According to the Provincial Water Well Information System there are 93 (of which 28 wells are within 500 m of the study area) registered water wells potentially within 2 km of the subject site, including wells located on the subject site. Of the 93 wells, 29 were industrial, 41 were for research, 19 were municipal and four were domestic wells. Of the 29 industrial wells, 21 were used for water withdrawal, six were water test holes, one well was used for observation and one for waste disposal. The four domestic wells were used for water withdrawal. Eight of the industrial wells were associated with Imperial Oil and were located within the southwest quarter of section 32, township 17, range 19 and west of the 2nd Meridian, which is the location of the former Refinery and the disturbance terminal. Historical documents indicate that seven water wells and one disposal well were installed on the Refinery during its operation. The Imperial Oil deep disposal well was decommissioned in the late 1970s and five of the seven water wells were decommissioned in 1991. Two wells may remain onsite, apparently under buildings and condition unknown. Two of the industrial wells were associated with Interprovincial Pipelines (now Enbridge) and are located in the northwest quarter of the above referenced section. Of the 41 research wells, three were water test holes, one was a soil test hole and one was an observation well. Thirty-six of the 41 research wells were used for groundwater quality monitoring. One municipal well owned by the City of Regina, is located within LSD13 of section 29, township 17, range 19 and west of the 2nd Meridian, which is south of the former Refinery site. This well was used for water withdrawal. The remaining 18 municipal wells were used for observation (five wells), water test holes (five wells), and water withdrawal (eight wells). A summary of the water well drilling logs can be found in Appendix A.

2.2 Surrounding Land Use

The surrounding land uses and zoning described below are summarized on Drawings No. 3 and 4.

The Imperial Oil Distribution Terminal property (550 McDonald Street) to the east of the CP Railway is zoned as Heavy Industrial (IC). East of the Distribution Terminal is zoned as Prestige Industrial Service (IP) which is a zone that *“is designed to promote industrial development and related business service uses which incorporate high standards of design, landscaping and open spaces.”* Southeast of the study area (300 1st Avenue) is zoned as IB. Uses include retail and personal services.

Directly south of the study area, including the addresses along Adams Street and 609 Winnipeg Street, as well as west of the study area, is zoned as Light Industrial (IA). Southwest of the study area, including 530 through 680 Winnipeg Street, is zoned for Public Service, which is a zone that *“is established to preserve and control areas used or intended to be used by the public for active and passive recreational purposes.”*

West of the study area, and beyond of the IA zone, there is a Public Service zone and an Institutional zone. Surrounding this to the north, west and south, including properties on the east side of Montreal Street, are zoned as Residential Older Neighbourhood (R3), which includes mainly duplexes and triplexes.

North of the study area, and north of the CN Railway line (IB), the area directly west across Winnipeg Street is zoned as a Direct Control District (DCD3), which is *“is intended to provide a sensitive control of uses on the west side of the 100 and 200 Blocks of Winnipeg Street North. This regulation is needed because of the proximity to the adjacent residential area.”* General uses may include, but are not limited to, automobile rental, leasing, sales, service and gasoline stations, religious institutions, day care centres, financial institutions, libraries, offices, public use, and retail shops.

The following observations in relation to the study area were recorded during the visual site inspection:

North:	CN Railway right-of-way, then Staples Business Depot Distribution/Call Centre and parking lot;
West:	Winnipeg Street, then the CN Railway right-of-way, then commercial businesses. Near the north end of the study area, there is a park and school west of the commercial district;
East:	CP Railway right-of-way, then the Imperial Oil Terminal;
South (west side):	Commercial businesses and the north end of Adams Street; and
South (east side):	Commercial businesses, including car dealerships.

Photographs of the site and surrounding land uses are presented in Appendix C.

3.0 DATABASE REVIEW

EcoLog Environmental Risk Information Service (EcoLog) was subcontracted to acquire public records available in appropriate environmental Federal, Provincial and private databases regarding the study area and surrounding properties.

Searches were conducted within a 500 m radius of the study area, unless otherwise specified. Databases were searched for information regarding:

- Automobile wrecking and supplies;
- Manufacturers and/or distributors of chemicals;
- Environmental compliance and convictions;
- Provincial wastewater dischargers;
- Assessment of effects of industrial effluent on aquatic life;
- EcoLog ERIS environmental risk reports;
- Location and severity of contaminated sites on First Nation reserves;
- Spills to land and water;
- Contaminated sites on Federal land;
- Horizontal wells;
- Hazardous substance storage tanks and sites;
- Approvals for intensive livestock operations;
- Mine and mineral information;
- PCB storage facilities;
- Pollutant releases to air, land and water;
- Registered pesticide vendors;
- Fuel storage tanks;
- Oil and gas wells and pipelines;
- Pulp and paper mills;
- Manufacturers and waste generators;
- Waste disposal facilities;
- Water wells; and
- Certificates of approval for various processes and operations.

A complete list of the databases searched, including those which revealed no information regarding our study area, can be found in section (i) of the EcoLog ERIS Report in Appendix B.

3.1 Automobile Wrecking & Supplies (Private Database)

- E Z Automotive Ltd.; 120 Winnipeg Street; Automobile Wrecking and Recycling; and
- Fast Glass; 225 Quebec Street; Automobile Wrecking and Recycling.

3.2 Environmental Spills (Provincial Database)

- Intersection of Quebec Street and 1st Avenue; 1991-08-31; 325 L of diesel;
- Imperial Oil Terminal, Tank Car Rack; 550 McDonald Street; 1993-06-18; 909 L of diesel;
- Imperial Oil Terminal; 550 McDonald Street; 1995-04-20; 900 L of diesel;
- 550 McDonald Street; 1999-05-04; 591 L of diesel;
- 550 McDonald Street; 1996-06-10; 300 L of unknown substance;
- 550 McDonald Street; 1998-03-11; 450 L of gasoline;
- 1400 1st Avenue; unknown date; 400 L of unknown substance;
- 530 McDonald Street; 1983-06-10; 75 kg of fertilizer;
- 530 McDonald Street; 1989-06-02; 1600 L of gasoline;
- 706 Toronto Street; 1987-04-15; 4 L of xylene; and
- 285 Quebec Street; 1989-09-01; 50 L of Transformer Oil.

Additional spills, reported in documents obtained from Saskatchewan Ministry of the Environment under the Freedom of Information Act, include the following:

- Procor; 300 1st Avenue; 1993-11-02; unknown quantity of butyl xylene;
- Procor; 300 1st Avenue; 1996-03-08; trace amounts of “other oils”;
- 300 1st Avenue; 1997-08-19; unknown quantity of anhydrous ammonia;
- Procor; 300 1st Avenue; 1997-07-07; unknown quantity of H₂S Propane;
- Rail Car Repair Shop; 300 1st Avenue; 1998; 90 L of cooling oil;
- McDonald Street and 1st Avenue; 2001; 45.5 L of used motor oil;
- Imperial Oil Terminal; 550 McDonald Street; 1995-07-10; 661 L of gasoline;
- 550 McDonald Street; 2000-09-27; 450 L of gasoline;
- Intersection of Hoffer Drive and McDonald Street; 1993-11-09; 45 gallons of diesel;
- Canadian Pacific Railway Company; 1992-10-19; 5.08 m³ of water (75%) and methanol (25%) from pressure testing pipe;
- Procrane Inc.; 610 McDonald Street; 1983-07-09; unknown quantity of fuel;
- 445 Winnipeg Street; 2004-06-01; 90.9 L of hydraulic oil;
- Enbridge Pipelines Inc. (Interprovincial Pipeline); 1982; unknown quantity and substance;
- Enbridge Pipelines Inc. (Interprovincial Pipeline); 1990-06-18; 47 m³ of crude oil;

- Enbridge Pipelines Inc. (Interprovincial Pipeline); 1992-08-02(or 04); 1.8 m³ (or 2255 L) of crude oil;
- Enbridge Pipelines Inc. (Interprovincial Pipeline); 1993-07-28; 0.1 m³ of sweet crude oil;
- Enbridge Pipelines Inc. (Interprovincial Pipeline); 1993; 85 L of crude oil;
- Enbridge Pipelines Inc. (Interprovincial Pipeline); 1994; 40 L of industrial chemical condensate;
- Enbridge Pipelines Inc. (Interprovincial Pipeline); 1994-05-11; 0.4 m³ of a gasoline/diesel mixture; and
- Enbridge Pipelines Inc. (Interprovincial Pipeline); 1999-10-24; 1400 L of diesel.

Additional spills, listed in a report entitled Limited Phase I Environmental Site Assessment, Imperial Oil Limited, Regina Distribution Terminal written by Clifton Associates Limited and dated March 11, 2005, include the following:

- Imperial Oil Limited Terminal; 550 McDonald Street; 2002-08-22; 397 L of gasoline; and
- Consumer Co-Op Refinery; Intersection of 9th Avenue and McDonald Street; 2004-07-13; 400 000 L of diesel.

3.3 Hazardous Substance Storage Tanks (Provincial Database)

- Agrifoods International Cooperative Ltd., a manufacturing company located at 445 Winnipeg Street, has three registered ASTs and four registered USTs. Two of the ASTs and two of the USTs contain diesel. One of the ASTs and one of the USTs contains gasoline (motor). One of the USTs contains heating oil / furnace oil;
- Regina Transit System, located at 333 Winnipeg Street, has one registered AST and three registered USTs. The AST contains clean oil. Two of the USTs contain diesel and one contains gasoline (motor);
- Plains Ventures Ltd., a repair shop located at 715 1st Avenue, has one registered UST which contains waste oil;
- Red Line Transport Ltd., a trucking company located at 1035 5th Avenue, has two registered USTs. One UST contains diesel and the other contains gasoline (motor);
- Imperial Oil Terminal, a distribution facility located at 550 McDonald Street, has 26 registered ASTs. Six of the ASTs contain gasoline (motor), five contain diesel, four contain jet fuel / kerosene, one contains heating oil / furnace oil and 10 contain chemical substances that include methanol, xylenes, blue dye, fuel additives and waste water;

- Heartland Agro Services Ltd., a bulk station located at 530 McDonald Street, has one registered AST containing diesel, and ten registered USTs. Of the USTs, five contain diesel, two contain gasoline (motor), one is a collection tank (chemical), and two contain unknown substances;
- Brandt Industries Ltd., a manufacturing company located at 705 Toronto Street, has two registered ASTs. One tank contains diesel and the other contains gasoline (motor);
- Purolator Courier, located at 706 Toronto Street, has one registered AST which contains waste oil;
- Landry's Service Ltd., a service station located at 180N Winnipeg Street, has four registered USTs, all of which contain gasoline (motor);
- STM Car Wash, a service station located at 210 Winnipeg Street, has three registered USTs, two of which contain gasoline (motor) and one of which contains diesel; and
- Al-Mar Auto Repair, located at 250 Winnipeg Street, has one registered AST which contains waste oil.

3.4 Hazardous Substance Storage Sites (Provincial Database)

- Regina Transit System, located at 333 Winnipeg Street, has warehouse storage containing unknown material;
- Dutch Industries Limited, located at 705 1st Avenue, has outdoor storage containing waste paint and related material;
- Imperial Oil Limited, located at 550 McDonald Street, has warehouse storage containing gasoline, diesel, gasoline with additives, Turbine Fuel, Acetone and Petroleum Ether;
- Cowan Fuel & Fertilizer Ltd., located at 530 McDonald Street, has warehouse storage containing ammonium, nitrate, Advance, Furadan, Diazinon, Hoegrass, Lorsban, Vitavax, etc.;
- Heartland Agro Services Ltd., located at 530 McDonald Street, has warehouse storage containing ammonium, nitrate, Advance, Furadan, Diazinon, Hoegrass, Lorsban, Vitavax, etc.; and
- Brandt Industries Ltd., located at 705 Toronto Street, has outdoor storage containing waste, paint and paint related material.

3.5 National PCB Inventory (Federal Database)

- Imperial Oil Limited, located at 550 McDonald Street, has one in-use PCB item; and
- MacMillan Bathurst Inc., located at 1400 1st Avenue, has two PCB items which are stored for disposal.

3.6 National Pollutant Release Inventory (Federal Database)

- Imperial Oil Limited, located at 550 McDonald Street, reported releases from 2002 through 2005. Substances released include Ethylbenzene, Toluene, n-Hexane, Xylenes, Methanol, Benzene, 1,2,4-Trimethylbenzene and Volatile Organic Compounds (VOCs);
- Smurfit-MBI, located at 1400 1st Avenue, reported releases in 2002. Substances included Diethanolamine (and its salts), Oxides of Nitrogen (NO₂), Carbon Monoxide, Sulphur Dioxide, PM₁₀ - Particulate Matter ≤10 Microns, PM_{2.5} - Particulate Matter ≤2.5 Microns and VOCs; and
- Enbridge Pipelines Inc., located within NW-32-017-19 W2M, reported releases from 2002 through 2005. Substances released include Ethylbenzene, Toluene, n-Hexane, Cyclohexane, Xylenes, Benzene, Hydrogen Sulphide and VOCs.

3.7 Pesticide Register (Provincial Database)

- Cowan Fuel & Fertilizer Ltd., located at 530 McDonald Street; and
- Heartland Agro Services Ltd., located at 530 McDonald Street.

3.8 Retail Fuel Storage Tanks (Private Database)

- Cowan Fuel & Fertilizer Ltd., located at 530 McDonald Street, has a service station which provides gasoline, Oil and Natural Gas; and
- Landry's Esso Service, located at 180N Winnipeg Street, has a service station which provides gasoline, Oil and Natural Gas.

3.9 Scott's Manufacturing Directory (Private Database)

- Louban Media, located at 425 Winnipeg Street, provides digital printing and other printing services;
- Humphrey Window and Door Store, located at 375 Quebec Street, manufactures plastic products, as well as metal windows and doors;
- Humphrey Aluminum Products, located at 375 Quebec Street, manufactures metal windows and doors, as well as other specialty-line building supplies;
- A & C Blacksmith Shop Ltd., located at 442 Quebec Street, manufactures prefabricated metal building components, ornamental and architectural metal products and other miscellaneous metal products;
- Glacier Glass Services Ltd., located at 410 Quebec Street, manufactures glass products, lumber, plywood, millwork and other specialty-line building supplies;

- EDM-Exclusive Design Millwork, located at 510 Quebec Street, manufactures wood windows and doors;
- FPC Industries (1991) Ltd., located at 305 Quebec Street, manufactures ornamental and architectural metal and wire products;
- Bell Tire Retreaders Ltd., located at 687 Adams Street, manufactures tires;
- Clements Printers, located at 845 1st Avenue, manufactures signs and provides printing services; and
- Shanahan's Building Specialties Ltd., located at 225 Quebec Street, provides metal services, office and store machinery and equipment.

3.10 Summary

1. The majority of the larger spills (>100 L) reported in the area have originated from 530 and 550 McDonald Street and consisted of refined gasoline or diesel with the spill volumes ranging from 325 L to 900 L released. A number of spills also occurred on the Enbridge property, north of the site, and included crude oil, condensate, gasoline and diesel. Other spills include cooling oil, motor oil, H₂S, propane, hydraulic oil, xylenes, and anhydrous ammonia. A significant spill occurred in 2004 at the Co-op Refinery, located to the northeast of the study area, releasing 400 000 L of diesel. This spill was identified in a previous Phase I Assessment completed on the Distribution Terminal, but was not identified during the database searches, as it falls more than 500 m from the study area.
2. Storage tanks currently located on the study area include two ASTs and two USTs owned by Agrifoods and one AST and three USTs owned by Regina Transit. Other significant storage in the area includes 26 ASTs at the Imperial Oil Distribution Terminal and fertilizer at 530 McDonald Street.
3. Reported airborne pollutant releases include VOCs from the Imperial Oil Distribution Terminal, Smurfit-MBI and Enbridge between 2002 through 2005.
4. Retail Fuel storage is located at 530 McDonald and 180N Winnipeg Street. These businesses include service stations with gasoline, oil and natural gas.
5. Pesticides are stored at 230 McDonald Street.
6. Manufacturing includes glass, millwork, blacksmiths, printers and aluminium products.

4.0 HISTORICAL RECORDS REVIEW

EcoLog Environmental Risk Information Service (EcoLog) was subcontracted to search public records for the following:

- Current land titles (study area and directly adjacent properties);
- Reverse directory search (study area and directly adjacent properties); and
- Historical Fire Insurance Plans (study area only).

OAEI searched public records to acquire:

- Historical land titles.

Searches were conducted within a 500 m radius of the study area, unless otherwise specified.

4.1 Land Titles

Current and historical land titles for the properties within the study area are listed below. The current and historical land titles for the adjacent properties are summarized in Appendix D. All titles are for the surface ownership only, unless otherwise specified. The current land title information and property ownership for each property is summarized on Drawing No. 5a. Drawing No. 5b shows the transfer of Imperial Oil property to others in 1979. Drawings No. 5c through No. 5f summarize the significant property ownership changes; showing snapshots of the property ownership in 1986, 1979, 1966 and 1930, respectively. Copies of the land title certificates and a summary table are included in Appendix D.

STUDY AREA

425 Winnipeg Street 79R42384; X	Date	Owner
	2004 - Present	Regina & District Food Bank Inc.
	2003 - 2004	Independent's Choice Distribution Ltd.
	1979 - 2003	Agrifoods International Cooperative Ltd.
	1979 - 1979	City of Regina
	1951 - 1979	Imperial Oil Limited

445 Winnipeg Street 79R42384; X	Date	Owner
	2004 - Present	Regina & District Food Bank Inc.
	2003 - 2004	Independent's Choice Distribution Ltd.
	1979-- 2003	Agrifoods International Cooperative Ltd.
	1979 - 1979	City of Regina
	1951 - 1979	Imperial Oil Limited

445B Winnipeg Street FA4603; B	Date	Owner
	1979 - Present	City of Regina
	1951 - 1979	Imperial Oil Limited

333 Winnipeg Street FA4603; B	Date	Owner
	1979 - Present	City of Regina
	1951 - 1979	Imperial Oil Limited

609 Winnipeg Street 80R46599; F; 3-4 & 81R01103; Z	Date	Owner
		Minerals
	2003 - Present	Devon Canada Corporation Surface
	2002 - Present	Auto Gallery 1994 Ltd. <i>Prior to 2002 see A to B</i>
	<i>A</i>	
	2001 - 2002	Auto Gallery 1994 Ltd.
	1989 - 2001	Gene's Ltd.
	1981 - 1989	Canada Safeway Limited
	1979 - 1981	Dairy Producer's Co-Operative Limited <i>Prior to 1979, A merges with B, see below for details of B</i>
	<i>B</i>	
	1980 - 2002	Agrifoods International Cooperative Ltd.
	1979 - 1980	Dairy Producer's Co-Operative Limited
	1967 - 1979	Imperial Oil Limited <i>Prior to 1967 see B1 to B11</i>

B1

1919 - 1979 Imperial Oil Limited
 1916 - 1919 The Northern Trusts Company
 1913 - 1916 John Kenneth McInnis
 1913 - 1913 Alfred Baker & John Sandison
 1908 - 1913 John Cotton

B2

1919 - 1979 Imperial Oil Limited
 1916 - 1919 The Northern Trusts Company

B3

1923 - 1967 Imperial Oil Limited
 1922 - 1923 City of Regina

B4

1916 - 1967 Imperial Oil Limited
 1908 - 1916 J.K. McInnis

B5

1954 - 1967 Imperial Oil Limited
 1953 - 1954 City of Regina

B6

1954 - 1967 Imperial Oil Limited
 1923 - 1954 City of Regina
 1919 - 1923 Imperial Oil Limited
 1916 - 1919 The Northern Trusts Company
 1913 - 1916 John Kenneth McInnis
 1913 - 1913 Alfred Baker & John Sandison
 1908 - 1913 John Cotton

B7

1954 - 1967 Imperial Oil Limited
 1923 - 1954 City of Regina
 1919 - 1923 Imperial Oil Limited
 1916 - 1919 The Northern Trusts Company

B8

1954 - 1967 Imperial Oil Limited
 1923 - 1954 City of Regina
 1919 - 1923 Imperial Oil Limited
 1916 - 1919 The Northern Trusts Company

B9

1918 - 1967	Imperial Oil Limited
1918 - 1918	Harold W. Chapin
1916 - 1918	John Kenneth McInnis

B10

1918 - 1967	Imperial Oil Limited
1918 - 1918	Harold W. Chapin
1916 - 1918	The Northern Trusts Company

B11

1967 - 1967	Imperial Oil Limited
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**607 Adams Street
80R46599; F; 7**

Date	Owner
2000 - Present	Japanese Auto Supply Ltd.
1998 - 2000	Hai Ngoc Le
1996 - 1998	George Phillip & Elaine Dorish
1989 - 1996	George Dorish
1989 - 1989	The Royal Bank of Canada
1989 - 1989	Thorne Ernst & Winney Inc.

**623 Adams Street
80R46599; F; 8**

Date	Owner
2002 - Present	MacKenzie Plumbing & Heating (1989) Ltd. MacKenzie Plumbing & Heating (1989) Ltd. & Jim Lauten
1999 - 2002	Lauten
1980 - 1999	Agrifoods International Cooperative <i>Prior to 1980 see A to H</i>
	<i>A</i>
1980 - 1980	<i>Prior to 1980 one part merges, see 609 Winnipeg Street for details</i>
	<i>B</i>
1979 - 1980	Dairy Producers Co-Operative Limited
1919 - 1979	Imperial Oil Limited
1916 - 1919	The Northern Trusts Company Limited
	<i>C</i>
1979 - 1980	Dairy Producers Co-Operative Limited
1919 - 1979	Imperial Oil Limited
1916 - 1919	John Kenneth McInnis

D

1979 - 1980	Dairy Producers Co-Operative Limited
1919 - 1979	Imperial Oil Limited
1916 - 1919	John Kenneth McInnis
1914 - 1916	Kenneth Pierce Dunstan

E

1979 - 1980	Dairy Producers Co-Operative Limited
1923 - 1979	Imperial Oil Limited
1922 - 1923	City of Regina

F

1979 - 1980	Dairy Producers Co-Operative Limited
1916 - 1979	Imperial Oil Limited
1908 - 1916	John Kenneth McInnis

G

1979 - 1980	Dairy Producers Co-Operative Limited
1958 - 1979	Imperial Oil Limited
1956 - 1958	City of Regina

H

1979 - 1980	Dairy Producers Co-Operative Limited
1958 - 1979	Imperial Oil Limited
1924 - 1958	City of Regina
1916 - 1924	The Northern Trusts Company Limited

4.2 Historical Fire Insurance Plans

Historical fire insurance plans were not available for the study area or adjacent properties.

4.3 Street Directories

Historical street directories were reviewed to identify businesses in the vicinity of the subject properties, which could potentially store, use or produce hazardous materials and/or waste materials. The following years were reviewed: 2008, 1999, 1995, 1990, 1984/85, 1980, 1975, 1970, 1963, 1960, 1955, 1950, 1945, 1940 and 1935. A directory review of 530 McDonald Street and 570 McDonald Street was conducted at a later date and the years reviewed differ slightly. Results for these properties will specify the years searched. The results for the study area are summarized below. The results for the adjacent properties can be found in Appendix D.

STUDY AREA

425 Winnipeg Street	Date	Occupant
	2008	Address not listed
	1999	Dairy Producers Co-Operative Ltd.
	1995	Dairy Producers Co-Operative Ltd.
	1990	Dairy Producers Co-Operative Ltd.
	1984/1985	Dairy Producers Co-Operative Ltd.
	1980	Dairy Producers Co-Operative Ltd.
	1975	Address not listed
	1970	Address not listed
	1963	Address not listed
	1960	Address not listed
	1955	Address not listed
	1950	Address not listed
	1945	Address not listed
	1940	Address not listed
	1935	Address not listed

333 Winnipeg Street	Date	Occupant
	2008	Address not listed
	1999	City of Regina Transit System
	1995	City of Regina Transit System
	1990	City of Regina Transit System
	1984/1985	Address not listed
	1980	Address not listed
	1975	Address not listed
	1970	Address not listed
	1963	Address not listed
	1960	Address not listed
	1955	Address not listed
	1950	Address not listed
	1945	Address not listed
	1940	Address not listed
	1935	Address not listed

445 Winnipeg Street	Date	Occupant
	2008	Community Action Co-Op Council on Social Development
	1999	Vacant
	1995	Dairy Producers Co-Operative Ltd.
	1990	Dairy Producers Co-Operative Ltd.
	1984/1985	Dairy Producers Co-Operative Ltd.
	1980	Address not listed
	1975	Address not listed
	1970	Address not listed
	1963	Address not listed
	1960	Address not listed
	1955	Address not listed
	1950	Address not listed
	1945	Address not listed
	1940	Address not listed
	1935	Address not listed

445B Winnipeg Street	Date	Occupant
	2008	Address not listed
	1999	Address not listed
	1995	Address not listed
	1990	Address not listed
	1984/1985	Address not listed
	1980	Address not listed
	1975	Address not listed
	1970	Address not listed
	1963	Address not listed
	1960	Address not listed
	1955	Address not listed
	1950	Address not listed
	1945	Address not listed
	1940	Address not listed
	1935	Address not listed

609 Winnipeg Street	Date	Occupant
	2008	Auto Gallery/Suzuki/Subaru
	1999	Auto Gallery Subaru Suzuki
	1995	Auto Gallery Inc.
	1990	Import Doctor
	1984/1985	Address not listed
	1980	Address not listed
	1975	Address not listed
	1970	Address not listed
	1963	Address not listed
	1960	Vacant
	1955	Res (1 tenant)
	1950	Res (1 tenant)
	1945	Res (1 tenant)
	1940	Address not listed
	1935	Address not listed

607 Adams Street	Date	Occupant
	2008	Japanese Auto Supply Ltd. Auto Care Pre 1992 Discount Yard
	1999	Address not listed
	1995	Address not listed
	1990	Vacant
	1984/1985	Street not listed
	1980	Street not listed
	1975	Street not listed
	1970	Street not listed
	1963	Street not listed
	1960	Street not listed
	1955	Street not listed
	1950	Street not listed
	1945	Street not listed
	1940	Street not listed
	1935	Street not listed

623 Adams Street	Date	Occupant
	2008	Address not listed
	1999	Address not listed
	1995	Address not listed
	1990	Address not listed
	1984/1985	Street not listed
	1980	Street not listed
	1975	Street not listed
	1970	Street not listed
	1963	Street not listed
	1960	Street not listed
	1955	Street not listed
	1950	Street not listed
	1945	Street not listed
	1940	Street not listed
	1935	Street not listed

4.4 Summary

Significant changes in land titles within the study area include Imperial Oil purchasing the main refinery property in 1916 from private owners and occupying the majority of it until 1979 when it was sold to the City of Regina and Dairy Producers Co-Operative. The City of Regina immediately sold the southern portion of the property they had obtained to Dairy Producers Co-Operative. The current ownership of the former Refinery now includes the City of Regina with numerous occupants including several community outreach programs and a daycare, the Regina District Food Bank, Auto Gallery, Japanese Auto Supply and MacKenzie Plumbing and Heating. Imperial Oil still owns the Distribution Terminal property to the east of the study area.

5.0 HISTORICAL AERIAL PHOTOGRAPHS

Aerial photographs of the Refinery and adjacent properties were obtained for all available dates. The review of aerial photographs is open to interpretation. In order to identify the Refinery facilities and aid in the interpretation of the photographs, a historical engineering drawing was used during the air photo review and is included along with the air photos in Appendix E.

Historical aerial photographs of the former refinery and adjacent areas were reviewed for the years 1947, 1948, 1949, 1950, 1961, 1962, 1965, 1966, 1968, 1971, 1972, 1975, 1978 (2), 1981 (2), 1982, 1983, 1986, 1987, 1989, 1993, 1997, 2005 and 2006. Six oblique aerial photographs of the former refinery and adjacent areas from 1928, 1954, 1960, 1961 (two photos) and 1964 were included in the review. These photographs are included in Appendix E. The conditions observed during our review of each historical aerial and oblique photograph are summarized below.

5.1 1928 Oblique Aerial Photograph

Study Area (1928)

Refinery facilities cover the study area. The study area is bordered on the west by Winnipeg Street (consisting of two lanes of traffic) and the CN Rail line just beyond, which runs along the north-south axis. At the north end of the study area the CN Rail line changes orientation and veers to the east-northeast to provide the north boundary. The CP Rail line, running north-south, creates the east border. The south end of the study area is bordered by residential and agricultural land. There is no definitive boundary between the Refinery property and the properties to the south.

In the northern third of the study area some storage (two large tanks along the western property boundary) and a processing area can be easily identified. Between these two features, there are approximately ten smaller tanks located in a north/south row. According to historical documents, the processing facilities seen on the photo in this area are the asphalt plant and associated rail line loading rack. Historical documents also indicate that the incinerator, original tetraethyl lead (TEL) plant agitators, centrifuge mixing shed, pump house, cracking coil and the DEP plant are located north of the asphalt plant along the rail lines; although these facilities can not be seen clearly in this photograph, possibly because they have not yet been constructed.

The central third of the study area contains, from west to east; approximately 30 small and medium tanks, several buildings, the water reservoir and the cooling tower, and a process/treating area. The eastern most building is identified in a later refinery photograph as the treating plant. The process/treating area is identified in historical documents as containing the fluidized catalytic cracking unit, the vacuum unit, caustic treating, powerformer, catalyst polymerization unit and chemical storage; some of these facilities may not be yet be constructed at the time of this photo.

The southern third of the study area contains mostly storage tanks with process facilities in the northeast corner, the garage/machine shop and marketing facilities along the rail line, and the refinery entrance and offices in the southwest corner. In the 1928 photograph the Tank Farm/storage facilities includes six large tanks, five medium tanks and five smaller tanks. The process facilities are identified in historical documents as the power house, the boiler house and the store house. The rail car loading and unloading facilities are located behind the marketing building. Immediately to the north of the office buildings is a large covered rectangular feature which is likely the API oil/water separator. It is not clear in this photograph if the oil/water separator is yet operational. To the east of the office buildings there appears to be a low lying area covered by natural vegetation. Some dark and light patches are visible in the vegetation.

Adjacent Properties (1928)

East – Immediately to the east of the Refinery runs the CP Rail line. East of the rail line lies the Tank Farm area of the Refinery. In this photograph there are three tanks located on the Tank Farm and a fourth tank appears to be under construction. The area north of the tanks appears to consist of ponds. Southeast of the three tanks there is vacant land that may be used for agriculture.

South – South of the southwest corner of the Refinery are the former residences of the Refinery employees. There is a large building directly east of the residences that is likely a barn or warehouse. Vacant or possibly agricultural land lies to the southeast of the Refinery.

West – The western boundary of the Refinery is defined by Winnipeg Street followed by the CN Rail line. The land west of the Refinery is mainly residential and/or vacant land.

North – The northern boundary of the Refinery is marked by the CN Rail line. Agricultural or vacant land occupies the area to the north.

5.2 1947 Aerial Photograph

Study Area (1947)

The southern portion of the Refinery appears similar to the 1928 aerial photograph. However, in this photograph the API oil/water separator can be identified immediately north of the refinery office buildings in the southwest corner of the property. One large tank in the southeast corner near the rail loading area has been removed to provide space for a building expansion of the marketing building and a parking area.

In the central portion of the Refinery, the cooling tower and water reservoir is the large rectangular feature just north of the cluster of 12 small tanks. Several tanks and a building have been removed from the area immediately south of the cluster of 12 tanks and there are now two new buildings and there appears to be some new construction in this area. Just to the west of this area, two buildings visible in the 1928 photograph have been removed and have been replaced with 26 small tanks that comprise the treating area.

The northern portion of the Refinery is easily visible in this aerial photograph. Tanks line the western side of the area. To the northeast of the cooling tower are three small white tanks, which are part of the asphalt plant. The cracking coil and DEP plant are located north of the asphalt plant and the darker area north of these facilities is the coke dump area. There are six tanks in the northern tip of the Refinery and the original TEL plant lies immediately to the east of these tanks.

Adjacent Properties (1947)

East – There are now seven tanks located on the Tank Farm property. The area north of the Tank Farm is being used as a disposal pit; otherwise, the area is generally as previously described.

South – A road now runs along the southern property boundary. The large barn previously located in the central portion of this area has been removed. Also, there are two additional buildings located on the south side of 1st Avenue. These structures are possibly residences; however, supporting details are not available. There is also a faint roadway, which runs south from the southern boundary of the Refinery, which is later identified as Adams Street.

West – Much of the area west of Winnipeg Street and the CN rail line is residential. Commercial businesses were added between the CN rail line and Winnipeg Street in the southwest corner.

North – A few houses lie northwest of the refinery, but otherwise there is little development north of the Refinery.

5.3 1948 Aerial Photograph

Study Area (1948)

The Refinery appears generally as previously described.

Adjacent Properties (1948)

The areas to the east, south, west and north appear generally as previously described.

5.4 1949 Aerial Photograph

Refinery (1949)

In the southern portion of the Refinery, two tanks have been moved into a berm with an adjacent tank. The naturally vegetated area along the southern boundary has been now cleared and may be used as storage. Otherwise, the Refinery appears generally as previously described.

Adjacent Properties (1949)

East – The Tank Farm and adjacent properties appear generally as previously described. The area being used for disposal pits appears to be a depression, with a ramp-like feature, which leads towards the tankage.

South – A new building is located along the west side of Winnipeg Street just west of the Refinery residential properties; otherwise, the area appears generally as previously described.

West – The area appears generally as previously described.

North – The area appears generally as previously described.

5.5 1950 Aerial Photograph

Study Area (1950)

Only the southern portion of the Refinery is visible in this photograph. New facilities in the centre of the Refinery (northeast portion of this photograph) such as a few new small buildings and flare stacks and/or above ground processing pipes are visible in this photograph.

One new building is located east of a group of three tanks in the centre of this photograph. This is identified as the storehouse.

The age of the Refinery starts to become noticeable, as the newly planted trees in the early photographs are now mature trees. This is most apparent along Winnipeg Street and through the Imperial Oil employee housing to the south of the Refinery.

Adjacent Properties (1950)

East – The area to the east of the Refinery is generally not visible in this photograph. Visible areas appear consistent with previous photographs.

South – 1st Avenue is now stretched along the south boundary of the former Refinery residences to the CP Rail Line. Adams Street is more defined than in previous photos and there are some new developments south of the Refinery along Adams Street. A building is now located on the northwest corner of Adams Street and 1st Avenue and the land northwest of this intersection is under construction. Parking areas have been added to the businesses in the southwest region of Winnipeg Street across from the former Refinery residences.

West – The residential properties west of Winnipeg Street appear generally as previously described; however, at least one commercial structure is identified in the properties facing Winnipeg Street. The commercial property seen in early photographs diagonal from the southwest corner of the Refinery has been further developed. It now appears to be operating as a car or trailer dealership. The parking area is larger and rows of vehicles are parked on the property.

North - The photograph does not cover areas to the north of the Refinery.

5.6 1954 Oblique Aerial Photograph

Study Area (1954)

Changes to the Refinery offices in the southwest corner of the Refinery are visible. The oil/water separator is visible to the north of the offices. East of the offices lies a small building with a southern entrance, which is the lunch room. A parking area lies north of the lunch room and south of the Tank Farm. The gate and guard shack are at the north end of Adams Street. The truck loading area is east of the parking lots, and the mechanical building lies adjacent to the CP Rail line in the southeast corner. East of Adams Street and south of the truck loading area appears to be storage of barrels and possibly pipelines. The marketing building is present north of the mechanical building and above grade piping and small storage tanks are visible. The garage and machine shop are north of the marketing building, followed by the TEL plant and a large incinerator stack. The remainder of the southern portion of the Refinery is used as product storage.

In the centre of the Refinery property is the treating area and the main processing area. These two areas are divided by the main pipe band, which runs up the centre of the Refinery.

In the northern part of the Refinery property, the cooling tower is now located north of the water reservoir. Due to the angle of this photograph, it is difficult to see other changes in the northern part of the Refinery.

Adjacent properties (1954)

East - New tanks are present in the Tank Farm, east of the Refinery. There are 16 tanks visible in this photograph.

South – There is a large storage area immediately south of the southeast corner of the Refinery property.

West - The area appears generally as previously described.

North - The IPPL Tank Farm is present northeast of the Refinery.

5.7 1960 Oblique Aerial Photograph

Study Area (1960)

It is difficult to see changes in the Refinery facilities in this oblique photograph; however, it appears that the main processing area is now located in the centre of the Refinery. In general, the Refinery appears as previously described.

Adjacent Properties (1960)

East – In general, the Terminal appears as previously described; however, there now appears to be a fire training area along the southwest side of the Tank Farm and two larger businesses south of the Terminal along 1st Avenue.

South – The residences located south of the Refinery have been removed. A small building with a service bay is located on the west corner of Adams Street and 1st Avenue.

West – The extent of residential properties to the west of the Refinery can be seen in this photograph.

North – The area north of the Refinery is vacant. The area northeast of the Refinery is not visible in this photograph.

5.8 1961 Aerial and Oblique Photographs

Study Area (1961)

The Refinery appears generally as previously described.

In the oblique photographs, the details of the Refinery processes mentioned previously are apparent. In particular, the oblique photograph looking north appears very similar to the 1954 photo, indicating that the expansion of the Refinery was complete by 1954.

Adjacent Properties (1961)

East – The area appears generally as previously described. The disposal pits north of the Tank Farm are evident in the oblique aerial photograph.

South – A new building is being constructed on the south side of 1st Avenue across from the former Refinery residences. There is new commercial development along the south end of Winnipeg Street.

West – The residential properties west of the CN Rail line and commercial strip have expanded.

North – The area appears generally as previously described.

5.9 1962 Aerial Photograph

Study Area (1962)

The Refinery appears generally as previously described.

Adjacent Properties (1962)

East – The Tank Farm appears generally as previously described.

South – Additional developments, possibly a storage facility or a trucking operation, are visible south of 1st Avenue. Otherwise the area appears as previously described.

West – The residential area west of Winnipeg Street appears generally as previously described.

North – Visible areas appear generally as previously described; however, the field of view of the photograph does not include as much area to the north compared to previous photographs.

5.10 1964 Oblique Aerial Photograph

Study Area (1964)

The Refinery appears generally as previously described. This is an excellent photograph showing the Refinery facilities and piping very clearly.

Adjacent Properties (1964)

East – The Tank Farm appears generally as previously described. Liquids in the lime pits at the north end of the Tank Farm are visible in this photograph.

South – Southeast of the Refinery there is one new building west of the two houses along 1st Avenue. Otherwise, the area appears generally as previously described.

West – The area appears generally as previously described.

North – The full extent of the IPPL facilities, which lie to the north of the Refinery, are visible in this photograph. Otherwise, the area appears generally as previously described.

5.11 1965 Aerial Photograph

Study Area (1965)

The southern and central areas of the Refinery appear generally as previously described. In the northern portion of the site there are four small tanks present in the coke dump area located north of the asphalt plant.

Adjacent Properties (1965)

East – The Tank Farm appears generally as previously described. Further to the northeast, there is a diagonal strip of land that has been cleared for the construction of the Ring Road. The construction joins the Tank Farm property at the northern tip of the sludge disposal area.

South – In the southwest corner of this photograph, new developments are visible. There is now a circular feature (possibly a traffic circle) at the northern tip of Adams Street immediately south of the former Refinery. Adams Street is diverted around the circular feature to the east where it enters the Refinery.

West – The residential area appears generally as previously described.

North – The area appears generally as previously described.

5.12 1966 Aerial Photograph

Study Area (1966)

Only the northern portion of the refinery is visible in this aerial photograph. The area shown appears generally as previously described.

Adjacent properties (1966)

East – The Tank Farm appears generally as described previously. There appears to be some vegetation on the disposal pits and a small road running parallel to the proposed Ring Road right of way entering the disposal pits.

South – The area is not visible in this photograph.

West – The area appears generally as described previously.

North – The area appears generally as described previously.

5.13 1968 Aerial Photograph

Study Area (1968)

The Refinery appears generally as described previously.

Adjacent properties (1968)

East – The Tank Farm appears generally as previously described. The Ring Road is complete to the northeast of the Tank Farm and cuts through the sludge disposal pits. The sludge pits are still visible on the north side of the Ring Road.

South – Adams Street has been abandoned. Some property along the north end of Adams Street is now used as part of the refinery entrance. The previously described traffic circle connects a road running east west into the refinery from Winnipeg Street and a road running north to the Refinery. The area appears fenced in. There are residential communities south of Ross Street in the southeast corner of photograph. The Ross Avenue Drainage Ditch is also visible south of 1st Avenue.

West – The area appears as previously described.

North – The Ring Road now crosses the area north of the study area. Other facilities north of the Refinery appear as previously described.

5.14 1971 Aerial Photograph

Study Area (1971)

The Refinery appears generally as previously described. An aerator has been added to the water cooling reservoir.

Adjacent Properties (1971)

East – The Tank Farm appears generally as previously described. The Esso Cardlock at 530 McDonald Street is present southeast of the Tank Farm.

South – The area appears generally as previously described.

West – The area appears generally as previously described.

North – The area north of the Refinery is not shown on this photograph.

5.15 1972 Aerial Photograph

Study Area (1972)

The Refinery appears generally as previously described.

Adjacent properties (1972)

The adjacent properties appear generally as previously described.

5.16 1975 Aerial Photograph

Study Area (1975)

The Refinery appears generally as previously described.

Adjacent Properties (1975)

East – Development of a bermed holding pond is visible in the southwest corner of the Tank Farm property. There are three new tanks on the property. Tire tracks can be seen in the now dry waste sludge pits north of the Tank Farm. A road lies north of the bermed holding pond, and indicating the transformation of the Tank Farm into the Distribution Terminal.

South – The southern area appears generally as previously described.

West – There appears to be additional development on the north end of Winnipeg Street, consisting of new buildings between the school and the northern part of the Refinery.

North – The Ring Road/Winnipeg Street overpass is under construction. As well, the northern tip of the property to the north is under construction.

5.17 1977 and 1978 Aerial Photographs

Study Area (1978)

The Refinery is being dismantled in these photographs. The majority of the refinery facilities have been removed. There are two buildings remaining along the east side of the property and the Refinery office buildings are still present in the southwest corner. The reservoir can be identified in the centre of the Refinery and a few tanks remain scattered around the Refinery. Shadows of the tall stacks in the processing area can be seen.

Adjacent properties (1977 and 1978)

East – The Distribution Terminal buildings, trucking loading, entrance, parking and tankage are fully visible in this photograph. The holding pond is dry. The waste disposal pits north of the Tank Farm are dry. The area east of the Tank Farm shows evidence of a darker patch and possible disposal/excavation.

South – The area appears generally as previously described.

West – There is some development along the commercial area on the southern portion of Winnipeg Street. This may be expansions of existing businesses.

North – There are empty tanks located on the IPPL facility.

5.18 1980 Aerial Photographs

Study Area (1980)

All surface facilities on the northern portion of the main Refinery have been removed; however, the roads are still present and there is a darker area where the former coke dump area was located. There is one new large building on the southern portion of the Refinery and several former Refinery buildings are still present as follows; the marketing building and mechanical shops/garages along the east side of the site, two small shops are further west (the storehouse and the lunch/locker room), the technical building is present on the west side of the site.

Adjacent Properties (1980)

East – The Distribution Terminal appears generally as previously described. Further to the east, Hoffer Drive is visible.

South – The area directly south of the former Refinery is not visible in this photograph and it cannot be determined if it has changed; however, the southeast portion appears generally as previously described.

West – The area appears generally as previously described.

North – The area appears generally as previously described.

5.19 1981 Aerial Photograph

Study Area (1981)

Only the southern portion of the site is visible. The buildings mentioned previously are still visible as well as the Refinery offices in the southwest corner of the study area. Adams Street has been constructed and paved with boulevards. It runs north-south from 1st Avenue into the former Refinery site.

Adjacent Properties (1981)

East - The area appears generally as previously described.

South – The area appears generally as previously described.

West – The area appears generally as previously described.

North – This area is not visible in this aerial photograph.

5.20 1982 Aerial Photograph

Study Area (1982)

This is a close range photograph of the southern portion of the study area. The area appears as previously described. The Refinery buildings located within the study area at this time all appear to be in use.

Adjacent Properties (1982)

East – The majority of this area is not shown on the aerial photograph.

South – There is some development of the properties along the south side of 1st Avenue. There are no new buildings; however, new parking lots are visible. The building on the corner of 1st Avenue and the west side of Adams Street has been removed.

West – This area appears generally as previously described.

North – The area north of the study area is not shown on this map.

5.21 1983 Aerial Photograph

Study Area (1983)

As with the 1981 aerial photograph, the above ground facilities have been removed but the roads, building foundations and former tank foundations are still visible. Buildings on the southern portion of the former Refinery appear to be in use and appear generally as previously described.

Adjacent properties (1983)

East – The Distribution Terminal appears generally as previously described.

South – The area appears generally as previously described.

West – The area appears generally as previously described.

North – The area appears generally as previously described.

5.22 1986 Aerial Photograph

Study Area (1986)

The former Refinery appears generally as previously described.

Adjacent Properties (1986)

East – The Distribution Terminal appears generally as previously described.

South – There is one new building in the southeast corner of the Distribution Terminal along McDonald Street. There are three new buildings at the corner of 1st Avenue and Adams Street.

West – The area appears generally as previously described.

North – There is a new building, owned by SIAST, north of the former Refinery between Winnipeg Street and the Ring Road.

5.23 1987 Aerial Photograph

Study Area (1987)

The remaining building foundations in the northern portion of the former Refinery have been buried or removed. The Regina Transit Operations Facility now occupies the central portion of study area. The southern portion of the former Refinery appears generally as described previously.

Adjacent Properties (1987)

East – The Distribution Terminal appears generally as previously described. Further to the east there are additional buildings on Hoffer Drive.

South – A new building is present just south of the former Refinery property line in the area of the former Refinery residences. All other facilities in the area appear generally as previously described.

West – The area appears generally as previously described.

North – There is now a parking lot around the SIAST building north of the former Refinery and the SIAST building appears to be in use.

5.24 1989 Aerial Photograph

Study Area (1989)

The Regina Transit Operations Centre now has a parking area and a road around it; however, it does not appear to be in use. The northern and southern portions of the former Refinery appear to be similar to previous descriptions.

Adjacent Properties (1989)

East – The Distribution Terminal appears generally as previously described. There are additional developments present along Hoffer Drive further to the east.

South – A new building is present on the east side of Adams Street near the former Refinery entrance. Otherwise, the area appears generally as previously described.

West – The area appears generally as previously described.

North – The area appears generally as previously described.

5.25 1993 Aerial Photograph

Study Area (1993)

The area appears generally as previously described, however, the Regina Transit Operations Centre is now in use.

Adjacent Properties (1993)

East - Four tanks have been removed from the Distribution Terminal property in the west and centre rows of the Tank Farm. There is additional development in the vacant land to the east of the Ring Road.

South – The area appears generally as previously described.

West – The area appears generally as previously described.

North – The area appears generally as previously described.

5.26 1997 Aerial Photograph

Study Area (1997)

Only the southern portion of former Refinery land is visible in this photo and it appears generally as previously described. It appears that the former Refinery office in the southwest corner of the study area has been removed.

Adjacent Properties (1997)

East – The southern portion of the Distribution Terminal appears generally as previously described. The northern portion of the Distribution Terminal is not visible in this photograph. A new building is now located on the southwest corner of 1st Avenue and McDonald Street.

South – The area appears generally as previously described.

West – The southern portion of the commercial strip that is visible in this photograph appears generally as previously described.

North – The area north of the former Refinery is not visible in this photograph.

5.27 2005 and 2006 Aerial Photographs

Study Area (2005 and 2006)

The area to the north of the Transit Operations Facility appears to be used as a dumping facility with some mounding in the eastern and central areas. From the site visit in 2008, this area was discovered to be used by the City of Regina for burning and mulching Christmas trees. The remaining areas of the former Refinery appear generally as previously described.

Adjacent properties (2005 and 2006)

East – Two more tanks have been removed from the Distribution Terminal property. Otherwise, it appears generally as previously described.

South – There are more building developments along the east side of Adams Street.

West – The businesses along the west side of Winnipeg Street are very clear in the 2006 aerial photograph. There are some new buildings present along the centre portion of Winnipeg Street and some buildings along the northern end of the Winnipeg Street have been removed.

North – The area appears generally as previously described.

6.0 HISTORICAL ENVIRONMENTAL REPORTS AND OTHER RECORDS

Government and non-government agencies and individuals contacted during the Phase I ESA to obtain historical records were as follows:

Saskatchewan Ministry of the Environment;

- Environmental Records and Reports available through the Freedom of Information and Protection of Privacy Department - Mr. Ralph Bock.

City of Regina; and

- Environmental Engineering Department - Ms. Susan Harty;
- Bylaw Enforcement, Building Division - Mr. Earl Rohrick;
- Public Works - Randy Burant, Water Project Coordinator;
- Zoning Maps and Land Use Bylaws (on-line);
- Address and Street Maps (on-line); and
- Infrastructure and Contour maps.

Imperial Oil Limited;

- Mr. A. P. Bakker.

6.1 Saskatchewan Ministry of the Environment

Environmental Records and Reports were made available through the Freedom of Information and Protection of Privacy Department. The documents are included in the list of documents in Appendix F.

6.2 The City of Regina

Environmental Records and Reports were made available by the Environmental Engineering Department of the City of Regina. These documents are included in the list of documents in Appendix F.

The City of Regina Bylaw Enforcement, Building Division reported no outstanding building permits or orders of compliance against the properties located at 333, 445 or 445B Winnipeg Street.

The City of Regina Public Works Department provided information regarding the City's use of water wells as a public potable water source, included in section 2.1.2 of this report. This correspondence is included in the supporting documents in Appendix G.

6.3 Imperial Oil Limited

Environmental Records and Reports that were provided by Imperial Oil are included in the list of documents in Appendix F.

6.4 Historical Refinery Development Summary

6.4.1 Imperial Oil Refinery (1916 to 1979)

The Former Imperial Oil Regina Refinery was constructed during a period of three and one half months from April to July of 1916. The construction of the Refinery was apparently completed in July 1916, but it did not start refining crude oil until September 1916.

One of the first tasks of construction was to build housing for the refinery construction. This housing, located south of the Refinery site, was completed in early 1916. It was cited that approximately 1 000 workers were employed during the construction. When the Refinery started operation in 1916 it employed approximately 400 people.

The initial capacity of the refinery was approximately 1 500 barrels per day (bpd) and the initial crude oil supply arrived via railcar from Wyoming and Montana. A barrel of oil is equivalent to approximately 35 Imperial gallons or 159 litres. Although limited specific information was found, it has been inferred that the original refinery process design included batch tower stills (shell stills with partial condensers or towers), pressure stills to crack gas oil, acid treating, caustic treating and clay treating.

Modifications were made over the ensuing years. In 1919, the capacity was increased to about 2 500 bpd. In 1927, tube and tank cracking units were added to further increase the capacity to 5 000 bpd and to enable production of bunker fuel. An asphalt plant was added in 1928. In 1936, crude oil from Turner Valley, Alberta, via pipeline became the primary source of crude, and a bauxite plant was added to remove the sulphur compounds found in this crude oil in 1939. By about 1943, a high-pressure catalytic polymerization unit and reformer were added increasing the refining capacity to 9 500 bpd. In 1950, the Interprovincial Pipeline (IPPL) was constructed, and with it the flow of crude oil from several new Alberta oil fields discovered at Leduc, Woodbend and Redwater after World War II arrived via pipeline at the Regina Refinery on October 23, 1950, replacing the depleted Turner Valley source. Minor modifications at this time, including conversion of the no longer needed bauxite plant into a crude oil distillation unit, increased the refinery capacity to 20 000 bpd.

Modernization of the facility was completed in 1954. The crude oil refining capacity was increased to 22 500 bpd. The new and modernized existing processing equipment included a 22 500 bpd capacity atmospheric distillation unit, a 9 000 bpd capacity distillation unit, a 7 500 bpd capacity fluid catalytic cracking unit, a 3 100 bpd capacity thermal cracking unit (thermal reformer, powerformer), a gas recovery plant, and a catalytic polymerization unit. Two new product treating plants used to chemically remove impurities, such as hydrogen sulphide, mercaptans, phenols and naphthenic acids, from the refined petroleum products were added during the new construction program. The total tank storage capacity for the refinery was increased to 1 750 000 barrels to handle the agriculturally driven seasonal fluctuations in demand for petroleum products. In 1954, the Refinery occupied a total area of 214 acres. Approximately 315 employees were employed at this time.

Three underground product pipelines were operated at the refinery, including the 0.5 m diameter IPPL pipeline, currently owned by Enbridge Pipelines Ltd. (Enbridge), as discussed above; a 0.4 m diameter pipeline used to transport crude oil; and the 0.25 m diameter Sarnia Special Stream pipeline used to transport partially refined or off spec crude oils to Sarnia Ontario for additional processing and treating.

The products refined at the Regina Refinery included aviation and high grade gasolines, fuel oils (including multiple grades of diesel fuel, aviation fuels and kerosene for summer and winter uses), asphalts, and bunker fuels.

In approximately 1975 the decision was made by Imperial Oil to consolidate all of the prairie refineries into one large refinery in Edmonton, Alberta. This resulted in the closure of the Regina Refinery in the fall/winter of 1975. Decommissioning was completed by 1979.

6.4.2 Post Refinery Developments (1979 to 2007)

Based on our review of historical aerial photographs and other historical records, the major changes to surface features observed on the former Regina Refinery site since decommissioning of the refinery facilities in 1979 are listed below and shown on Drawing No. 6:

1. Construction and expansion of the Ring Road over the time period from 1967 to 1976 across the northern portion of the land formerly owned by Imperial Oil.
2. Conversion of the former Imperial Oil Tank Farm east of the CP Rail right-of-way to a Distribution Terminal in 1974.
3. Remedial excavation of the former coke disposal pits from 1974 to 1979.
4. Remedial excavation of the former sludge disposal pits from 1974 to 1979.
5. Construction of the Agrifoods Dairy Producers building between 1980 and 1981. This area was formerly occupied mainly by petroleum storage tanks. The building was apparently donated or sold by Agrifoods in 2004 to the Regina District Food Bank, which currently occupies the building.
6. Widening of Winnipeg Street to the west in 1983.
7. Development of the Staples Call Centre in 1984 on land formerly owned by Imperial Oil north of the refinery site and bounded by CP Rail on the east, CN Rail on the south, Winnipeg Street on the west and the Ring Road on the north side.
8. Construction of the Regina Transit Operations Facility (Bus Barns) in 1987 in the centre of the former Refinery near the location of the former cooling water storage area and just north of the former main processing area.
9. Use of the northern portion of the former Refinery site as a city facility for mulching and composting of Christmas trees and other organic waste materials from approximately 1988 to the present time.
10. Remedial excavation of soil in the vicinity of the first TEL plant located in the northeast corner of the study area in 1990.
11. Acquisition of 623 Adams Street, at the southeast corner of former Refinery site, by MacKenzie Plumbing and Heating in 1999.
12. Acquisition of 607 Adams Street, at the southeast corner of former Refinery site, by Japanese Auto Supply in 2000.
13. Acquisition of 609 Winnipeg Street, at the southwest corner of former Refinery site, by Auto Gallery in 2001.
14. The existing network of underground utilities servicing the former refinery site and surrounding properties is shown on Drawing No. 7. These utility locations were provided by the City of Regina.

6.5 Review of Historical Environmental Information

The historical documents including environmental reports, drawings and various technical communications that were reviewed as part of this study are listed in Appendix F. These documents contain historical information related to the decommissioning and environmental assessment of the subject property, as well as some adjacent properties. Very limited information was available regarding the initial development and facility upgrades at the refinery. The historical environmental information that is relevant to the future environmental risk management of the subject property and some adjacent properties is summarized in the following subsections.

6.5.1 Study Area

During the historical document review one engineering site plan from 1967 was found, a copy is included in Appendix E. It is assumed that this drawing generally represents the facility as it basically was from the modernization in 1954 through to decommissioning in the late 1970's. The facilities shown on the 1967 drawing are overlain on the 1962 air photo and the 2006 air photo and are included as Drawings No. 8a and 8b, respectively. No bluelines, as-builts or other engineering drawings showing the original refinery facilities or other upgrades were found. Information about the historical refinery operations has been used to help identify the possible contaminants of concern in each former operating area. Based on our review of the 1967 drawing and the air photos, the approximate locations of the most likely historical operating facilities are shown on Drawing No. 9. A list of the most likely historical refinery facilities is presented in Table 1 along with potential contaminants associated with each area. An incomplete list of tank usage based on the available information is summarized on Drawing No. 10.

Very few documents dated prior to 1974 (the start of the refinery decommissioning) were found during the historical review. More recent documents referenced the following events that may have occurred on the Refinery property during operations as summarized below.

Tetraethyl Lead (TEL) Plants

- A (TEL) spill apparently occurred in the late 1950's at the "old" TEL plant located near the north east corner of the former refinery property adjacent to the CP Railway;
- The TEL impacted material from this spill was apparently excavated and landfarmed in an area near the northeast corner of the Tank Farm located east of the CP Rail lines;

- A “new” TEL plant was constructed in the 1960s in the south east part of the former refinery property between to the CP Railway spur lines and the treating area; and
- A TEL spill apparently occurred in the late 1960's at the “new” TEL plant.

Crude Spills

- A spill of crude oil from the Sarnia Special Stream at the IPPL pipeline located north of the former Tank 115 at the north end of the Tank Farm property apparently occurred in 1970; and
- A minor excavation was completed in the area of this spill in 1988 during a piping repair.

Storm Water Practices and the API Separator

- Surface water on the Refinery was directed south and into the API separator. Only the process area from 1954 onwards was reported to have been paved;
- The process area was drained to the API separator;
- Water accumulating in the tank berms was directed southward and eventually to the API separator;
- The tank berm around the Tank 2 location was used as extra water storage when needed;
- It was noted that an effort was made by the refinery operating personnel to never dispose of high phenolic content water into the API separator; and
- Although no records are available, we assume that the treated water from the API separator was likely discharged into the City of Regina sanitary sewer.

Deep Disposal Well

- The Refinery installed and operated a deep disposal well for the disposal of high phenolic content water, sour water and spent caustic water;
- The well was installed in 1963 under Provincial Government approval to a depth of approximately 1200 m into the Lodgepole Formation; and
- This well was decommissioned during the Refinery shutdown in the late 1970s.

Waste Disposal Practices

- Normal operations (water draw-offs, product sampling, tank cleaning) along with minor accidental releases resulted in product accumulating in the tank berms. This product was allowed to accumulate and then recovered by vacuum trucks;

- Disposal pits were operated on the Tank Farm until the early 1960's. These pits contained tank bottom sludges, cat frac bottoms and bunker bottoms, boiler house lime sludge, spent caustic, API separator bottoms and sludges from vessels; and
- After the closure of the disposal pits, material was taken to the Pilot Butte disposal area, an Imperial Oil owned property located approximately 12 km east of the Refinery or to the City of Regina landfill. Material disposed of at Pilot Butte included: tank bottom sludges, boiler house lime sludges and spent polymer plant catalyst.

6.5.2 Former Refinery Decommissioning Activities

Historical information indicates that the refinery decommissioning occurred from 1975 to 1979. At the time of decommissioning, the following materials were recorded as having been transported offsite for landfill disposal:

- Excavated oily soils;
- Separator cleanings;
- Mullite balls;
- Silica gel;
- Hydrofiner catalyst;
- Polymerization catalyst;
- Platinum catalyst;
- Copper chloride;
- Coke piles;
- Weathered materials from tank cleaning;
- TEL and fittings; and
- Lab reagents.

Materials that were retained or disposed onsite included:

- Atmospheric and Vacuum Unit was flushed and purged to the API separator;
- Fluidized Cat cracker was flushed and purged to the API separator with the exception of the high phenol content wash water which was disposed of in the deep disposal well;
- Sour water was injected into the to deep disposal well; and
- Salt demisters were washed to the sanitary sewer.

Materials that were disposed of on the Imperial Oil terminal property included:

- Sand from naphtha landspread on the Distribution Terminal property;
- Sand from middle distillates landfarmed on Distribution Terminal property;
- Tank scale and sand blast landfarmed on Distribution Terminal property; and
- Buried lead tank cleaning was to be excavated and landfarmed on Distribution Terminal property.

Decommissioning information indicates that foundations were to be removed to 0.25 m (10 inches) above grade, piping cut at grade, underground tanks removed, water wells decommissioned, and the deep disposal well filled with concrete. Observations during the construction of new facilities and the activities completed thereafter on the former refinery property indicate the following:

- Some underground tank(s) were left in place, historical documents indicated that one was encountered during the construction of the City of Regina Transit Operations Facility;
- Some soils encountered during the construction of the Transit Operations Facility appeared to have hydrocarbon staining and were excavated and landfarmed on the city compost facility;
- The former Refinery piping was apparently cut level with ground surface and filled with diesel (to prevent corrosion) when abandoned, but these lines were later removed in 1991;
- Municipal underground utilities were left in place; and
- Five of the seven water wells used to supply process water for the refinery were decommissioned in 1991, one of the wells could not be located, and one is apparently located under the Transit Operations Facility building. The five wells, which had all been completed in the underlying Regina Aquifer at depths ranging from approximately 21 m to 27 m below grade, were decommissioned by removing the well casings and/or grouting the well openings.

6.5.3 *Post Refinery Development Activities*

The following are some observations noted in the historical documents regarding the post refinery development features:

- Soils excavated during construction of the Transit Operations Facility in 1980 to 1981 were landfarmed in the compost area; and
- Construction of a new sewer line in the northeast corner of the current Food Bank property was completed in 1988.

6.6 Environmental Assessments

Some of the historical documents listed in Appendix F present the findings of environmental assessments that have been conducted by several engineering consulting firms (AMEC, Beckie Hydrologist Ltd., Clifton Associates, Gartner Lee Ltd., Ground Engineering Ltd., and O'Connor Associates Environmental Inc.). An assessment of the water quality in the Regina area aquifers (based on published data collected by others) was conducted by Golder Associates on behalf of SMOE and documented in a report dated June 1987.

The soil and groundwater sampling locations from the above referenced studies on the former Refinery and immediately adjacent sites are shown on Drawing No. 11. All of the available geo-environmental data have been compiled and reviewed. Copies of all available borehole logs are included in Appendix H. For preliminary summary purposes, the relevant chemical data for soils and groundwater have been compared with the 2008 SMOE Risk-Based Corrective Actions for Petroleum Hydrocarbon Impacted Sites (SMOE 2008), or the Canadian Environmental Quality Guidelines (Canadian Council of the Ministers of the Environment (CCME), 2002 and 2008), for commercial land use and fine grained soils. The most stringent of the protection of potable groundwater, aesthetic considerations, human soil ingestion and ecological soil contact pathways have also been considered.

Locations where dissolved petroleum hydrocarbon compounds and phenols have been detected in the groundwater at concentrations exceeding the referenced guidelines are shown on Drawings No. 12a through 13b for both the Condie and Regina Aquifers, respectively. Locations where metals have been detected in the groundwater at concentrations above the referenced guidelines are presented on Drawings No.14a and 14b for the Condie and Regina Aquifers respectively.

The locations where trace metals including lead have been detected in soil samples at concentrations above the referenced criteria are shown on Drawing No.15.

The locations where petroleum hydrocarbons have been detected in soil samples at concentrations above the above referenced guidelines are shown on Drawing No. 16.

The results of leachable metal analysis are summarized in a table included as Appendix I.

Phase separated liquid hydrocarbons (LNAPL) have not been observed in any of the monitoring wells at the site.

The environmental assessment and monitoring reports referenced herein indicate that the principal direction of groundwater flow in the Condie Aquifer is southwest. The direction of groundwater movement in the deeper Regina Aquifer has not been determined at the site.

7.0 CURRENT SITE CONDITIONS

The current conditions observed during our recent site reconnaissance visit on May 13, 2008 are described below. Current photographs taken at the site in May 2008 are included in Appendix C.

7.1 Buildings and Facilities

The Regina Refinery site currently has two owners that occupy the majority of the site. The City of Regina owns the central and northern portions of the site. There are no buildings or facilities present in the northern section; however, there are some old foundations that appear to have been left in place following decommissioning of the Refinery. The central portion of the site is also owned by the City of Regina and is now occupied by the Regina Transit Operation Facility. Again, there are a number of what appear to be former Refinery facility foundations remaining on the property.

The southern portion of the site appears to have five of the former Refinery buildings and some newer buildings. There is what appears to be a former Refinery warehouse located in the southeast corner of the site. There is a former pump station in the centre of the paved area and two buildings in the centre of the property. It also appears there is a former office building located along Winnipeg Street that is now in use at the site. As for more recent developments, the large Agrifoods and Food Bank building is the largest feature in the southern portion of the site. A daycare and adult learning centre are located in the buildings to the west. The site is also occupied by Neighbourhood Computers that appears to fix up old automobiles and recycle electronic equipment. A semi truck training school appears to occupy some of the paved portions at the south end of the site.

7.2 Underground Pipelines, Oil and Gas Wells, Releases and Complaints

There are no records of active pipelines, oil and gas wells or recent complaints on the subject properties. Historical records suggest that there may be inactive abandoned pipelines (including the former Turner Valley pipeline) and sewer lines from the former refinery that are now buried.

7.3 Processes and Operations

As mentioned above, there appear to be a number of commercial businesses occupying the site. These include:

- The City of Regina Transit Operations Facility;
- The Food Bank;
- ICD;
- First Years Child Care Inc.;
- Community First Computers; and
- Several community outreach programs.

There do not appear to be any industrial operations on the site.

7.4 Underground and Aboveground Storage Tanks (USTs and ASTs)

There is one registered tank on the City of Regina Transit Operations Facility and seven tanks registered to Agrifoods (now the Food Bank). Four of these USTs were approved for decommissioning in August 2002. There appears to be one tank remaining below the former pump station located in the southern portion of the site. Several tank hatches were also observed around the site that may access underground tanks or other facilities.

7.5 Stains and Stressed Vegetation

There was no visible evidence of stained soils or stressed vegetation on the ground surface of the subject properties during the site reconnaissance on May 13, 2008.

7.6 Designated Substances

Asbestos

Due to the age of the former site facilities, asbestos may be present in the remaining buildings and any remaining buried pipes due to the construction materials used during the Refinery operations (1916 - 1976). The only risk of contacting asbestos containing materials will occur if the asbestos in the buildings is in poor condition or if buried structures or materials are exposed.

Lead

Lead may be present in soils on the site and possibly on painted surfaces of the remaining Refinery buildings.

PCBs

The remaining Refinery buildings may have PCBs; as well PCBs may potentially be found below grade given the age of the refinery facilities that may have been covered with soil following site decommissioning.

Ozone Depleting Substances (ODSs), Urea Formaldehyde Foam Insulations (UFFIs)

ODSs and UFFIs may be present in both the historic and current onsite buildings.

7.7 Substance Containers

Other than the storage tanks described in sections 3.3 and 3.4, there are no substance containers or drums visible on the subject properties.

7.8 Chemicals and Hazardous Substances

Chemicals and hazardous substances may be stored in some of the industrial, commercial or community service buildings currently in use on the subject properties; however, we have not been granted access to inspect the interiors of any of these buildings.

7.9 Waste Management Practices

It is our understanding that all garbage collected at the site is disposed by either the City of Regina or a private company.

8.0 SUMMARY AND CONCLUSIONS

The following summary of findings is based on our review of the referenced historical information and land use records outlined in this report:

1. The former Imperial Oil Refinery processing and treating operations occurred on the property which is the subject of this historical review, as indicated on Drawing No. 2. Much of the petroleum storage tank capacity was located on the adjoining property east of the CP Rail right-of-way which is still owned and used as a distribution terminal by Imperial Oil. Refinery waste materials including separator and tank bottom sludges were apparently deposited and landfarmed on the property that comprises the existing Distribution Terminal or were hauled offsite to an Imperial Oil owned property at Pilot Butte for disposal.
2. The Imperial Oil refinery was initially constructed in 1916 to process crude oil at a rate of approximately 1 500 barrels per day. The refinery facilities were upgraded and expanded several times between 1919 and 1943 when the refining capacity reached 9 500 barrels per day. A major modernization and expansion between 1950 and 1954 increased the refining capacity to 22 500 barrels per day and a total onsite tank storage capacity of approximately 1.75 million barrels. The refinery and tank farm areas in 1954 occupied a total area of approximately 214 acres (87 hectares) whereas the refinery property that is the subject of this study only comprises an area of approximately 62 acres (25 hectares). Only minor modifications appear to have been made to the refinery infrastructure between 1954 and 1975.
3. The API oil/water separator was used to treat surface runoff water from the process area and the bermed tank compounds before being discharged, presumably, to the sanitary sewer. After 1963, sour water from the processing and treating operations and other hydrocarbon contaminated water was disposed in a deep disposal well installed to a depth of approximately 1 200 m with Provincial Government approval. The deep disposal well was decommissioned and sealed as part of the refinery decommissioning operations in the late 1970s.
4. The historical records and aerial photographs indicate that the aboveground equipment, tankage and some of the buildings on the refinery portion of the property were removed during the decommissioning between 1975 and 1979. Below grade piping, sewers and foundations appear to have been left in place. Most of the waste materials, such as excavated oily soils, sludges and sediments cleaned from tanks, separators and processing units during the decommissioning or spent catalysts, coke and other waste materials apparently were either moved to the adjacent petroleum terminal property for landfarming or were hauled offsite for landfill disposal.

5. The seven water supply wells installed by Imperial Oil into the Regina Aquifer to provide processing water for the refinery operations were left in place at the time of the Refinery decommissioning (1975 to 1979). Five of these wells which had not been destroyed or covered by new buildings were later removed and sealed by Imperial Oil in 1991.
6. Based on our review of the historical land use records, the former Refinery site, and all of the properties adjacent to the former Refinery are zoned and used for either commercial or industrial purposes.
7. Since the decommissioning of the former Imperial Oil Refinery in 1979 and the subsequent transfer of the land ownership to the City of Regina and others, the following site development activities have occurred:
 - a) Construction and expansion of the Ring Road over the time period from 1967 to 1976 across the northern portion of the land formerly owned by Imperial Oil.
 - b) Conversion of the former Imperial Oil Tank Farm east of the CP Rail right-of-way to a Distribution Terminal in 1974.
 - c) Remedial excavation of the former Coke disposal pits from 1974 to 1979.
 - d) Remedial excavation of the former sludge disposal pits from 1974 to 1979.
 - e) Construction of the Agrifoods Dairy Producers building between 1980 and 1981. This area was formerly occupied mainly by petroleum storage tanks. The building was apparently donated or sold by Agrifoods in 2004 to the Regina District Food Bank, which currently occupies the building.
 - f) Widening of Winnipeg Street in 1983.
 - g) Development of the Staples Call Centre in 1984 on land formerly owned by Imperial Oil north of the refinery site and bounded by CP Rail on the east, CN Rail on the south, Winnipeg Street on the west and the Ring Road on the north side.
 - h) Construction of the Regina Transit Operations Facility (Bus Barns) in 1987 in the centre of the former refinery near the location of the former cooling water storage area and just north of the former main processing area.
 - i) Use of the northern portion of the former Refinery site as a City facility for mulching and composting of Christmas trees and other organic waste materials from approximately 1988 to the present time.
 - j) Remedial excavation of soil in the vicinity of the first TEL plant located in the northeast corner of the study area in 1990.
 - k) Acquisition of 623 Adams Street, at the southeast corner of former Refinery site, by MacKenzie Plumbing and Heating in 1999.

- l) Acquisition of 607 Adams Street, at the southeast corner of former Refinery site, by Japanese Auto Supply in 2000.
 - m) Acquisition of 609 Winnipeg Street, at the southwest corner of former Refinery site, by Auto Gallery in 2001.
8. Some environmental assessments have been carried out on the former refinery property and adjoining properties since the site decommissioning was completed in 1979. The data summarized in Drawings No. 11 to 16, inclusive, indicates that the shallow, fine grained soils and groundwater in the shallow Condie Aquifer in some areas on, or adjacent to, the site, exhibit some evidence of impact by metals and limited impacts from petroleum hydrocarbons. Although much of the available soil and groundwater data was collected in the late 1980s and 1990s, our comparison of these results with the current guidelines indicates that the extent of residual groundwater impacts at the site is limited. Furthermore, there is currently no direct evidence to suggest that the occupants of the commercial and industrial properties are being adversely affected by the reported exceedances in the subgrade soils and groundwater. The limited groundwater sampling data available from the deeper Regina Aquifer indicates that petroleum hydrocarbons and phenols, which are of possible concern from the former refinery operations, appear to have not adversely affected the groundwater quality. However, metals concentrations have been historically detected above the referenced guidelines in three wells in the Regina aquifer. LNAPL has never been recorded in any of the monitoring wells completed in the Condie and Regina Aquifers at the site.

9.0 LIMITATIONS

9.1 Limitations and Exceptions of the Assessment

This Phase I ESA has been prepared for Imperial Oil Limited in general accordance with the agreed scope of work and CSA Z768-01. Constraints imposed by practicality and scheduling, however, limited the information available to us at the time of reporting. In addition, the findings and conclusions of the ESA are based solely on the extent of observations and information gathered during the ESA. Specific exceptions to the CSA guidelines were as follows:

- Contact was not made with surrounding land owners or businesses; information on surrounding land use presented herein was based on our visual observations during the site reconnaissance and available historic information sources;
- Tax assessment rolls and company records (except as noted herein) were not reviewed;

- Historic information sources (street directories, fire insurance maps) were reviewed but copies are not reproduced in the report; and
- Recommendations are not included in the report.

O'Connor Associates Environmental Inc. has assumed that referenced information provided to us by other sources is factual.

9.2 Limitation of Liability, Scope of Report and Third Party Reliance

This report has been prepared and the work referred to in this report has been undertaken by O'Connor Associates Environmental Inc. (O'Connor Associates) for Imperial Oil Limited. It is intended for the sole and exclusive use of Imperial Oil Limited and its respective insurers, agents, employees and advisors. Any use, reliance on or decision made by any person other than Imperial Oil Limited based on this report is the sole responsibility of such other person. Imperial Oil Limited and O'Connor Associates make no representation or warranty to any other person with regard to this report and the work referred to in this report and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The services performed in the preparation of this report were conducted in a manner consistent with the level of skill and care ordinarily exercised by professional engineers and scientists practicing under similar conditions.

If site conditions or applicable standards change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

Nothing in this report is intended to constitute or provide a legal opinion.

10.0 CLOSURE

This report has been prepared in accordance with generally accepted environmental geoscience and engineering practices for the exclusive use of Imperial Oil Limited. Information presented herein was obtained while conducting an authorized non-intrusive Limited Phase I Environmental Site Assessment and Historical Review of the Former Imperial Oil Refinery located in northeast Regina, Saskatchewan. The findings of the Phase I site assessment and historical review are based on a review of the available geological, historical and regulatory information described herein.

Should any questions arise, please contact the undersigned.

Yours very truly,

O'CONNOR ASSOCIATES ENVIRONMENTAL INC.

S.L. Wheatley, B.Sc.

R.A. Nicholson, B.A.

S.E. Kenway, P.Eng.



J.G. Agar, P.Eng.



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Distribution: Addressee (5 paper, 5 electronic)

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**HISTORICAL REFINERY FACILITIES
AND POSSIBLE CONTAMINANTS**

HISTORICAL FACILITY	POSSIBLE CONTAMINANTS
1. Railway Tank Car Unloading / Loading a) Crude oil b) Aviation gasoline and ethyl fluids c) Gasoline and distillates	petroleum hydrocarbons, tetraethyl lead
2. Marketing Area a) Leaded motor gasoline and unleaded distillates	hydrocarbons, lead
3. Asphalt Plant	hydrocarbons, PAHs and metals from tank cleaning
4. Tank Farms / Tank Compounds a) Crude oil b) Condensate c) Fuel oils (kerosene) d) Diesel, naphtha e) Gasoline (leaded and unleaded) f) Aviation fuels	hydrocarbons, tank bottom sludges containing metals (Cu, Cd, Fe, Mn, Ni, Pb, V, Zn)
5. Pipelines a) IPPL, SSS b) Refinery pipelines connecting tanks to processing, treating and loading/unloading areas	hydrocarbons (including both unrefined crude oil, condensate and refined products)
6. Laboratories a) Main refinery laboratory b) Asphalt laboratory	small quantities of solvents, acids and liquid, mercury from broken instruments (possibly in sewer drains connected to the laboratories)
7. Mechanical Shops and Automotive Service Garages	lubricating oils (new and used), small quantities of solvents and ethylene glycol
8. Processing Area a) Atmospheric and Vacuum Unit b) Continuous Tube and Tank Cracking Unit c) Crude Distillation and Cracking Unit d) Crude Oil Stills, Shell Stills and Coking Stills e) Fluidized Catalytic Cracking and Light Ends Unit f) Polymerization Unit g) Powerformer h) Power Plant and Boiler House	refined and unrefined hydrocarbons, spent catalysts such as molybdenum and cobalt, PAHs, phenols, sulphur, metals (As, B, Ba, Co, Cu, Cd, Cr, Mn, Mb, Ni, Se, V, Zn), scale (containing metals) from tanks and processing equipment, H ₂ SO ₄ , sulphate, sulfide, low soil pH, calcium, fluoride, aluminum (silicate)

TABLE 1 (Page 2 of 2)

**HISTORICAL REFINERY FACILITIES
AND POSSIBLE CONTAMINANTS**

HISTORICAL FACILITY	POSSIBLE CONTAMINANTS
9. Treating Area a) Agitators b) Bauxite Plant c) Catalytic Sweetener Unit d) Clay Treating Plant e) Continuous Lye Wash Plant (with Doctor Treating Unit) f) Continuous Naptha Treating Plant g) Copper Chloride Treating Unit h) Ethyl Plant i) Merox Treating Plant j) Suphuric Acid Treating Plant	aluminum (silicate), caustic (NaOH), hydrocarbons, spent catalysts, lead (litharge), sulphide, PAHs, copper chloride, lead, TEL, cobalt, molybdenum, sulphate, sulfide, sulphuric acid, low soil pH, phenols
10. Flares and Caustic Burners	hydrocarbons, PAHs, sodium, potassium, sulphate / sulphide, elevated soil pH, phenols, metals (Ba, Cu)
11. Fire Training Area	hydrocarbons (gasoline, naphtha), PAHs, lead, elevated soil pH
12. Main Oil-Water Separator	hydrocarbons, metals (As, Ba, Cd, Cu, Cr, Hg, Mo, Ni, Pb, V, Zn), sulphur, phenols
13. Pits Sludge Disposal	hydrocarbons (gasoline, naphtha), PAHs, lead, elevated soil pH
14. Coke Disposal Pits	PAHs